Using
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## Using

Excel \& Access
FOR ACCOUNTING 2013

## Glenn Owen

Allan Hancock College

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## Using Excel ${ }^{\circledR}$ \& Access ${ }^{\circledR} 2013$ for Accounting Glenn Owen

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## Brief Contents

Preface ..... vii
Part 1 Excel for Accounting ..... 1
Chapter 1 Excel Tour ..... 3
Chapter 2 Excel Basics ..... 24
Chapter 3 Financial Statement Analysis ..... 60
Chapter 4 Depreciation ..... 85
Chapter 5 Loan and Bond Amortization ..... 107
Chapter 6 Cash Budgeting ..... 131
Chapter 7 Other Topics: Present/Future Values, Predicting Costs, and Allowance for Uncollectible Accounts ..... 160
Part 2 Access for Accounting ..... 185
Chapter 8 Access Tour ..... 187
Chapter 9 Access Basics ..... 199
Chapter 10 Tables ..... 232
Chapter 11 Queries ..... 264
Chapter 12 Forms ..... 308
Chapter 13 Reports ..... 343
Index ..... 370

## Contents

Prefacevii
1
Part 1 Excel for Accounting
3
Chapter 1 Excel Tour
3
Case: What SUP, Inc.
4
Understanding Excel's Capabilities
Starting, Navigating, and Working with Excel Files ..... 4
Getting Excel Help ..... 15
Examples of How Excel Is Used in Accounting ..... 16
End Note ..... 22
Chapter 1 Practice ..... 23
Questions ..... 23
Chapter 2 Excel Basics ..... 24
Case: What SUP, Inc. ..... 24
Entering Information ..... 24
Entering Data ..... 24
Changing Column Width and Row Height ..... 26
Editing Data ..... 27
Controlling the Appearance of Data ..... 28
Entering Formulas and Using Functions ..... 30
More Extensive Use of Formulas ..... 32
Entering and Editing Formulas ..... 32
Manipulating Data and Structuring Worksheets ..... 34
Using AutoFill ..... 34
Using Relative and Absolute References ..... 36
Inserting and Deleting Columns and Rows ..... 38
Working with Multiple Worksheets ..... 40
Using Headers and Footers ..... 44
Printing ..... 45
Using Print Preview and Page Setup ..... 46
Printing a Worksheet ..... 48
Printing and Viewing Formulas ..... 49
End Note ..... 50
Chapter 2 Practice ..... 51
Questions ..... 51
Assignments ..... 51
Case Problem 1: Kelly's Boutique ..... 53
Case Problem 2: Wine Depot ..... 54
Case Problem 3: Snick's Board Shop ..... 56
Case Problem 4: Rosey's Roses ..... 58
Chapter 3 Financial Statement Analysis ..... 60
Case: What SUP, Inc. ..... 60
Vertical Analysis ..... 60
Pie Charts ..... 64
Horizontal Analysis ..... 67
Column Charts ..... 70
Ratio Analysis ..... 74
End Note ..... 80
Chapter 3 Practice ..... 81
Questions ..... 81
Assignments ..... 81
Case Problem 1: Kelly's Boutique ..... 82
Case Problem 2: Wine Depot ..... 83
Case Problem 3: Snick's Board Shop ..... 83
Case Problem 4: Rosey's Roses ..... 84
Chapter 4 Depreciation ..... 85
Case: What SUP, Inc. ..... 85
Depreciation Calculations ..... 85
Conducting a What-If Analysis with the Depreciation Function ..... 88
Creating a Depreciation Summary ..... 89
Calculating Depreciation Using Other Methods ..... 90
Charting Depreciation Expense ..... 96
End Note ..... 100
Chapter 4 Practice ..... 101
Questions ..... 101
Assignments ..... 101
Case Problem 1: Kelly's Boutique ..... 103
Case Problem 2: Wine Depot ..... 104
Case Problem 3: Snick's Board Shop ..... 105
Case Problem 4: Rosey's Roses ..... 105
Chapter 5 Loan and Bond Amortization ..... 107
Case: What SUP, Inc. ..... 107
Loan Calculations ..... 107
Loan Amortization Schedule ..... 108
What-If Analysis and the Payment Function ..... 110
Names in a Worksheet ..... 111
Present Value and Bonds ..... 113
Bond Amortization Schedule ..... 115
What-If Analysis and Goal Seeking ..... 117
Scenario Manager ..... 119
Monthly Periods ..... 122
End Note ..... 124
Chapter 5 Practice ..... 125
Questions ..... 125
Assignments ..... 125
Case Problem 1: Kelly's Boutique ..... 126
Case Problem 2: Wine Depot ..... 127
Case Problem 3: Snick's Board Shop ..... 128
Case Problem 4: Rosey's Roses ..... 129
Chapter 6 Cash Budgeting ..... 131
Case: What SUP, Inc. ..... 131
Operating Activities Budget ..... 131
Sales Budget ..... 132
Operating Cash Receipts Budget ..... 134
Purchases Budget ..... 136
Operating Cash Payments for Purchases ..... 138
Sales and Administrative Expenses Budget ..... 140
Operating Cash Payments Budget ..... 141
Investing and Financing Activities Budgets ..... 143
Finalizing and Formatting the Cash Budget ..... 144
Using What-If Analysis and Goal Seeking with the Cash Budget ..... 150
End Note ..... 151
Chapter 6 Practice ..... 152
Questions ..... 152
Assignments ..... 152
Case Problem 1: Kelly's Boutique ..... 154
Case Problem 2: Wine Depot ..... 155
Case Problem 3: Snick's Board Shop ..... 157
Case Problem 4: Rosey's Roses ..... 158
Chapter 7 Other Topics: Present/ Future Values, Predicting Costs, and Allowance for Uncollectible Accounts ..... 160
Case: What SUP, Inc. ..... 160
Present/Future Value Analysis ..... 160
Predicting Future Costs ..... 169
Calculating an Allowance for Uncollectible Accounts ..... 174
End Note ..... 177
Chapter 7 Practice ..... 178
Questions ..... 178
Assignments ..... 178
Case Problem 1: Kelly's Boutique ..... 180
Case Problem 2: Wine Depot ..... 181
Case Problem 3: Snick's Board Shop ..... 182
Case Problem 4: Rosey's Roses ..... 183
Part 2 Access for Accounting ..... 185
Chapter 8 Access Tour ..... 187
Case: What SUP, Inc. ..... 187
Understanding Access's Capabilities and New Features ..... 187
Starting, Navigating, and Working with Access Files ..... 188
Getting Access Help ..... 193
Examples of How Access Is Used in Accounting ..... 194
End Note ..... 197
Chapter 8 Practice ..... 198
Questions ..... 198
Chapter 9 Access Basics ..... 199
Case: What SUP, Inc. ..... 199
Tables ..... 199
Creating the Product Table ..... 200
Creating the Supplier Table ..... 202
Creating a Category Table ..... 203
Entering Data into Tables ..... 204
Establishing Table Relationships ..... 205
Printing Tables ..... 208
Queries ..... 209
Creating a Query ..... 209
Printing a Query ..... 211
Forms ..... 211
Creating a Form ..... 212
Using a Form to View, Edit, or Add Information ..... 213
Printing a Form ..... 214
Reports ..... 214
Creating a Report ..... 215
Editing a Report ..... 217
Printing a Report ..... 220
End Note ..... 221
Chapter 9 Practice ..... 222
Questions ..... 222
Assignments ..... 222
Case Problem 1: Kelly's Boutique ..... 224
Case Problem 2: Wine Depot ..... 226
Case Problem 3: Snick's Board Shop ..... 227
Case Problem 4: Rosey's Roses ..... 229
Chapter 10 Tables ..... 232
Case: What SUP, Inc. ..... 232
Add, Change, and Delete Records ..... 232
Add Records ..... 233
Change Records ..... 234
Delete Records ..... 234
Add a Picture with an OLE Field ..... 235
Add an OLE Field to a Table ..... 236
Add Pictures to the Table ..... 237
Change the Structure of a Database ..... 238
Change a Field Size, Row Height, Column Width, and Data Type ..... 239
Create Validation Rules ..... 242
Create Default Values ..... 245
Create Formats and Input Masks ..... 246
Referential Integrity ..... 250
Documenting a Database ..... 253
End Note ..... 256
Chapter 10 Practice ..... 257
Questions ..... 257
Assignments ..... 257
Case Problem 1: Kelly's Boutique ..... 258
Case Problem 2: Wine Depot ..... 259
Case Problem 3: Snick's Board Shop ..... 261
Case Problem 4: Rosey's Roses ..... 262
Chapter 11 Queries ..... 264
Case: What SUP, Inc. ..... 264
Querying Selected Records ..... 264
Using Character Data in a Select Query ..... 265
Using Wildcards in a Select Query ..... 267
Editing a Select Query ..... 269
Using Comparison Operators and Sorting in a Select Query ..... 272
Using Compound Criteria and Limiting Output in a Select Query ..... 276
Performing Calculations ..... 279
Displaying the Results of Calculations in a Field ..... 279
Computing Statistics ..... 281
Action Queries (Update, Parameter, and Delete) ..... 286
Update Queries ..... 287
Parameter Queries ..... 292
Delete Queries ..... 294
Print a Query ..... 296
End Note ..... 296
Chapter 11 Practice ..... 297
Questions ..... 297
Assignments ..... 297
Case Problem 1: Kelly's Boutique ..... 299
Case Problem 2: Wine Depot ..... 302
Case Problem 3: Snick's Board Shop ..... 303
Case Problem 4: Rosey's Roses ..... 304
Chapter 12 Forms ..... 308
Case: What SUP, Inc. ..... 308
Labels and Text Box controls ..... 308
List Box and Combo Box Controls ..... 311
List Box Control ..... 312
Combo box Control ..... 314
Calculated Controls ..... 317
Check Box Control ..... 321
Special Combo Box Control ..... 324
Subforms ..... 329
Printing a Form ..... 332
Documenting a Form ..... 333
End Note ..... 334
Chapter 12 Practice ..... 335
Questions ..... 335
Assignments ..... 335
Case Problem 1: Kelly's Boutique ..... 336
Case Problem 2: Wine Depot ..... 338
Case Problem 3: Snick's Board Shop ..... 339
Case Problem 4: Rosey's Roses ..... 341
Chapter 13 Reports ..... 343
Case: What SUP, Inc. ..... 343
Use a Query to Create a Report ..... 343
Use Grouping and Summarizing in a Report ..... 347
Grouping ..... 347
Summarizing ..... 350
Modify an Existing Report ..... 356
Counting and Summing in Report Sections ..... 356
Lines, Borders, and Formatting in Report Sections ..... 360
End Note ..... 362
Chapter 13 Practice ..... 363
Questions ..... 363
Assignments ..... 363
Case Problem 1: Kelly's Boutique ..... 364
Case Problem 2: Wine Depot ..... 365
Case Problem 3: Snick's Board Shop ..... 367
Case Problem 4: Rosey's Roses ..... 368
Index ..... 370

## Preface

What if you could integrate two critical business software programs into your accounting classroom without using confusing and complicated manuals? What if your students could use these programs to reinforce basic accounting concepts in an interactive case setting? What if you could do both without spending a fortune and a vast amount of time preparing examples, cases, and illustrations? Excel and Access for Accounting is a textbook that fulfills and expands upon all three of these "what ifs."

## Why Is This Textbook Needed?

Many accounting educators are looking for ways to incorporate more business software into their accounting curriculum without displacing basic accounting instruction. They have tried to accomplish this by creating a stand-alone com-puter-based course, a lab component course, or by adding business computer software to their regular accounting curriculum. Current texts in this field are very generic in nature, spending little if any time on accounting-specific issues. Those that do address accounting issues address only worksheet or database issues but not both. Some texts that have a worksheet focus deliver a wide array of financial and managerial topics but lack a natural case flow. Some with a database focus emphasize the creation of accounting systems but do not address how databases are used to support the accounting function.

Moreover, employers expect today's college student to be computer literate in commercial accounting, worksheet, and database software. The demand for this type of training is growing daily as more and more businesses employ business software to solve real-world problems.

Instructors often want to incorporate business software into the first course but are reluctant to invest the time and effort necessary to accomplish this goal. Existing materials are often "preparer" driven in that they focus on the creation of worksheets and databases without addressing the effective use of these tools. Students are often discouraged in their use of computers because of the complicated and confusing manuals that concentrate on using the software without any business or accounting context.

This text responds to all of those needs. It provides a self-paced, step-by-step environment in which the students use a worksheet (Excel ${ }^{\circledR}$ ) and a database (Access ${ }^{\circledR}$ ) to solve real accounting and business problems. The text is designed to reinforce the concepts students learn in their first accounting courses and to show how worksheets and databases can help users make better and more informed business decisions.

## What Are the Goals of This Textbook?

This textbook takes a user perspective by illustrating how worksheets and databases are used and created. Both Excel and Access are user friendly, with extensive help features and helpful toolbars to aid in accessing commonly used functions. The textbook uses a proven and successful pedagogy to demonstrate the features of both software programs and to elicit student interaction.

The textbook's first goal is to help students apply the accounting concepts they've learned to real-world problems, aided by the use of a worksheet and/or database. The content complements the first course in accounting and therefore should be used either as a supplement to that course or as the primary textbook in a stand-alone course that follows the first course in accounting. Some instructors have found this textbook and the QuickBooks for Accounting textbook or the Peachtree for Accounting textbook ideal matches for a stand-alone "Computers in Accounting" course.

The second goal is to motivate students to become more familiar with and more at ease using a worksheet and/or database to solve accounting and business problems. Using this software application in an accounting context maintains student interest and provides additional incentive for pursuing an accounting degree or emphasis.

The third goal of this text is to reduce the administrative burdens of accounting faculty by providing a self-paced environment for their students to learn how important software applications are used in business. Accounting faculty must manage different learning styles of students as well as teach accounting concepts and practice techniques. The additional task of integrating computer applications into the classroom will be made simpler by using this text.

## What's New in Excel 2013 and Access 2013?

## Excel 2013

The first thing you'll see when you open Excel 2013 is a brand new look. It's cleaner, but it's also designed to help you get professional-looking results quickly. You'll find many new features that let you get away from walls of numbers and draw more persuasive pictures of your data, guiding you to better, more informed decisions.

Templates do most of the set-up and design work for you, so you can focus on your data. When you open Excel 2013, you'll see templates for budgets, calendars, forms, and reports, and more.

The new Quick Analysis tool lets you convert your data into a chart or table in two steps or less. Preview your data with conditional formatting, sparklines, or charts, and make your choice stick in just one click. To use this new feature, see Analyze your data instantly.

Flash Fill is like a data assistant that finishes your work for you. As soon as it detects what you want to do, Flash Fill enters the rest of your data in one fell swoop, following the pattern it recognizes in your data. To see when this feature comes in handy, see Split a column of data based on what you type.

In Excel 2013 each workbook has in its own window, making it easier to work on two workbooks at once. It also makes life easier when you're working on two monitors.

Drilling down to different levels of detail in a complex set of data is not an easy task. Custom sets are helpful, but finding them among a large number of fields in the Field List takes time. In the new Excel Data Model, you'll be able to navigate to different levels more easily. Use Drill Down into a PivotTable or PivotChart hierarchy to see granular levels of detail, and Drill Up to go to a higher level for "big picture" insights. To learn more about it, see Drill into PivotTable data.

## Access 2013

What's new in Access 2013? In a word, apps. An Access web app is a new type of database that you build in Access, then use and share with others as a SharePoint app in a web browser. To build an app, you just select the type of data you want to track (contacts, tasks, projects, and so on). Access creates the database structure, complete with views that let you add and edit data. Navigation and basic commands are built-in, so you can start using your app right away.

The new built-in views each have an Action Bar with buttons for adding, editing, saving, and deleting items. You can add more buttons to this bar to run any custom macros you build, or you can remove buttons you don't want people to use.

The new AutoComplete control looks up data from a related table. Think of a combo box that works more like an instant search box.

New drill-through links let you quickly view details about a related item. Access apps handle the behind-the-scenes logic to make sure the right data is displayed.

## What's New in This Edition?

The fourth edition of Using Excel and Access for Accounting includes a new case used throughout the text. What SUP, Inc. is owned by Nathan Peters and Meagan Lopez and is located in Seattle Washington.

They've been in business for five years and have developed a number of online customers. The fast-growing sport of standup paddle boarding (SUP) is a fun, easy way for their customers to go play on the water. With a minimum of equipment, their customers can paddle anything from ocean surf to lakes and rivers-no waves required. They are eager to expand their customer base and their supplier pool. Their local C.P.A., Kyle Ski, has suggested hiring a local college student to help them computerize their operations. He suggests they use QuickBooks to keep their accounting records but also encourages them to use Excel and Access to help them analyze their business situation and support their accounting operations.

Also included in this edition is a chapter focusing on other accounting topics, including using Excel to prepare a present/future value analysis, predict costs,
and calculate an allowance for uncollectible accounts. Each of these topics is explored in detail in Chapter 7 and provides additional evidence that Excel is an extremely useful tool to accountants.

Consistent with the author's case approach to teaching and assessment, this edition also introduces a new end-of-chapter continuing case feature focusing on the business activities of Rosey's Roses, a retailer located in Savannah Georgia, and specializing in roses. You, the manager of the business, are curious to see how Excel and Access might help him manage the business. His girlfriend Katie handles the financial aspects of the business but hasn't had much experience with Excel or Access. You have hired an accounting student to help construct several worksheets and databases that he hopes will improve the financial and managerial aspects of the company.

## What Are the Key Features of This Textbook?

- The chapters incorporate a continuing, interesting, realistic case-What SUP, Inc.-that helps students apply Excel and Access features.
- A tested, proven, step-by-step methodology keeps students on track. Students enter data, analyze information, and make decisions all within the context of the case. The text constantly guides students, letting them know where they are in the course of completing their accounting tasks.
- Numerous screenshots include callouts that direct students' attention to where they should look on the screen. On almost every page in the book, you will find examples of how steps, screenshots, and callouts work together.
- Trouble? paragraphs anticipate the mistakes that students are likely to make (or problems they are likely to encounter) and help them recover and continue with the chapter. This feature facilitates independent learning and frees the instructor to focus on accounting concepts rather than on computer skills.
- The end-of-chapter material begins with questions intended to test students' recall of what they learned in the chapter.
- Chapter Assignments follow the Questions and provide students additional hands-on practice with Excel and Access skills.
- Four continuing Case Problems—Kelly's Boutique (a bookstore). Wine Depot (a wine distributor), Snick's Board Shop (a skateboard shop), and Rosey's Roses (a retail rose plant store)—conclude each chapter. These cases have approximately the same scope as the What SUP chapter case.
- The Instructor's Package contains an Instructor's Manual that includes solutions to end-of-chapter materials, and a link to a companion Web site with completed files for instructor use only.


## Using This Text Effectively

Before you begin, note that this textbook assumes you are familiar with the basics of the Windows operating system (XP, Vista, Windows 7, or Windows 8): how to control windows, how to choose menu commands, how to complete dialog boxes, and how to select directories, drives, and files. If you do not understand these concepts, please consult your instructor.

The best way to work through this textbook is to read the text carefully and complete the numbered steps, which appear on a shaded background, as you work at your computer. Read each step carefully and completely before you try it.

As you work, compare your screen with the figures in the chapter to verify your results. You can use Excel 2013 and Access 2013 with either Windows XP, Vista Windows 7 or Windows 8. The screen shots you see in this book were captured in a Windows 7 environment. If you are using Windows XP, Windows 8 , or Vista, you might see some minor differences between your screen and the screens in this book. Any significant differences that result from using the different operating systems with Excel or Access will be explained.

Don't worry about making mistakes-that is part of the learning process. The Trouble? paragraphs identify common problems and explain how to correct them or get back on track. Follow the suggestions given only if you are having the specific problem described.

After you complete a chapter, you can answer the Questions, Assignments, and Case Problems found at the end of each chapter. They are carefully structured so that you will review what you have learned and then apply your knowledge to new situations. Feel free to page back through the text to clarify how each task should be accomplished.

## Your Student CD

To complete the chapter and exercises in this book, you must have a Student CD. The Student CD contains some practice files you need for the chapters, the Assignments, and the Case Problems. Your instructor or lab manager may provide you with a Student CD, your instructor may require you to make your own Student CD, or you may be asked to use the disk that accompanies this text. See your instructor for specific details. In any case, this text will assume you have a Student CD that contains the aforementioned practice files.

## Excel and Access Versions

The text and related data files created for this text were constructed using Excel 2013 15.0.4481.1510 and Access 2013 15.0.4481.1510. To check your version and release number click the File tab, and then click Account. Under the Product Information section for your Office product find the version number and product ID number. All references to Excel and Access throughout the rest of this textbook are to Excel 2013 or Access 2013.

## Excel and Access Options

Excel and Access have many options that can be altered by the user. In a lab environment, or in an environment where different people use the same computer, these options may have been altered from the default settings set when the software was first installed.


#### Abstract

About the Author Glenn Owen is a tenured faculty member of Allan Hancock College's Business Department where he teaches accounting and serves as the College's Academic Senate President. In June 2011 he retired as a lecturer at the University of California at Santa Barbara, where he taught accounting and information systems courses since 1980. His professional experience includes five years at Deloitte \& Touche and seven years as vice-president of finance positions at Westpac Resources, Inc., and ExperTelligence, Inc. He has authored many Internet-related books and accounting course supplements. He is the author of the popular QuickBooks for Accounting and Peachtree for Accounting texts and teaches both regular and Internet-based courses in financial and managerial accounting. He joined Dale Klooster and Warren Allen as an author to the popular Integrated Accounting 8e general ledger accounting software and text and recently began authoring the online version of Integrated Accounting, now titled Integrated Accounting Online 1e, which utilizes the Cengage Learning General Ledger (CLGL) as a platform to help students solve accounting problems online in a general ledger format. His innovative teaching style emphasizes the decision maker's perspective and encourages students to think creatively. His graduate studies in educational psychology and 38 years of business experience combine to yield a balanced blend of theory and practice.


## Dedication

I would like to thank my family for all of their support over the years. I'd also like to thank my Dad, who at 90 , still does his best at beating me at cribbage. His problem solving mind-set is what drove me to the accounting profession and what prompted me to ask 'why not' more often than I probably should have. Thanks Dad.

## Excel for Accounting

Chapter 1Excel Tour3Chapter 2
Excel Basics ..... 24
Chapter 3
Financial Statement Analysis ..... 60
Chapter 4
Depreciation ..... 85
Chapter 5
Loan and Bond Amortization ..... 107
Chapter 6
Cash Budgeting ..... 131
Chapter 7
Other Topics: Present/Future Values, Predicting Costs, and Allowance for Uncollectible Accounts ..... 160


## Case: What SUP, Inc.

Nathan Peters and Meagan Lopez own What SUP, Inc., located in Seattle, Washington. They've been in business for five years and have developed a number of online customers. The fast-growing sport of stand up paddleboarding (SUP) is a fun, easy way for their customers to go play on the water. With a minimum of equipment, their customers can paddle anything from ocean surf to lakes and rivers-no waves required. They are eager to expand their customer base and their supplier pool. Their local C.P.A., Kyle Ski, has suggested hiring a local college student to help them computerize their operations. He suggests they use QuickBooks to keep their accounting records but also encourages them to use a worksheet software application to help them analyze their business situation and support their accounting operations. Nathan, excited to get started, places an ad in the local college paper.

As an accounting student at the local college, you've become fairly adept at using computers to complete homework assignments but you're eager to broaden your horizons. You'd like to combine your accounting and computer skills with some practical experience. Lucky for you, an ad in the college paper for part-time computer and accounting help falls on your desk one afternoon. After an intense interview and background check, you're hired!

Your initial meeting with Nathan, Meagan, and Kyle reveals some unfamiliarity with the software application Kyle has suggested you use. Kyle has agreed to coach you through the basic use of the worksheet program after Nathan and Meagan reluctantly agree to pay his fees. They're hoping, of course, that you can learn the worksheet application quickly and help them use it to further their business expansion.

First off, Kyle introduces you to Excel, a powerful worksheet application he has been using since the mid-eighties. Kyle explains that this most recent incarnation of Excel is far more than a simple calculation program.

## Understanding Excel's Capabilities

You have often used paper worksheets in your accounting courses and ask Kyle if Excel is just an electronic version of that same worksheet. He explains that, in essence, you are correct. In your beginning accounting courses, a worksheet might have been used to adjust a trial balance for accrual accounting and to create financial statements like the income statement, balance sheet, and statement of cash flows. You added columns of numbers, subtotaled them in places, drew lines, created titles, and so forth.

Excel is, however, much more than an expensive calculator or place to put information. Built-in functions can help an accountant create financial statements, pivot table reports, analyses, depreciation schedules, loan amortization schedules, cash flow budgets, cost-volume-profit analyses with charts, and more. But first, you need to become familiar with the multitude of Excel commands and procedures.

## Starting, Navigating, and Working with Excel Files

To begin, Kyle asks you if you are familiar with starting programs in Windows 7. Since Nathan and Meagan admit to very little knowledge of computers, you offer to demonstrate. First you explain that some of the company's computers use the Windows Vista, Windows 8, or XP operating system but that the one you are most familiar with uses the Windows 7 operating system. In either case, you explain that starting Excel is the same in either operating system. You then offer to demonstrate the process for starting Excel in Windows 7.

## To start Excel:

1 Click the Start button.

2 Select All Programs and then scroll down your list of programs and click the Microsoft Office folder. Your window may look like Figure 1.1.


3 Click Microsoft Office Excel 2013 to start the application.
Trouble? Your start menu may be completely different from that shown in Figure 1.1. See your instructor or lab personnel for instructions on starting Excel.

Figure 1.1
Starting Excel

Kyle explains that Excel always opens a list of recent worksheets and thumbnail pictures of built-in Excel templates. In this text, you'll be building your own worksheets or modify existing spreadsheets to solve accounting-related problems. To begin you'll often begin by double-clicking a blank worksheet. Your window should look like Figure 1.2. A worksheet is a grid of rows and columns into which you enter information. You can add additional sheets to a workbook if necessary.

Nathan has been replicating Kyle's actions on his own laptop, which has Excel installed as well. He notes that his screen does not exactly match Kyle's, whose Quick Access toolbar and Ribbon seem different than Nathan's. Kyle explains that screen size can change the appearance of the Ribbon and that both the Ribbon and Quick Access toolbar can be customized.

To illustrate, Kyle has captured his Excel window in Figure 1.2 and provided callouts and an explanation of the Excel window characteristics.


Figure 1.2
The Excel Window

File - This is where you manage your files and the data about them - creating, saving, inspecting for hidden metadata or personal information, and setting options. In short, it is everything that you do to a file that you don't do in the file.
Quick Access Toolbar - At the top of the Excel window is the Quick Access Toolbar, which is designed to give you an easy way to execute the commands used most often. The default setting in Excel provides access to the Save, Undo, and Redo commands. The Quick Access toolbar can be modified to include the Print Preview, Open, Quick Print, and other commands as well. This is accomplished by right-clicking the Quick Access Toolbar and selecting Customize Quick Access Toolbar (or by right-clicking any command on the Ribbon and selecting Add to Quick Access Toolbar). Don't adjust your Quick Access Toolbar yet; we'll get to that shortly.
Ribbon - There are three basic components of the Ribbon, as follows.
1 Tabs: There are several of them across the top depending on whether you have added any add-ins to Excel. Each represents core tasks you do in Excel.

2 Groups: Each tab has groups that show related items together.
3 Commands: A command is a button, a box to enter information, or a menu. The principal commands in Excel are gathered on the first and second tabs, the File and Home tabs.

The commands on this tab are those that Microsoft has identified as the most commonly used when people do basic tasks with worksheets. For example, the Paste, Cut, and Copy commands are arranged first on the Home tab, in the Clipboard group. Font formatting commands are next, in the Font group. Commands to center text or align text to the left or right are in the Alignment group, and commands to insert and delete cells, rows, columns, and worksheets are in the Cells group. Groups pull together all the commands you're likely to need for a particular type of task, and throughout the task they remain on display and readily available instead of being hidden within menus. These vital commands are visible above your work space.

The commands on the Ribbon are the ones you use the most. Instead of showing every command all the time, Excel 2013 shows some commands in response to an action you take. When you see an arrow (called the Dialog Box Launcher) in the lower right corner of a group, there are more options available for the group. Click the arrow, and you'll see a dialog box or a task pane.

Other Excel Window Items - As with all Windows screens, scroll bars control your view of the worksheet (horizontal and vertical). Formulas contained in each cell are displayed in the Formula Bar. The View Toolbar gives you quick access to viewing your worksheet in Normal layout (shown in Figure 1.2), Page layout (shown in Figure 1.5), or Page Break preview layout.

## To demonstrate some of Excel's features, Kyle suggests you follow along while he opens an old Excel file:

1 Open Excel, if you closed it previously.
2 Click on the right of the Quick Access Toolbar and then place a check next to the Open command. This will add the Open command to your Quick Access Toolbar if it is not already there.
3 Click your newly created Open icon in the Quick Access Toolbar to open a new file. (Note: if you are using Excel in a computer lab environment, your changes to the Quick Access Toolbar may not reappear the next time you start Excel.)
4 Navigate the Open window to the location of this text's student files. (The location would be the CD provided with the text or from your computer lab's server.)
5 Double-click the file ch1-01, which should be located in a Ch 01 folder. The workbook shown in Figure 1.3 should appear.
6 Click the File menu and then click Save As. (This is done to keep your original student file available in case you need it again and also to provide a unique name for your file.) Click Computer and then click Browse to navigate yourself to the location where you want to save your file.


Figure 1.3
Sample Workbook

7 Add your name to the file name using the underscore key as shown in Figure 1.4. In this example, the file will be saved as ch1-01_student_ name (replace student_name with your name). In this example, the file was saved to a removable flash drive called G Owen (E:) in a folder called Excel Files as seen in Figure 1.4. Your file location may be different but it is recommended that if you are working in a lab environment that you save your files to a removable disk or online location.

8 Click Save.
9 Click in cell A1. This is now the active cell.
10 Hold the Shift key down and then click in cell F1. This should then highlight cells A1:F1. Alternatively, you could click in cell A1 and, with the mouse button down, drag the cursor to cell F1.

11 In the Font group, click the $\mathbf{B}$ icon to make the text in those cells bold.

12 In the Alignment group, click the center text icon to center the text in those cells.

13 Click in cell D2 and then with the mouse button down, drag the cursor to cell D31.
14 In the Number group, click the \$ icon to format the text in those cells in currency format.


Figure 1.4
Saving a Worksheet


Figure 1.5
Ch1-01 Student File as Modified

15 In the Number group, click the arrow next to the Number group name to launch the Dialog Box Launcher.
16 Type $\mathbf{0}$ in the decimal places text box, and then click OK.
17 Use the vertical scroll bar to move down the worksheet until you can see row 31.

18 Click in cell D31. Note the formula $=\operatorname{SUM}(\mathrm{D} 2: \mathrm{D} 29)$ which appears on the formula bar.

19 In the Font group, click the Borders icon and then select the Top and Double Bottom Border icon. Depending on the size of your Excel window, your screen should look like Figure 1.5.

20 Keep this file open.

Kyle further discusses and then illustrates the changes in Excel's appearance when a different view is selected and when the screen resolution or size is changed.

Page Layout View - In Page Layout view, there are page margins at the top, sides, and bottom of the worksheet as well as a bit of blue space between worksheets. Rulers at the top and side help you adjust margins. You can turn the rulers on and off as you need them (click Ruler in the Show/Hide group on the View tab). With this new view, you don't need Print Preview to make adjustments to your worksheet before you print. It's easy to add headers and footers in Page Layout view; when you type in the new header and footer area at the top or bottom of a page, the Design tab opens with all the commands you need to create them. You can see each sheet in a workbook in the view that works best for that sheet. Just select, for each worksheet, a view on the View toolbar or in the Workbook Views group on the View tab. Normal view and Page Break preview are both there.

Screen Resolution and Window Size - The figures displayed so far should match your version of Excel if your screen is set to high resolution and the Excel window is maximized. If not, things look different. If your screen is set to a low resolution-for example, to 800 by 600 pixels-then a few groups on the Ribbon will display the group name only, not the commands in the group. You will need to click the arrow on the group button to display the commands. The groups that display only the group name in a smaller resolution are those with less frequently used commands. At any resolution, if you make the Excel window smaller, there is a size at which some groups will display only the group names and so you will need to click the arrow on the group button to display the commands.

## To examine the affects of page layout view and screen size:

1 Scroll to the top of the worksheet so that row A is visible in your ch1-01 file.

2 Click the View tab and then select Page Layout from the Workbook Views group. Alternatively, you could have selected the Page Layout icon from the View Toolbar. Your screen should look like Figure 1.6.


Figure 1.6
Page Layout View of the Excel Window

3 Click the Show group to see the expanded menu in Figure 1.7.

```
    Ruler
    Gridlines
```

```Formula Bar
```

```Headings Show
```

Figure 1.7
Show/Hide Group on the View Tab

4 Uncheck the Ruler, Formula Bar, Guidelines, and Headlines checkboxes to modify the look of the worksheet.
5 Click the Show group and then check the Ruler, Formula Bar, Guidelines, and Headlines checkboxes.



12 Keep this file open.
"What are the tabs at the bottom of the worksheet?" Meagan asks.
"Those are different worksheets contained in our workbook" Kyle explains. ''I create those using Excel's Pivot Table feature, which I'll explain later. For now I'll have you look at them to see what they tell us."

Kyle then explains that the Pivot Table feature in Excel allows you to view data in multiple ways. In the Sales by Salesperson worksheet, he organized the sales data (located on the sales data worksheet) by salesperson, providing a total of the month's sales by individual salesperson. In the Sales by Customer worksheet, he reorganized the sales data by customer, providing a total of the month's sales by individual customer. In both cases, Kyle has used Excel's new conditional formatting feature to reflect graphically the values for salespersons and customers relative to each other. These tools will be demonstrated in later chapters.

## To view additional worksheets in a workbook:

1 Click the Sales by Salesperson tab to reveal the worksheet shown in Figure 1.10.

Figure 1.10
Sales by Salesperson Worksheet


2 Click in the down arrow next to the Row Labels text to view alternative ways of sorting or organizing this information.

3 Click the Sales by Customer tab to reveal the worksheet shown in Figure 1.11.

Figure 1.11
Sales by Customer Worksheet


4 Again, click in the down arrow next to the Row Labels text to view alternative ways of sorting or organizing this information.
5 Click on the Sales Data tab to re-open the Sales Data worksheet.
6 Keep this file open.

Now that you've had a brief view of how to start, navigate, and work with Excel files, it's time to become familiar with Excel's help features.

## Getting Excel Help

Excel's help features are quite extensive. Anytime you are working with Excel and are not certain how to accomplish a task-for example, format a cell, write a formula, or create a chart-then you should press the [F1] function key or click the blue and white question mark on the Tab bar. To illustrate, Kyle decides to show you Excel's help feature when trying to create a new chart.

## To view Excel's help to create charts:

1 Press the [F1] function key or click the question mark located in the upper right-hand corner of your screen to open Excel's help window as shown in Figure 1.12.


Trouble? You do not have to be connected to the Internet to get Excel help. However, the online help is much more extensive. This example assumes you are connected to the Internet. If you are not connected, Excel will give you access to Basic Help. As a result, none of the following steps will work.

2 Type Creating Charts into the Search help text box and then press [Enter].
3 Click Create a chart.

4 Read the Create a chart article as shown in Figure 1.13. Then close the Excel Help window.

Figure 1.13
Excel Help for Creating a Chart


Now that you're familiar with Excel's help feature, Kyle thinks it is a good idea to explore how Excel is used in the accounting field.

## Examples of How Excel Is Used in Accounting

There are an unlimited number of ways Excel can be used in accounting. This text will focus on building worksheets by using formulas, functions, and features available in Excel to create and analyze inventory and financial statements, calculate depreciation and create depreciation schedules, create loan and bond amortization schedules, and create cash flow budgets.

You may have previously learned how to create financial statements from a trial balance. For example, the trial balance in Figure 1.14 contains data that, through the use of cell references, formulas, and other Excel features, might be used to create an income statement. However, in most cases, accounting programs like QuickBooks and Peachtree are used to gather and summarize information to create financial statements. In this text, we will focus on how to use Excel to support the creation and analysis of those statements. Another example is the creation and maintenance of an inventory list. Figure 1.15 illustrates the use of Excel to manage inventory items, which you'll do in Chapter 2.

| 4 | A | B | C |
| :---: | :---: | :---: | :---: |
| 1 | Coast Jewelers, Inc. |  |  |
| 2 | Trial Balance |  |  |
| 3 | December 31, 2012 |  |  |
| 4 |  |  |  |
| 5 | Account | Dr. | Cr. |
| 6 | Cash | \$ 25,412.35 |  |
| 7 | Accounts receivable | 84,245.25 |  |
| 8 | Inventory | 125,351.45 |  |
| 9 | Prepaid expenses | 15,625.26 |  |
| 10 | Supplies | 10,245.15 |  |
| 11 | Land | 120,000.00 |  |
| 12 | Building | 300,000.00 |  |
| 13 | Accumulated depreciation: Building |  | \$ 60,000.00 |
| 14 | Equipment | 65,000.00 |  |
| 15 | Accumulated depreciation: Equipment |  | 8,000.00 |
| 16 | Accounts payable |  | 75,182.10 |
| 17 | Long-term debt |  | 400,000.00 |
| 18 | Common stock |  | 10,000.00 |
| 19 | Retained earnings |  | 15,000.00 |
| 20 | Sales revenue |  | 1,527,515.65 |
| 21 | Cost of goods sold | 993,900.30 |  |
| 22 | Advertising expense | 54,215.45 |  |
| 23 | Depreciation expense | 16,000.00 |  |
| 24 | Payroll expense | 240,451.45 |  |
| 25 | Utilities | 45,251.09 |  |
| 26 | Total | \$2,095,697.75 | \$2,095,697.75 |

Figure 1.14
Trial Balance

| 4 | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Rosey's | Roses |  |  |  |  |
| 2 | Inventor |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 | Type | Description | Quantity | Cost/Unit | Cost |  |
| 5 | Shrub | Abraham Darby \#5 | 25 | \$39.99 | \$999.75 |  |
| 6 | Shrub | Be My Baby \#5 | 30 | \$18.99 | \$569.70 |  |
| 7 | Shrub | Deja Blu \#5 | 18 | \$25.99 | \$467.82 |  |
| 8 | Shrub | Koko Loko \#7 | 17 | \$17.99 | \$305.83 |  |
| 9 | Shrub | Peach Drift \#10 | 33 | \$12.99 | \$428.67 |  |
| 10 | Shrub | Red Drift \#10 | 15 | \$6.99 | \$104.85 |  |
| 11 | Shrub | Sedona \#5 | 3 | \$14.99 | \$44.97 |  |
| 12 | Shrub | Sweet Intoxication \#5 | 17 | \$9.99 | \$169.83 |  |
| 13 | Shrub | Wing Ding \#5 | 30 | \$11.99 | \$359.70 |  |
| 14 | Climber | Climbing Orange Crush \#7 | 16 | \$32.99 | \$527.84 |  |
| 15 | Climber | Don Juan Climber \#5 | 25 | \$37.99 | \$949.75 |  |
| 16 | Tree | Barbara Streisand 36in Tree | 50 | \$52.99 | \$2,649.50 |  |
| 17 | Tree | Firefighter 36in Tree | 14 | \$55.99 | \$783.86 |  |
| 18 | Tree | Trumpeter 36in Tree | 4 | \$65.99 | \$263.96 |  |
| 19 |  |  |  |  |  |  |
| 20 | Total |  |  |  | \$8,626.03 |  |

Figure 1.15
Inventory Listing

Horizontal Income Statement

Figure 1.16
In Chapter 3, you'll learn how to perform a financial statements analysis. For example, income statements between 2014 and 2015 are compared via a horizontal analysis in Figure 1.16, which includes a "percent of change" column. An analysis of expenses for a given year is depicted in the pie graph of Figure 1.17.

| 4 | A | B | C | D | E | F | G |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Kelly's Boutique |  |  |  |  |  |  |
| 2 | Income Statement |  |  |  |  |  |  |
| 3 | For the Year Ended |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |
| 5 |  | 31-Dec-14 | 31-Dec-15 |  | \% of Sales |  | \% Change |
| 6 | Sales Revenue | S 345,274.22 | \$420,755.88 |  | 100\% |  | 22\% |
| 7 | Less: Cost of Goods Sold | 164,217.74 | 225,154.87 |  | 54\% |  | 37\% |
| 8 | Gross Margin | 181,056.48 | 195,601.01 |  | 46\% |  | 8\% |
| 9 | Expenses: |  |  |  |  |  |  |
| 10 | Advertising | S 25,871.45 | \$ 28,741.55 |  | 7\% |  | 11\% |
| 11 | Depreciation | 8,431.22 | 8,000.00 |  | 2\% |  | -5\% |
| 12 | Interest | 15,574.15 | 19,412.51 |  | 5\% |  | 25\% |
| 13 | Payroll | 105,487.51 | 99,413.44 |  | 24\% |  | -6\% |
| 14 | Supplies expense | 4,732.84 | 4,561.11 |  | 1\% |  | -4\% |
| 15 | Utilities | 10,847.00 | 8,424.71 |  | 2\% |  | -22\% |
| 16 | Net income before taxes | 10,112.31 | 27,047.69 |  | 6\% |  | 167\% |
| 17 | Income taxes | 3,784.44 | 10,847.55 |  | 3\% |  | 187\% |
| 18 | Net income | S 6,327.87 | \$ 16,200.14 |  | 4\% |  | 156\% |

Figure 1.17
Expense Chart


In Chapter 4, you'll learn how to perform depreciation calculations and create depreciation schedule. For example, you'll use Excel's SLN (Straight-line depreciation function) to calculate the depreciation expense for each year and related accumulated depreciation, as shown in Figure 1.18. You'll also use Excel's DDB (Declining balance depreciation function) to calculate depreciation expense for each year, as shown in Figure 1.19.

| 4 | A | B | C |
| :---: | :---: | :---: | :---: |
| 1 | Coast Jewelers, Inc. Depreciation Schedule |  |  |
| 2 |  |  |  |
| 3 | Asset \# | 1001 |  |
| 4 | Asset | Display Cases |  |
| 5 | Date acquired | 1/1/2011 |  |
| 6 | Cost | S 15,000.00 |  |
| 7 | Depreciation method | S/L |  |
| 8 | Salvage value | S - |  |
| 9 | Estimated useful life | 5 |  |
| 10 |  |  |  |
| 11 | Year | Depreciation Expense | Accumulated Depreciation |
| 12 | 2011 | \$3,000.00 | \$3,000.00 |
| 13 | 2012 | \$3,000.00 | \$6,000.00 |
| 14 | 2013 | \$3,000.00 | \$9,000.00 |
| 15 | 2014 | \$3,000.00 | \$12,000.00 |
| 16 | 2015 | \$3,000.00 | \$15,000.00 |


| 4 | A | B | C | D | E | F | G | H |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Coast Jewelers, Inc. Depreciation Schedule |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |
| 3 | Asset \# | 1001 |  |  |  |  |  |  |
| 4 | Asset | Display Cases |  |  |  |  |  |  |
| 5 | Date acquired | 1/1/2011 |  |  |  |  |  |  |
| 6 | Cost | S 15,000.00 |  |  |  |  |  |  |
| 7 | Depreciation method | DDB |  |  |  |  |  |  |
| 8 | Salvage value | \$ |  |  |  |  |  |  |
| 9 | Estimated useful life | 5 |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |
| 11 | Year | Depreciation Expense | Accumulated Depreciation |  | Straight-Line Test | Switch | Depreciation Expense | Accumulated Depreciation |
| 12 | 2011 | \$6,000.00 | \$6,000.00 |  | \$3,000.00 | - | \$6,000.00 | \$6,000.00 |
| 13 | 2012 | \$3,600.00 | \$9,600.00 |  | \$2,250.00 | - | \$3,600.00 | \$9,600.00 |
| 14 | 2013 | \$2,160.00 | \$11,760.00 |  | \$1,800.00 | - | \$2,160.00 | \$11,760.00 |
| 15 | 2014 | \$1,296.00 | \$13,056.00 |  | \$1,620.00 | X | \$1,620.00 | \$13,380.00 |
| 16 | 2015 | \$777.60 | \$13,833.60 |  | \$1,944.00 | X | \$1,620.00 | \$15,000.00 |

In Chapter 5, you'll learn how to perform loan amortization schedules and calculate loan payments given an interest rate, term, and loan amount. For example, you'll use Excel's PMT (Payment function) and formulas to produce the loan amortization schedule shown in Figure 1.20.

In Chapter 6, you will learn how to prepare cash receipts budgets based on a pattern of expected cash collections; see Figure 1.21 for an example.

Figure 1.18
Straight-line Depreciation

Figure 1.19
Double Declining Balance Depreciation

Figure 1.20
Loan Amortization Schedule

|  | A | B | C | D | E |
| :---: | :--- | ---: | :---: | :---: | :---: |
| 1 | Coast Jewelers, Inc. |  |  |  |  |
| 2 | Loan Amortization Schedule |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 | Amount | $\$$ | $75,000.00$ |  |  |
| 5 | Rate | $10 \%$ |  |  |  |
| 6 | Term | 3 |  |  |  |
| 7 | Payment | $\$ 30,158.61$ |  |  |  |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |
| 10 | Payment \# | Payment | Interest | Principal | Balance |
| 11 |  |  |  |  | $\$ 75,000.00$ |
| 12 | 1 | $\$ 30,158.61$ | $\$ 7,500.00$ | $\$ 22,658.61$ | $\$ 52,341.39$ |
| 13 | 2 | $\$ 30,158.61$ | $\$ 5,234.14$ | $\$ 24,924.47$ | $\$ 27,416.92$ |
| 14 | 3 | $\$ 30,158.61$ | $\$ 2,741.69$ | $\$ 27,416.92$ | $\$$ |

Figure 1.21
Cash Receipts Budget

| A | A | B | $C$ | $C$ | C | F |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: |
| 1 | Coast Jewelers | 1st | 2nd | 3rd | 4th |  |
| 2 | Cash Budget | Quarter | Quarter | Quarter | Quarter | Year |
| 3 |  |  |  |  |  |  |
| 28 | Cash from (to) operating activities | 58,500 | 34,500 | 8,750 | $(5,750)$ | 96,000 |
| 32 | Cash from (to) investing activities | - | $(300,000)$ | - | - | $(300,000)$ |
| 36 | Cash from (to) financing activities | - | 250,000 | $(20,000)$ | $(20,000)$ | 210,000 |
| 37 | Change in cash | 58,500 | $(15,500)$ | $(11,250)$ | $(25,750)$ | 6,000 |
| 38 | Beginning cash | 25,000 | 83,500 | 68,000 | 56,750 | 25,000 |
| 39 | Ending cash | 83,500 | 68,000 | 56,750 | 31,000 | 31,000 |

Finally, in Chapter 7, you'll learn how to use Excel to prepare a present value analysis (Figure 1.22), predict future costs (Figure 1.23), and calculate an allowance for uncollectible accounts (Figure 1.24).

| 4 | A | B | C | D | E | F | G |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Coast Jewelers |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |
| 3 | Present Value Analysis |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |
| 5 |  |  |  | Year | Interest | Annuity | Investment |
| 6 | Future need: | \$75,000.00 |  | 0 |  |  | \$0.00 |
| 7 | Term (in years): | 3 |  | 1 | \$0.00 | \$24,026.14 | \$24,026.14 |
| 8 | Interest rate: | 4\% |  | 2 | \$961.05 | \$24,026.14 | \$49,013.33 |
| 9 | Annuity payment required: | (\$24,026.14) |  | 3 | \$1,960.53 | \$24,026.14 | \$75,000.00 |
| 10 |  |  |  |  |  |  |  |
| 11 |  |  |  | Year | Interest | Investment |  |
| 12 | Current investment: | (\$23,000.00) |  | 0 |  | \$23,000.00 |  |
| 13 | Interest rate: | 6\% |  | 1 | \$1,380.00 | \$24,380.00 |  |
| 14 | Term (in years): | 3 |  | 2 | \$1,462.80 | \$25,842.80 |  |
| 15 | Investment value in future: | \$27,393.37 |  | 3 | \$1,550.57 | \$27,393.37 |  |
| 16 |  |  |  |  |  |  |  |
| 17 |  |  |  | Year | Interest | Annuity | Investment |
| 18 | Current annuity investment: | (\$13,500.00) |  | 0 |  |  | \$ |
| 19 | Interest rate: | 5\% |  | 1 | \$0.00 | \$13,500.00 | \$13,500.00 |
| 20 | Term (in years): | 3 |  | 2 | \$675.00 | \$13,500.00 | \$27,675.00 |
| 21 | Investment value in future: | \$42,558.75 |  | 3 | \$1,383.75 | \$13,500.00 | \$42,558.75 |
| 22 |  |  |  |  |  |  |  |
| 23 |  |  |  | Year | Interest | Investment |  |
| 24 | Future need: | \$16,500.00 |  | 0 |  | \$13,468.91 |  |
| 25 | Interest rate: | 7\% |  | 1 | \$942.82 | \$14,411.74 |  |
| 26 | Term (in years): | 3 |  | 2 | \$1,008.82 | \$15,420.56 |  |
| 27 | Invest now: | (\$13,468.91) |  | 3 | \$1,079.44 | \$16,500.00 |  |
|  |  |  |  |  |  |  |  |


| 1 | A | B | C | D | E |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Coast Jewelers |  | Quarter | Hours Open | Expense |
| 2 |  |  | 1st | 480 | 15,000 |
| 3 | Predicting Costs |  | 2nd | 500 | 18,000 |
| 4 |  |  | 3rd | 410 | 14,500 |
| 5 |  |  | 4th | 600 | 20,000 |
| 6 |  |  |  |  |  |
| 7 | High Expense |  |  | 600 | 20,000 |
| 8 | Low Expense |  |  | 410 | 14,500 |
| 9 | Difference |  |  | 190 | 5,500 |
| 10 |  |  |  |  |  |
| 11 | Hi-Lo Method |  |  |  |  |
| 12 | Variable cost/hour open |  | \$ 28.95 |  |  |
| 13 | Fixed cost |  | \$2,631.58 |  |  |
| 14 |  |  |  |  |  |
| 15 | Prediction of expense if open | 550 | hours = | \$ 18,553 |  |
| 16 |  |  |  |  |  |
| 17 Least Squares/Regression Method | Least Squares / Regression Method |  |  |  |  |
| 18 | Variable cost/hour open |  | \$ 30.51 |  |  |
| 19 | Fixed cost |  | \$1,694.18 |  |  |
| 20 |  |  |  |  |  |
| 21 | Prediction of expense if open | 550 | hours = | \$ 18,477 |  |

Figure 1.22
Present Value Analysis

Figure 1.23
Predicting Future Costs

| 4 | A | B | C | D | E | F | G | H |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 |  |  |  | Current | $\begin{gathered} 0-30 \text { Days } \\ \text { Past Due } \end{gathered}$ | 31-60 Days Past Due | $\begin{gathered} 61 \text { - } 90 \text { Days } \\ \text { Past Due } \end{gathered}$ | $>90 \text { Days }$ <br> Past Due |
| 2 | Allowance for Uncollectible Accounts |  |  | 58,000 | 18,000 | 3,000 | 2,500 | 1,000 |
| 3 |  |  |  | 1.00\% | 8.00\% | 20.00\% | 25.00\% | 50.00\% |
| 4 |  |  |  |  |  |  |  |  |
| 5 | Facts: |  |  | Past experien | ce ratio | 0.60\% |  |  |
| 6 | Accounts receivable balance (beg) | 75,000 |  |  |  |  |  |  |
| 7 | Sales on account | 850,000 |  |  |  |  |  |  |
| 8 | Collections on account | $(837,500)$ |  |  |  |  |  |  |
| 9 | Write-offs of accounts receivable | $(5,000)$ |  |  |  |  |  |  |
| 10 | Accounts receivable balance (end) | 82,500 |  |  |  |  |  |  |
| 11 |  |  |  |  |  |  |  |  |
| 12 | Percentage of Sales Method |  |  |  |  |  |  |  |
| 13 | Allowance for Uncollectible accounts (beg) | 3,000 |  |  |  |  |  |  |
| 14 | Write-offs of accounts receivable | $(5,000)$ |  |  |  |  |  |  |
| 15 | Uncollectible accounts expense | 5,100 |  |  |  |  |  |  |
| 16 | Allowance for Uncollectible accounts (end) | 3,100 |  |  |  |  |  |  |
| 17 |  |  |  |  |  |  |  |  |
| 18 | Aging Method |  |  |  |  |  |  |  |
| 19 | Allowance for Uncollectible accounts (beg) | 4,500 |  |  |  |  |  |  |
| 20 | Write-offs of accounts receivable | $(5,000)$ |  |  |  |  |  |  |
| 21 | Uncollectible accounts expense | 4,245 |  |  |  |  |  |  |
| 22 | Allowance for Uncollectible accounts (end) | 3,745 |  |  |  |  |  |  |

Figure 1.24
Calculating an Allowance for Uncollectible Accounts

## End Note

The three of you are somewhat overwhelmed by your first exposure to Excel but are pleased with what you've accomplished. You've learned some of Excel's capabilities and new features; how to start, navigate, and work with Excel files; how to use Excel help; and how Excel is used in accounting.

In the next chapter, you will learn how to enter information, create formulas, use functions, and print in Excel.

## Chapter 1 Questions

1 Identify some new features in the 2013 version of Excel.
2 Why would you use conditional formatting?
3 Explain the difference between a worksheet and a workbook.
4 Describe the nature of the commands found on the File and Home tabs.
5 What and where is the Quick Access Toolbar?
6 Describe the three basic components of the Ribbon.
7 How do you modify the Quick Access Toolbar to add the Open command?
8 What is the Page Layout view?
9 What is the quickest way to get help while in Excel?
10 What are the key accounting topics addressed in this text that relate to your learning Excel?


## Case: What SUP, Inc.

After providing you a tour of Excel, Kyle suggests you all practice entering information into Excel using some formulas, functions, and features that are common to almost all accounting applications. He has created a preliminary trial balance for you to work on.

## Video Demonstration



DEMO 2A Entering information into a work

## Entering Information

To complete the trial balance it will be necessary to enter additional text and numbers. The basic data entry container for Excel is a cell. Each cell has an address determined by its location on the worksheet grid. The column number and row number determine the address.

## Entering Data

Kyle explains that, before putting data into a cell, you must first select the cell by clicking on it. As you type, the data is also automatically entered into the formula bar. Text entries into cells are often referred to as labels, whereas numbers or formula entries are referred to as values.

## To open the trial balance file and enter data into the worksheet:

1 Start Excel and then click Open Other Workbooks.
2 Double-click Computer and then double-click Browse. Navigate the Open window to the location of this text's student files. (The location would be the CD provided with the text or from your computer lab's server.)

3 Double-click the file ch2-01, which should be located in a Ch 02 folder. The workbook shown in Figure 2.1 should appear.


Figure 2.1
Partially Completed Trial Balance

4 Click cell B7, type 84245.25, then press the [Enter] key. Note how the number is automatically formatted for you (more on this later). Note also that the active cell is now one row lower, at cell B8.
5 Type $\mathbf{1 2 5 3 5 1 . 4 5}$ in cell B8, and then press the [Enter] key.
6 Click cell C20, type 1527515.65, then press the [Enter] key. Note that the cell value may show several \# signs. If this happens, you will need to resize the column width (more about this later).
7 Click cell A26, type the label Total, then press the [Enter] key. We'll format this cell later.
8 Continue to fill in the remaining empty cells so that your worksheet looks like that shown in Figure 2.2.

Figure 2.2
Almost Completed
Trial Balance


You have thus entered both values and labels into your worksheet. Now you can make changes to the data already entered.

## Changing Column Width and Row Height

Perhaps now is a good time to fix that sales number on the trial balance as Kyle suggests. The problem occurred when a number entered in cell C20 was wider than the column permitted. The result was a cell filled with \# signs. To fix it, Kyle explains, all you have to do is resize column C. However, for uniformity, you should resize not only column C but also column B .

## To change the column width and row height of a worksheet:

1 Place the mouse pointer between column C and column D at the top of the columns so that the mouse pointer cursor changes into a line with two arrows pointing left and right.

2 Double-click the mouse. Then click and hold the mouse button down to reveal the new column width as being Width: 11.38 ( 96 pixels).

3 To resize both column $B$ and $C$ point the mouse pointer to the $B$ of column B and click once. (This selects the entire column B.)
4 Now click and drag from the $B$ of column $B$ to the $C$ of column $C$. (This selects both columns B and C.)

5 With both columns selected, place the mouse pointer between column B and column C at the top of the columns so that the mouse pointer cursor changes into a line with two arrows pointing left and right.
6 Click and drag the column width to the right until the width is 13.00 (109 pixels). Both columns should now be the same width 13.00 (109 pixels).
7 To resize the height of row 4, click between rows 4 and 5 at the far left of the worksheet until the mouse pointer cursor changes into a line with two arrows pointing up and down.
8 While still holding the mouse button down, drag the row height down until the height is 21.00 ( 28 pixels).
"If you are like me," Kyle admits, "you will find yourself making a few mistakes along the way."

## Editing Data

Nathan agrees and wants to know about correcting errors. He claims he's not very good at typing and has made some mistakes when entering previous information. Kyle explains that you can always edit the information entered into a worksheet regardless of whether you've already pressed the Enter key or not.

Excel gives you two ways to edit data. You can either edit the formula bar or edit data directly in the cell. For instance, let's assume the utilities expense number you entered in cell B25 was 45251.09 when it should have been 45251.90. Also assume that the prepaid expenses entered in cell B9 was 15624.26 when it should have been 15625.45 .

## To edit data in the worksheet:

1 Click once in cell $\mathbf{B 2 5}$.
2 Double-click the value you entered into the cell. Note that this opens up the cell for editing.
3 Double-click the value again and the entire value is selected.
4 Type $\mathbf{4 5 2 5 1 . 9 0}$ and the press the [Enter] key.
5 Click once in cell $\mathbf{B 9}$.
6 Double-click the value you entered into the cell. Note that this opens up the cell for editing.
7 Double-click the value again and the entire value is selected.
8 Type $\mathbf{1 5 6 2 5 . 4 5}$ and the press the [Enter] key.
9 Since you actually did enter in the correct values you should undo your changes. Click the Undo button from the Quick Access Toolbar two times.

Meagan says she will probably have to use this procedure often because her keyboarding skills are rather weak. Fortunately, it is easy to use this process for correcting errors and making changes to a worksheet.

## Controlling the Appearance of Data

You ask Kyle why the numbers on the trial balance are formatted with commas, since you didn't type commas when you entered the values. He explains that initially he formatted both columns B and C to be in the "comma" format. Formatting does not change the text or numbers in the cell itself; rather, it changes the way the text or numbers appear in the worksheet. To experiment, he suggests you modify the format of cells B6, C13, B26, and C26 to a "currency" format, since the top and bottom of a column of accounting numbers are usually formatted with the $\$$. He further suggests that you replace the format with a "comma and cents" format using the format painter.

## To apply the currency format to specific cells:

1 Click cell B6, then click the Accounting Number Format tool (it looks like a \$) on the Number group in the Ribbon. Note how the number still has the comma and cents formatting from before but now contains the $\$$.

2 With cell B6 still selected, click the Format Painter tool (it looks like a paintbrush) on the Clipboard group. Note that cell B6 now has ants dancing around the border of the cell and that the mouse pointer has an added paintbrush. Your screen should look like Figure 2.3.

Figure 2.3
Using the Format Painter Tool


3 Click cell C13. You have now painted the Accounting Number Format to that cell.
4 Click cell C13 and then click the Format Painter tool again.

5 Click in cell B26 and, with the mouse button still down, drag it to the right to include cell C 26 ; then release the mouse button. You have now painted the Accounting Number Format to cells B26 and C26, which will soon contain the total of each column.

Kyle also explains that it is common practice to total the debit and credit columns of a trial balance and include a double underline under such totals. Because you are in the midst of formatting cells, he suggests you format the two "total" cells before you create a formula adding a column of cells.

## To format the "total" cells with a double underline:

1 Click and highlight cells B26 and C26 by clicking first in B26 and then dragging the mouse to C 26 while holding down the mouse button.
2 Place the mouse pointer over the Borders tool located on the Font group-specifically, over the small arrow located on the right of the Borders tool. Click the arrow to reveal several border options as shown in Figure 2.4


Figure 2.4
Selecting a Border

3 Click the Top and Double Bottom Border tool to format the cells.

To finish the trial balance, all you need now is a total for each column.

## Entering Formulas and Using Functions

Formulas in Excel always begin with an equal sign (=). These formulas can use numbers; math symbols to add, subtract, multiply, or divide (,,+- , /); cell references; and/or functions. Nathan asks if Excel has a calculator built in so one could add the column and then put the result in the total cell. Kyle explains that the disadvantage of such an approach is that, if your numbers later change, then you'd have to re-add the column. Meagan asks if the best way to add a column of numbers is therefore to add each cell. Kyle explains you could certainly do that by typing a formula like this: $=\mathrm{B} 6+\mathrm{B} 7+\mathrm{B} 8$ et cetera.

However, Kyle explains that Excel includes some functions that accomplish this task in a more efficient manner. The SUM function, for instance, will sum up specified series of cells.
"Hold on," you say. "Functions sound like programming and I'm just an accounting student who has no desire to learn computer programming."
"Don't panic!" Kyle advises. "Excel's functions are fairly simple. Each function reacts to certain arguments you provide. For instance, the SUM function is written as follows: $=\operatorname{SUM}$ (argument). The argument is a series of cell references you want summed. Let me show you how to add the sum function to your trial balance to add up the debit and credit columns."

## To use the SUM function to add a column of numbers:

1 Click cell B26.
2 Type $=\mathbf{S U M}(\mathbf{B 6}: \mathbf{B 2 5})$, then press [Enter]. The result of that function should be the amount $\$ 2,095,697.75$.
3 Click cell C26.
4 Alternatively, you can enter the argument by clicking and dragging the mouse pointer over the cells to be added. Click the AutoSum button in the Editing group of the Home tab. Your screen should look like Figure 2.5 just before you click the AutoSum button.

5 Dancing ants should now be marching around the cells C15 to C25, as shown in Figure 2.5.


Figure 2.5
Using AutoSum
6 Click the upper right handle and, with the mouse button down, drag the ants up until you reach cell C6.

7 Release the mouse button and press the [Enter] key.
8 Click the File menu and then click Save As. (This is done to keep your original student file available in case you need it again and also to provide a unique name for your file.)
9 Add your name to the file name using the underscore key as you have done previously. In this example, the file will be saved as ch2-01_student_name (again, replace student_name with your name). Be sure to save your file to a location (e.g., a USB drive) from which you can later retrieve it.

Kyle explains that now you've used two different methods of entering a sum function to add up both the debit and credit columns. In both cases, the resulting formula is the same; you've simply used different methods to achieve the same goal. Moreover, if you enter different data in the cells B6 to B25 or C6 to C25, the SUM function will automatically add them up.

## More Extensive Use of Formulas

Nathan comments that he envisions another use of this worksheet software. Weekly he prepares, by hand, a "Badfish SUPs sales" worksheet that identifies how many Badfish SUPs have been sold each week as well as their cost, markup, sales price, discount, and total sales. Kyle suggests that this might be a good opportunity to illustrate a more extensive use of formulas in Excel.

## Entering and Editing Formulas

Formulas in Excel always begin with an equal sign (=). As explained earlier in this chapter, these formulas can use numbers; math symbols to add, subtract, multiply, or divide (,,+- *, /); cell references; and/or functions.

Kyle prepares a worksheet with titles and headings that are similar to Nathan's hand-prepared worksheet. In it he includes the names of the four types of Badfish SUPs sold that week, the cost or price What SUP paid for each SUP, the usual markup on cost used to determine the price, the discount offered that week on each SUP, and the quantity of each SUP sold. Kyle then recommends that you, Nathan, and Meagan use this form to prepare a weekly Badfish SUP Sales worksheet for the week of November 15, 2015.

The price for each SUP is based on the SUP cost and markup percentage. For example, if a SUP costs $\$ 100$ and the markup is 50 percent, then What SUP sells the SUP for $\$ 150$ (the $\$ 100$ cost plus a markup of 50 percent $\times$ $\$ 100$, or $\$ 50$ ).

The total column is the product of the price less discount times the number of SUPs sold. For example, if the price (as previously determined) was $\$ 150$ but that week it was discounted 10 percent, then the net price would be $\$ 135$ (the selling price of $\$ 150$ minus the $\$ 15$ discount). If five SUPs were sold, the total would then be $\$ 675(5 \times \$ 135)$.

Kyle offers to walk you through the creation of formulas, the use of references, and (later) manipulating the data.

## To enter and edit formulas for the Weekly Badfish SUP Sales worksheet:

1 Open ch2-02 to reveal a file that should look like Figure 2.6.


Figure 2.6
Badfish SUP Sales

2 Click in cell D6, where you will place the formula to calculate price.
3 Remember, the formula for determining price is cost plus markup; hence you must enter a formula that computes the markup and then adds it to the cost. Type the formula $=\mathbf{B 6}+(\mathbf{B 6 *} \mathbf{C 6})$ into cell D6 and then press [Enter]. Note that B6 is the location of the cost and C6 is the location of the markup percentage. Note also that the cell has been preformatted so that two decimal places are always shown.
4 Click in cell G6, where you will place the formula to calculate the total sales of the River Surfer $6^{\prime} 11^{\prime \prime}$.
5 Recall that the formula for determining total sales is price less discount times the number sold; hence, you need to enter a formula that computes the net price and then multiplies it by the number sold. Type the formula $=(\mathbf{D 6}-(\mathbf{D 6} * \mathbf{E 6})) * \mathbf{F 6}$ into cell G6, then press [Enter]. Note that D6 is the location of the price, E6 is the location of the discount percentage, and F6 is the location of the number sold. Note also that the cell has been preformatted so that two decimal places are always shown. Figure 2.7 shows the worksheet just before you press [Enter].

| 1 | A | B | C | D | E | F | G | H |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |  |  |
| 2 | Badfish SUP Sales |  |  | - |  | , |  |  |
| 3 | Week of November 15, |  |  |  |  |  | ) |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 | Product | Cost | Markup | Price | Discount | Quantity | Total |  |
| 6 | River Surfer 6'11" | 450.00 | 100\% | 900.00 | 10\% | 7 | =(D6-(D6* | ))*F6 |
| 7 | River Surfer $8^{\prime}$ | 520.00 | 100\% |  | 9\% | 3 |  |  |
| 8 | River Surfer 9" | 600.00 | 100\% |  | 8\% | 8 |  |  |
| 9 | MCIT Inflatable 10'6" | 700.00 | 80\% |  | 15\% | 15 |  |  |
| 10 | Total |  |  |  |  |  |  |  |

## Figure 2.7

Entering a Formula
6 Keep this file open.
"Hold on a minute," Meagan says. "All of those parentheses are confusing me."
Kyle explains that the formula required those parentheses to specify the order of calculation. The formula (D6-(D6*E6))*F6 requires the innermost (here, bold) set of parentheses to be calculated first. This is the calculation of the discount (the price times the discount percentage). The outermost set of parentheses in the formula (D6-(D6*E6))*F6 is acted on next. This is the calculation of the discounted price (price less discount). Finally, the formula multiplies the newly calculated discounted price by the number sold to yield the total.
"Do we now have to type additional formulas for the other Badfish SUP?" you ask.
"Thank goodness, no," Kyle replies. "Excel has an AutoFill feature that saves you the time and effort of reentering similar formulas."

## Manipulating Data and Structuring Worksheets

The AutoFill feature is handy whenever you need formulas or data replicated down or across a worksheet. Kyle mentions that understanding this feature requires that you also understand the concept of relative and absolute references.

## Using AutoFill

In the Weekly Badfish SUP Sales worksheet, you created formulas to calculate price and total sales for the River Surfer $6^{\prime} 11^{\prime \prime}$ SUP. Now you want to use a similar formula to calculate the price and total sales for the other Badfish SUP. Kyle suggests you try the AutoFill feature yourself.

## To use the AutoFill feature:

1 Click in cell D6 on the Weekly Badfish SUP Sales worksheet.
2 Note that, when selected, the cell is outlined and a small square appears in the lower right corner of the cell. Click and hold the mouse button down so the mouse pointer is over that square. Then drag the frame down to cell $\mathbf{D} 9$ and release the mouse button See Figure 2.8.

| 1 | A | B | C | D | E | F | G |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |  |
| 2 | Badfish SUP Sales |  |  |  |  | - |  |
| 3 | Week of November 15,2015 |  |  |  | 15 |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 | Product | Cost | Markup | Price | Discount | Quantity | Total |
| 6 | River Surfer 6'11" | 450.00 | 100\% | 900.00 | 10\% | 7 | 5,670.00 |
| 7 | River Surfer $8^{\prime}$ | 520.00 | 100\% |  | 9\% | 3 |  |
| 8 | River Surfer 9' | 600.00 | 100\% |  | 8\% | 8 |  |
| 9 | MCIT Inflatable 10'6' | 700.00 | 80\% |  | 15\% | 15 |  |
| 10 | Total |  |  |  |  |  |  |

Figure 2.8
Filling a Formula Down a Column
3 Click in cell G6.
4 Click and hold the mouse button down so that the mouse pointer is over the square in the lower right corner of the cell. Drag the frame down to cell G9 and then release the mouse button. Your revised worksheet should look like Figure 2.9.


Figure 2.9
Watch Sales with Price and Total Values

5 Keep this file open.
"I see," you say. "By using the AutoFill feature we've copied the same formula down the worksheet."
"Not exactly," Kyle responds. "In fact, you've copied a similar formula down the worksheet, but it's not the same."

Kyle suggests that this is a good time to explain the worksheet concept of relative and absolute references.

## Using Relative and Absolute References

The formula placed in cells D7, D8, and D9 after using the AutoFill feature is similar but not exactly like the formula you wrote in cell D6. If you look at the resulting formula created in cell D7 and compare it to the formula in cell D6, you will see relative referencing at work. Cell D6 contains the formula $\mathrm{B} 6+(\mathrm{B} 6 * \mathrm{C} 6)$. Cell D 7 contains the formula $\mathrm{B} 7+(\mathrm{B} 7 * \mathrm{C} 7)$. In other words, using AutoFill changed the formula by increasing the row reference by 1 , from row 6 to row 7. This will continue to occur as AutoFill moves down relative to the original formula. Once again, looking at cell D8, you see the formula $\mathrm{B} 8+(\mathrm{B} 8 * \mathrm{C} 8)$ and at cell D9 the formula B9+(B9*C9).
"Do you always want AutoFill to change the references?" Nathan asks.
"Not necessarily," Kyle answers.
Kyle points out that relative referencing works well in this particular worksheet. An alternative scenario that would not use relative referencing is one where the discount is some specific percentage for all sales. If you locate that percentage in one cell, then relative referencing would not create proper formulas. He suggests you create a cell that specifies a discount percentage for that week, clear the discount part of the worksheet, and rewrite the total formula.

## To use absolute references in the worksheet:

1 Before making the following changes, click the File menu and button, then Save As to save the Excel file.
2 Name the file ch2-02_student_name (replacing student_name with your name as before), then click Save. You will now make changes to the file to illustrate absolute references.
3 Type Discount \% in cell A13. This is a label for the value you will place in cell B13. Press [Tab] to move to the next cell.
4 Type $\mathbf{1 0 \%}$ in cell B13, then press [Enter].
5 Select cells E6 through E9 by clicking in cell E6 and then, while holding down the Shift key, clicking cell E9. (This selects the five contiguous cells.) Alternatively, you could click in cell E6 and, while holding the mouse button down, drag the mouse pointer down to cell E9.
6 Right-click the selected cells to reveal the Shortcut menu, then click Clear Contents as shown in Figure 2.10. This removes values and text previously shown at E6 through E9.


7 Click cell E6.
8 Type a new formula $=\mathbf{B 1 3}$ in cell E6 and then press [Enter]. This results in replacing the cell reference E6 with the cell reference B13.
9 Using AutoFill, like you did before, replicate the formula in cell E6 down to E9. This, however, causes a problem due to relative referencing: the formula in E7 now contains a reference to B14 instead of the discount specified in B13. What we should have done is changed the B13 reference from a relative reference to an absolute reference.
10 Change the formula at E 6 to $=\mathbf{\$ B} \$ \mathbf{1 3}$ by placing a $\$$ in front of the B and the 13 . The addition of the $\$$ freezes the reference to an absolute cell, regardless of where the cell may be copied to or automatically filled using AutoFill. After you have edited the formula, press [Enter].

11 Using AutoFill, replicate the modified formula in cell E6 down through cell E9. Your worksheet should now look like Figure 2.11.

Figure 2.10
Right-Click Menu

Figure 2.11
Using Absolute

|  | A | B | C | D | E | F | G |  |  |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |  |  |  |
| 2 | Badfish SUP Sales |  |  |  |  |  |  |  |  |
| 3 | Week of November 15,2015 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

12 Keep this file open.
"So what happens if I change the discount from 10 percent to 13 percent?" Nathan asks. Kyle demonstrates that the new formula creates new totals as a different discount percentage is entered into cell B13. He suggests you try some alternative percentages to see the effects on the total column. When you are finished experimenting, return the discount to 10 percent.

## Inserting and Deleting Columns and Rows

Nathan wants to know how to add a row if a different SUP is sold. He would also like to insert a new column, which would display the discounted price.

## To insert columns and rows on a worksheet:

1 Click the $\mathbf{8}$ in row 8 to select the entire row.
2 Right-click the $\mathbf{8}$ in row 8 to reveal the Shortcut menu, then click Insert to add a new row. Figure 2.12 shows the window right before you click Insert.


3 After you click Insert, add the following SUP sales information to the new row 8: product, River Surfer $\mathbf{8}^{\prime} \mathbf{6}^{\prime \prime}$; cost, $\mathbf{5 6 0}$; markup, $\mathbf{1 0 0 \%}$; quantity, 4.
4 Use AutoFill to fill down the proper formulas for cells D8, E8, and G8.
5 Click the $\mathbf{F}$ in column F to select the entire column.
6 Right-click the Fin column F to reveal the Shortcut menu, then click Insert to insert a new column.
Trouble? Excel has an Undo command, which allows you to reverse any number of actions you have executed on a worksheet. If you accidentally delete the wrong column or too many columns, click the Undo button on the Quick Access toolbar.
7 Type Net Price in cell F5, then press [Enter].
8 Type =D6-(D6*E6) into cell F6, then press [Enter]
9 Format cell F6 in a comma style format.
10 Use AutoFill to fill down the formula in F6 through F10.
11 Click cell H11 and then click the AutoSum tool from the Editing group, then press [Enter]. Note how Excel's AutoSum feature automatically selects cells adjacent to cell H11 that it thinks contain data you want to sum. This is a handy feature, but it doesn't always select the cell you want to sum. In this case it worked great!
12 To polish off your worksheet, click cell H11 again and format it with a Top and Double Bottom Border by using the Borders tool from the Font group.
13 Click cell A14. Format the cell to make the label bold by clicking the Bold tool from the Font group. Your completed worksheet should look like Figure 2.13.

Figure 2.12
Inserting a Row

Figure 2.13
Final Badfish SUP Sales Worksheet


14 Click the File menu and then click Save to save your work.
15 Keep this file open.

## Working with Multiple Worksheets

Meagan is pleased with the results of the completed Weekly Badfish SUP Sales worksheet, but now she would like the sales to be summarized in 4 -week increments. Kyle replies that the best way to handle this would be to use multiple worksheets. You can create a worksheet for every week and a summary sheet for every 4 -week period.

At the bottom of the worksheet in Figure 2.13, you can see the Sheet1 label. Kyle suggests you first re-label Sheet1 as November 15, indicating the start of the week. Then he suggests you copy the November 15 worksheet and create a November 1 worksheet, then again for November 8, and again for November 22.

## To work with multiple worksheets:

1 Double-click the tab Sheet1, change the name of the worksheet to November 15, and then press the [Enter] key.
2 Right-click the newly labeled tab November 15 to reveal the Shortcut menu, then click Move or Copy.
3 Check the Create a copy checkbox and then click OK in the Move or Copy window. A new worksheet labeled November 15 (2) appears in the workbook.

4 Double-click the tab November 15 (2), change the name of the worksheet to November 8, and then press the [Enter] key. You now have two identical worksheets.
5 Repeat this process two more times to create a total of four worksheets, the last two labeled November 1 and November 22. Click and hold the tabs and then drag them left or right to place them in order. To see all the worksheets, you may have to shrink the scroll box on the bottom of the worksheet.
6 Place the mouse pointer just to the left of the arrow on the horizontal scroll box. Click and drag the mouse pointer to the right until all four weekly worksheet tabs are visible.
7 Change the title of each worksheet to reflect the new dates by editing cell A3. Click cell A3 on the worksheet November 1 and change the date to read November 1. Continue the same process for the last two worksheets. Remember: to change active worksheets, click the title of each worksheet on the bottom tabs.
8 Change the number of Badfish SUP sold for the week of November 1 (located in cells G6 to G10) to $\mathbf{3 , 2 , 7 , 1 , 4}$ respectively. Also change the discount percentage of cell B14 to $\mathbf{0 \%}$.
9 Change the number of Badfish SUP sold for the week of November 8 (located in cells G6 to G10) to $\mathbf{4 , 1 , 8 , 2 , 5}$ respectively. Also change the discount percentage of cell B14 to $\mathbf{5 \%}$.
10 Change the number of Badfish SUP sold for the week of November 22 (located in cells G6 to G10) to $\mathbf{3 , 6 , 7 , 4 , 8}$ respectively. Also change the discount percentage of cell B14 to $\mathbf{1 5 \%}$.
11 You now have four worksheets with different sales information for each period. The November 22 worksheet on your screen should look like Figure 2.14.


Figure 2.14
Final Badfish SUP Sales Worksheet

12 Save the updated worksheet.
13 Keep this file open.

Finally, a Summary worksheet can be created that summarizes sales from each week. Kyle suggests you set up a new Summary worksheet using the copy and paste features of Excel.

## To set up a summary worksheet:

1 Right-click the tab November 1, and then click Insert, and then double-click Worksheet and press [Enter].
2 Change the name of the new worksheet to Summary.
3 Click the November 1 worksheet tab.
4 Select cells A1 to A3, right-click the mouse to activate the Shortcut menu, and click Copy to copy the worksheet title.
5 Click the Summary worksheet tab, click in cell A1, right-click the mouse button, and click Paste to paste the worksheet title. If the picture is captured as well, click to select it and then press [Delete].
6 Click cell A3 and type Summary.
7 Resize the height of row 4 to $\mathbf{4 7}$ pixels.
8 Click the November 1 worksheet tab.
9 Select cells A5 to A11, right-click the mouse to activate the Shortcut menu and click Copy to copy the product title and names.
10 Click the Summary worksheet tab, click in cell A5, right-click the mouse button, and click Paste to paste the product title and names.
11 Resize column A to fit the product title and names ( 250 pixels).
12 In cells B5 to F5 type the various weekly dates: Nov 1, Nov 8, Nov 15, Nov 22, and Total respectively.
13 Format cells B5 to F5 using the Bold, Center, and Bottom Border tools on the Format toolbar. The resulting worksheet should look like Figure 2.15.

| 1 | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |
| 2 | Badfish SUP Sales |  |  |  |  |  |
| 3 | Summary |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 | Product | 1-Nov | 8-Nov | 15-Nov | 22-Nov | Total |
| 6 | River Surfer 6'11' |  |  |  |  |  |
| 7 | River Surfer $8^{1}$ |  |  |  |  |  |
| 8 | River Surfer $8^{\prime} 6^{\prime \prime}$ |  |  |  |  |  |
| 9 | River Surfer $9^{\prime}$ |  |  |  |  |  |
| 10 | MCIT Inflatable 10'6" |  |  |  |  |  |
| 11 | Total |  |  |  |  |  |

14 Keep this file open.

Figure 2.15
Creating a Summary Worksheet

The Summary worksheet you've set up is now ready for weekly data. Rather than typing the totals from each product for each week, Excel enables you to link the Summary worksheet with the weekly worksheets.

## To link the Summary worksheet to weekly worksheets:

1 Click in cell B6 of the Summary worksheet.
2 Type = into cell B6.
3 Before pressing Enter, activate the November 1 worksheet and click in cell H6; then press [Enter]. This automatically enters the reference 'November 1'!H6 into the Summary worksheet cell B6.
4 Use AutoFill to replicate the formula now entered in the Summary worksheet cell B6 down the worksheet to cell B10.
5 Click in cell C6 of the Summary worksheet.
6 Type $=$ into cell C6.
7 Before pressing Enter, activate the November 8 worksheet and click in cell H6; then press [Enter]. This automatically enters the reference 'November 8 '! H6 into the Summary worksheet cell C6.
8 Use AutoFill to replicate the formula now entered in the Summary worksheet cell C6 down the worksheet to cell C10.
9 Repeat this same process for November 15 and November 22.
10 Use the SUM function to total sales by product in cells F6 through F10 on the Summary worksheet.
11 Use the SUM function to total weekly sales in cells B11 through F11.
12 Format cells B11 to F11 with a Top and Double Bottom Border.

13 Increase the size of any column to remove the \# signs found in cells.
14 Reduce the size of the horizontal scroll box to reveal all worksheet tabs in your Badfish SUP Sales workbook. The completed summary worksheet should look like Figure 2.16.
Figure 2.16
Completed Summary

| , | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |
| 2 | Badfish SUP Sales |  |  |  |  |  |
| 3 | Summary |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 | Product | 1-Nov | 8-Nov | 15-Nov | 22-Nov | Total |
| 6 | River Surfer 6'11' | 2,700.00 | 3,420.00 | 5,670.00 | 2,295.00 | 14,085.00 |
| 7 | River Surfer $8^{\prime}$ | 2,080.00 | 988.00 | 2,808.00 | 5,304.00 | 11,180.00 |
| 8 | River Surfer 8' $6^{\prime \prime}$ | 7,840.00 | 8,512.00 | 4,032.00 | 6,664.00 | 27,048.00 |
| 9 | River Surfer $9^{\prime}$ | 1,200.00 | 2,280.00 | 8,640.00 | 4,080.00 | 16,200.00 |
| 10 | MCIT Inflatable $10^{\prime} 6^{\prime \prime}$ | 5,040.00 | 5,985.00 | 17,010.00 | 8,568.00 | 36,603.00 |
| 11 | Total | 18,860.00 | 21,185.00 | 38,160.00 | 26,911.00 | 105,116.00 |
|  | Summary November 1 | November 8 | vember 15 | ember 22 | : 11 |  |

15 Save your work.
16 Keep this file open.

## Using Headers and Footers

Often you will create multiple versions of a worksheet and, when they are printed, you won't know which version is which. Thus, it's important to include a date and time stamp on each worksheet. Kyle indicates that Excel has a builtin function that will not only date and time-stamp your work but also indicate the file name on each worksheet when printed. Both of these functions can be placed in either the header or footer of a worksheet.

## To use headers and footers in a worksheet:

1 Click the View tab on the Ribbon, then click Page Layout from the Workbook Views group.
2 Click the text Click to add header, and then type $\mathcal{\&}[$ Tab] (this will insert the sheet name as the header when the worksheet is printed).
3 Press [Tab] to move to the right section of the header.

4 Type $\boldsymbol{\&}[$ Date] into the right header text box. (This will print the system date in the upper right corner of each worksheet; the system date is the current date you are printing your worksheet.)
5 Press [Tab]. Your screen should look like Figure 2.17 except for the current date, which will instead be the system date at the time you complete this work.


Figure 2.17
Adding a Header to Your Worksheet
6 Scroll to the bottom of your worksheet.
7 Click in the center footer text box, and then type $\mathcal{\&}[$ File $]$ into the footer. This \&[File] will print the worksheet file name in the footer of each worksheet.
8 Press [Tab] and note the file name (ch2-02_student_name) in the Footer preview box.
9 Click outside the footer in any cell and then click Normal from the Workbook Views group on the View tab of the Ribbon.
10 Keep this file open.

## Printing

Printing often requires three steps: previewing the print job, editing the page setup, and then finally printing the worksheet. Kyle suggests that, to save paper, these three steps should always be performed.

## Using Print Preview and Page Setup

Previewing the print job will save you lots of paper and headaches, Kyle explains. A print preview is available from the File menu. In addition to previewing the print job, the Print window also gives you the option of zooming in on the print job, modifying margins, viewing page breaks, and printing the job.

Page Setup establishes the worksheet's page orientation and scaling, margin specifications, headers and footers (which we just addressed), and "sheet" provisions that include print area and print titles.

The Page section is the first tab, located on the far left of the Page Setup window. Here you can specify the page orientation (Portrait or Landscape). Kyle prefers the terms vertical and horizontal, which more accurately communicate the direction the worksheet will be printed on a standard $81 / 2^{\prime \prime}$ by $11^{\prime \prime}$ piece of paper. If the worksheet is too big to print on just one sheet, the user can scale the printing by a percentage of its normal size or to fit on a specific number of pages.

The Margin section is the second tab. Here you can modify the header and footer depth as well as the top, bottom, right, and left margins. In addition, you can specify that the worksheet be centered on the page either horizontally, vertically, both, or neither.

The Sheet section allows you to restrict printing to a certain segment of the worksheet and to repeat titles at the top or left of the worksheet if your printing runs more than a single page. While editing worksheets, Kyle likes to print his work in process and take it on the road, where he doesn't have a computer. In this case, he prints the gridlines and row and column headings so he can write additional formulas by hand.

Kyle decides to modify the page setup for the Summary worksheet by specifying a portrait orientation, centering the worksheet horizontally, and with gridlines and row and column headings.

## To preview a print job and edit the page setup of a worksheet:

1 Click the File menu and then click Print.
2 Select Landscape orientation option if it is not already selected (See Figure 2.18.).


Figure 2.18
Print Options
3 Click Page Setup from the bottom of the screen and then click the Margins tab and then click the Horizontally checkbox on the Center on page section.
4 Click the Sheet tab and click the Gridlines and Row and column headings checkboxes.

5 Click the Header/Footer tab; note that your previous modifications to the header and footer (during the page layout) have been preserved here.

6 Click OK.
7 Click the Zoom to Page icon located in the lower right hand corner of the screen to magnify the pending print job, then use the scroll bars to move around your view of the print job. You screen should look like Figure 2.19.


Figure 2.19
Print Preview with Magnification
8 Keep this file open.

## Printing a Worksheet

As already mentioned, you can print from the Print Preview window or print directly from the worksheet. Kyle once again suggests that you always preview your work before printing and thus that you get into the habit of printing from the Print Preview window.

The Print Preview window allows you to select a printer (assuming more than one printer is connected to your computer or network). In addition, you can specify the print range (which pages to print), what you wish to print (the entire workbook, the active sheet(s), or a specific selection you've already highlighted on the worksheet), and/or how many copies you want printed.

Meagan suggests you print one copy of the entire workbook with the gridlines and row and column headings specified previously as well as one copy of the summary worksheet without gridlines and row and column headings.

## To print the workbook:

1 Click the Zoom to Page icon again to reduce the print preview window.
2 Select a printer from the Printer drop-down list and then select Print Entire Workbook from the Settings drop-down list.
3 Click Print. This should print five pages.
Trouble? You may have to modify which printer to print to in lab situations. Please see the lab consultant or your instructor for instructions.

4 Save your work.

Nathan notices that, when the workbook was printed in total, only the Summary worksheet had a header and footer. Kyle explains that this happened because you had set up the header and footer for the Summary worksheet only; thus, headers and footers for the remaining worksheets should not be expected. Nathan also noticed that some worksheets printed in portrait view, and he suspects that this is due to not setting all worksheet to landscape as well.

## Printing and Viewing Formulas

"Is there any way to look at a worksheet and see all the formulas in the worksheet without clicking on each cell?" Nathan asks.
"Yes," Kyle replies. "You can not only view the underlying formulas, but often you'll want to print them for later analysis."

Kyle offers to demonstrate this Excel feature and advises that, whenever you print a worksheet with formulas, you be sure to include gridlines and row and column headings for easy reference. He suggests you print the formulas found on the November 1 sheet.

## To view and print formulas in a worksheet:

1 Click the return arrow (the arrow with a circle around it at the upper left-hand corner of the Print window) and then click the November 1 worksheet.

2 While holding the Ctrl key down, press the ['] key (located just above the Tab key). This reveals all cells as formulas, a feature known as the Formula view. Observe that the columns become larger when you press these keys.
3 While holding the Ctrl key down, press the ['] key again and the worksheet reverts back to values (known as the Value view). Simultaneously, the columns return to their original, smaller size.
4 Switch to the Formula view once again. (While holding the Ctrl key down, press the ['] key.)
5 Resize each column so that all formulas are viewable. (This will require some columns to be widened and others to be narrowed.)
6 Click the File menu and then click Print. Note that printing this worksheet requires two pages, as indicated in the lower left corner of the Print Preview window.
7 Under Settings, select Print Active Sheets and then change to Landscape Orientation.
8 Select Fit Sheet on One Page from the last drop-down list which should currently say No Scaling.
9 Click Page Setup and then click the Sheet tab and check the Gridlines and Row and column headings checkboxes so that the worksheet, when printed, can help you decipher the formulas.

10 Click OK in the Page Setup window (note that printing now requires only one page, as specified in the lower part of the window). Your print Preview screen should look like Figure 2.20.


11 Click Print in the Print Preview window.
12 Click OK in the Print window.
13 While holding the Ctrl key down, press the ['] key and so return to Value view.

14 Resize all columns so that all values are shown.
15 Close the worksheet and save your changes.

Kyle explains that printing the Formula view is an effective way of examining your worksheet logic and correcting any errors. It also allows you to view the formula logic when a computer is not available.
"That's a lot to grasp in one sitting," you complain.
"Oh there's a lot more to come, but let's take a break and start again tomorrow," Kyle says.

## End Note

The three of you are somewhat overwhelmed by the capabilities of Excel but are pleased with what you've accomplished. You've learned some basics about Excel's help system, how to work with files, and how to enter information into a worksheet, use formulas, manipulate data, structure a worksheet, and print worksheets in both Value and Formula views.

In the next chapter, you will learn how to use Excel to create financial statements.

## Chapter 2 Questions

1 Explain how information is entered into an Excel worksheet.
2 Identify the difference between labels and values.
3 What does it mean when a cell or cells in a worksheet include a series of \# signs?


4 Explain the process for changing column width or row height.
5 How do you control the appearance of data in a worksheet?
6 What does the Format Painter tool do?
7 How are formulas written in Excel?
8 Explain the arguments used in the SUM function.
9 Explain the importance of parentheses in formulas.
10 How does the AutoFill feature of Excel help the worksheet user?
11 Why would you want to use absolute references instead of relative references?

12 How do you change a relative reference to an absolute reference?
13 Describe the procedure used to insert a column or row into a worksheet.
14 How do you change the name of a sheet in a workbook?
15 What is the recommended procedure for printing a workbook or worksheet?

## Chapter 2 Assignments

1 Create a trial balance for What SUP as of March 31, 2016
You are to create a trial balance in a format identical to that created in this chapter. Include a debit and credit column, totals for each column, and appropriate labels and formatting. Start with blank spreadsheet and once you have created the spreadsheet save the file as ch2-03_student_ name (replacing student_name with your name). An alphabetical listing of account information as of March 31, 2016, follows.

| Accounts payable | $75,182.10$ |
| :--- | :--- |
| Accounts receivable | $90,432.41$ |
| Accumulated depreciation: Building | $65,000.00$ |
| Accumulated depreciation: Equipment | $11,000.00$ |
| Advertising expense | $14,265.74$ |


| Building | $300,000.00$ |
| :--- | ---: |
| Cash | $32,511.34$ |
| Common stock | $10,000.00$ |
| Cost of goods sold | $341,876.41$ |
| Depreciation expense | $8,000.00$ |
| Equipment | $72,000.00$ |
| Inventory | $118,348.94$ |
| Land | $125,000.00$ |
| Long-term debt | $420,000.00$ |
| Other expense | $1,500.00$ |
| Payroll expense | $69,421.72$ |
| Prepaid expenses | $13,842.11$ |
| Retained earnings | $192,697.36$ |
| Sales revenue | $434,925.13$ |
| Supplies | $8,434.19$ |
| Utilities expense | $13,171.73$ |

a. Print the completed worksheet in Value view, with your name and date printed in the lower left footer and file name in the lower right footer.
b. Print the completed worksheet in Formula view, retaining gridlines and row and column headings, with your name and date printed in the lower left footer and file name in the lower right footer.

## 2 Modify What SUP Sales Worksheet

Using the student file Ch2-04.xlsx, add appropriate formulas to the existing Fanatic SUP Sales worksheet to calculate price, total sales for each ring for the week, and total sales for all Fanatic SUP. Complete this worksheet in a manner consistent with the Weekly Badfish SUP Sales worksheet completed in this chapter. Prior to entering your formulas, the worksheet should look like Figure 2.21. Save the file as ch2-04_student_ name (replacing student_name with your name).

Figure 2.21
Partially Completed Diamond Ring Sales Worksheet
a. Print the completed worksheet in Value view, with gridlines and row and column headings and with your name and date printed in the lower left footer and file name in the lower right footer.
b. Print the completed worksheet in Formula view, retaining gridlines and row and column headings, with your name and date printed in the lower left footer and file name in the lower right footer.

## Chapter 2 Case Problem 1: KELLY'S BOUTIQUE

Kelly's Boutique, located in Pewaukee, Wisconsin, sells a unique combination of books and women's shoes. Customers love to peruse her book inventory while trying on the latest in shoe fashions, often buying both books and shoes even though they came in to buy only one type of merchandise. Casey, Kelly's youngest son, a college student studying accounting, is home for the holidays and can't wait to help his mom come in from the dark ages and use computers in her business. Throughout this text Casey will make every attempt to bring his mom up to speed by teaching her the use of Excel and Access as they apply to her accounting and business needs.

To begin, Casey suggests that Kelly use a worksheet to make a list of her book inventory. She doesn't maintain a large inventory, but she does carry books that she thinks moms in the community might be interested in reading or buying as gifts for their children or friends.

Start with worksheet ch2-05. Format this worksheet using bold and italics formatting for the titles and bold and border formatting for the column names. Add formulas for column E to compute the sales price as list price less the discount specified. Add the following two books and related information to the list. (Be sure the list maintains its alphabetic organization by inserting rows in the correct place.)

| Dept | Product | Author | List Price |
| :--- | :--- | :---: | :---: |
| Children | Make Way for Ducklings | McClosky | 17.99 |
| Adult | Snow Falling on Cedars | Guterson | 21.95 |

Insert a new column D with the title "On Hand" in bold, centered, and center justified. Change the formatting of the column to no decimals. Add the following on hand values to column D .

| Product | Author | On Hand |
| :--- | :--- | :---: |
| Angela's Ashes | McCourt | 5 |
| Betsy - Tacy | Lovelace | 2 |
| Blueberries for Sal | McCloskey | 2 |
| Caddie Woodlawn | Brink | 1 |
| Deep End of the Ocean | Mitchard | 4 |
| Divine Secrets of the YaYa Sisterhood | Wells | 3 |
| Green Eggs and Ham | Seuss | 1 |
| Harry Potter and the Chamber of Secrets | Rowling | 4 |
| Harry Potter and the Prisoner of Azkaban | Rowling | 3 |
| Harry Potter and the Sorcerer's Stone | Rowling | 2 |


| Product | Author | On Hand |
| :--- | :--- | :---: |
| Hop on Pop | Seuss | 1 |
| Horse Whisperer | Evans | 2 |
| Lentil | McCloskey | 2 |
| Make Way for Ducklings | McCloskey | 2 |
| Memoirs of a Geisha | Golden | 4 |
| Message in a Bottle | Sparks | 2 |
| One Morning in Maine | McCloskey | 1 |
| Snow Falling on Cedars | Guterson | 2 |
| The Cat in the Hat | Seuss | 1 |
| The Notebook | Sparks | 3 |

Add a "Total" label in cell B27 and a SUM function in cell D27 to add up the quantity of books on hand. Change the name of Sheet 1 to " $15 \%$ Discount." Create a copy of this worksheet and place it before Sheet2. Change the name of the newly created worksheet to " $20 \%$ Discount." Change the discount in cell F1 of this worksheet to $20 \%$. Save the file as ch2-05_student_name (replacing student_name with your name).
a. Print the completed $15 \%$ Discount worksheet in Value view, with your name and date printed in the lower left footer and file name in the lower right footer.
b. Print the completed $20 \%$ Discount worksheet in Value view, with your name and date printed in the lower left footer and file name in the lower right footer.
c. Print the completed $15 \%$ Discount worksheet in Formula view, with gridlines and row and column headings, landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer.
d. Print the completed $20 \%$ Discount worksheet in Formula view, with gridlines and row and column headings, landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer.

## Chapter 2 Case Problem 2: WINE DEPOT

The Wine Depot, located in Santa Barbara, California, imports and sells highquality wine from around the world. Owner Barbara Fairfield is curious to see how Excel might help her manage the business and account for its inventory. Her husband, Bud, is the accountant in the family but hasn't had much experience with Excel. He's hired you to help him construct several worksheets to help the business better understand the financial and managerial aspects of the company.

To begin, you decide to create a worksheet of some of Barbara's wine inventory. Start with worksheet ch2-06. Format the company name and worksheet title bold and italics. Format the title of each column of data bold with a bottom border. Format all values for the column Price as Accounting Number Format.

Add two column labels, Quantity and Value, to the right of the existing data and then insert quantity amounts as shown below [Note: SKU (Stock Keeping Unit) is a unique identifier for each of the distinct products and services that can be ordered from a supplier.]:

| SKU | Quantity |
| :--- | :---: |
| 17521 | 4 |
| 16716 | 10 |
| 16528 | 12 |
| 16739 | 5 |
| 15347 | 7 |
| 17539 | 3 |
| 11599 | 1 |
| 14539 | 5 |
| 17840 | 12 |
| 13883 | 12 |
| 15966 | 24 |
| 17454 | 24 |
| 17024 | 10 |
| 16554 | 8 |
| 17425 | 7 |
| 17549 | 3 |
| 17578 | 2 |
| 17275 | 1 |

Insert a formula to calculate value as quantity times price in cell I9, then filldown this formula for all cells in the table. Insert a text label "Total" in cell H28 and a formula to calculate the total value in cell I28. Insert two additional rows after row 27. Add two American Syrah wines in those two rows: Carhatt, $\$ 34$ ( 750 ml , year 2000, SKU 16769), quantity 10; and Cafaro, $\$ 35$ ( 750 ml , year 2000, SKU 16874), quantity 15. Delete the row containing the American Merlot from Wildhorse. Change the formatting of the Price and Value columns to include no decimals. After using Excel's Help function to learn how to sort items in a worksheet, sort the information on your worksheet by location and then by type, in ascending order. Change the name of Sheet1 to "Pricing." Create a copy of this worksheet and place it before Sheet2, then change the name of this sheet to "Cost." Add a label at cell C 4 of the Cost sheet called Cost \% in Bold, Italics. Type $60 \%$ as the cost percentage in cell D4 of the Cost sheet. Change the name of the column "Value" to "Cost." Create a new formula in cell I9 to calculate cost as Price times Cost $\%$ times Quantity. (Be sure to use absolute or relative references where appropriate.) Fill the formula in cell I9 down to all items. Save the file as ch2-06_student_name (replacing student_name with your name).
a. Print the completed Pricing worksheet in Value view, with portrait orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer.
b. Print the completed Cost worksheet in Value view, with portrait orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer.
c. Print the completed Pricing worksheet in Formula view, with gridlines and row and column headings, portrait orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer.
d. Print the completed Cost worksheet in Formula view, with gridlines and row and column headings, portrait orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer.

## Chapter 2 Case Problem 3: SNICK'S BOARD SHOP

Snick's Board Shop is located in La Jolla, California, and specializes in complete and longboard skateboards and equipment. Owner Casey "Snick" Miller is curious to see how Excel might help him manage the business and account for its inventory. His girlfriend Caitlin handles the financial aspects of the business but hasn't had much experience with Excel. They have hired you to help him construct several worksheets to help the business better understand the financial and managerial aspects of the company.

To begin, you decide to create a worksheet of Snick's inventory. Start with worksheet ch2-07 and make the following changes:

1 Format the company name and worksheet title bold and italics.
2 Format the title of each column (located in row 5) bold with a bottom border.

3 Format all values for the column Price as Accounting Number Format.
4 Resize column C to 250 pixels and column D to 925 pixels.
5 Use Excel's Help feature to learn how to wrap text in a cell. Format all cells containing data in column C and D to wrap text.

6 Add one column (titled Quantity) to the right of column Product \# and then type 10 as the quantity for all items. Add an additional column (titled Retail Value) to the right of column Quantity. Format both column titles as all other column titles.

7 Insert a formula to calculate the retail value as quantity times price in cell I6, then fill down this formula for all cells in the table.

8 Insert a text label "Total" in cell H19 and a formula to calculate the total retail value of all products in cell I19.

9 Format cell I19 with a top and bottom double border.
10 Insert two additional rows after row 9.

11 Add two products in rows 10 and 11 as follows.

| Category | Ramp | Ramp |
| :---: | :---: | :---: |
| Manufacturer | Element | Mojo |
| Product Name | Element Launch Ramp | Mojo Wedge Ramp |
| Description | Blast over any and everything in your path. $16^{\prime \prime}$ tall $\times 46^{\prime \prime}$ long $\times 19$ $3 / 4^{\prime \prime}$ wide. Folds to $23^{\prime \prime}$ long $\times 19$ $3 / 4^{\prime \prime}$ wide $\times 6^{\prime \prime}$ high. Steel kick plate for smooth transition. Rubber capped feet to avoid slippage. Durable, weatherproof, and powdercoated. Made from partially recycled materials. 2 reflective Element logo stickers for night visibility. Connects easily to other Element Drop Spot obstacles. Imported. | Skate the unskateable or simply pop your tricks higher and further. 11" tall. Imported. |
| Price | 179.99 | 179.99 |
| Style | Black/Red | Black/Blue |
| Product \# | 65-01837 | 65-00011 |
| Quantity | 5 | 8 |

12 Change the name of Sheet1 to "Retail Value."
13 Create a copy of this worksheet and place it before Sheet2, then change the name of this sheet to "Cost."

14 Add a label at cell F2 of the Cost sheet called Cost \% in Bold, Italics.
15 Type $45 \%$ as the cost percentage in cell G2 of the Cost sheet. Change the name of the column "Retail Value" to "Cost." Center the Cost title.

16 Create a new formula in cell I6 to calculate cost as Price times Cost \% times Quantity. (Be sure to use absolute or relative references where appropriate.) Fill the formula in cell I6 down to all items.

17 Save the file as ch2-07_student_name (replacing student_name with your name).

18 Print the completed Pricing worksheet in Value view, with landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer.

19 Print the completed Cost worksheet in Value view, with landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer.

20 Print the completed Pricing worksheet in Formula view, with gridlines and row and column headings, landscape orientation, scaling to fit to

1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer. Resize column D to 330 pixels and all other cells so that formulas are viewable. Don't save these changes.

21 Print the completed Cost worksheet in Formula view, with gridlines and row and column headings, landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and file name in the lower right footer. Resize column D to 330 pixels and all other cells so that formulas are viewable. Don't save these changes.

## Chapter 2 Case Problem 4: ROSEY'S ROSES

Rosey's Roses is located in Savannah, Georgia, and specializes in the sale of roses. You, as the manager of the business, are curious to see how Excel might help you manage the business and account for its inventory. To that end, you have hired a local college student to construct several worksheets to help the business better understand the financial and managerial aspects of the company.

To begin, the two of you decide to create a worksheet of Rosey's inventory. Start with worksheet ch2-08 and make the following changes:

1 Format the company name and worksheet title bold and italics.
2 Move the company name and worksheet title from column C to column A .
3 Format the title of each column (located in row 4) bold with a bottom border.

4 Add a column (titled Quantity) to the right of column Description.
5 Format the Quantity title aligned centered, bold with a bottom border.
6 Format the values under the Quantity title as comma style with no decimals.
7 Resize column C to 95 pixels.
8 Add an additional column (titled Cost/Unit) to the right of column Quantity.
9 Format the Cost/Unit title aligned centered, bold with a bottom border.
10 Format the values under the Cost/Unit title as currency.
11 Resize column D to 115 pixels.
12 Add an additional column (titled Cost) to the right of column Cost/Unit.
13 Format the Cost title aligned centered, bold with a bottom border.

14 Format the values under the Cost title as currency.
15 Resize column E to 115 pixels.
16 Enter the following values for Quantity and Cost/unit

| Type | Description | Quantity | Cost/Unit |
| :--- | :--- | :---: | :---: |
| Shrub | Abraham Darby \#5 | 25 | $\$ 39.99$ |
| Shrub | Be My Baby \#5 | 30 | $\$ 18.99$ |
| Shrub | Deja Blu \#5 | 18 | $\$ 25.99$ |
| Shrub | Koko Loko \#7 | 17 | $\$ 17.99$ |
| Shrub | Peach Drift \#10 | 33 | $\$ 12.99$ |
| Shrub | Red Drift \#10 | 15 | $\$ 6.99$ |
| Shrub | Sedona \#5 | 3 | $\$ 14.99$ |
| Shrub | Sweet Intoxication \#5 | 17 | $\$ 9.99$ |
| Climber | Climbing Orange Crush \#7 | 16 | $\$ 32.99$ |
| Climber | Don Juan Climber \#5 | 25 | $\$ 37.99$ |
| Tree | Barbara Streisand 36in Tree | 50 | $\$ 52.99$ |
| Tree | Firefighter 36in Tree | 14 | $\$ 55.99$ |
| Tree | Trumpeter 36in Tree | 4 | $\$ 65.99$ |

17 Insert a formula to calculate the cost as quantity times cost/unit in cell E5.
18 Format this cell aligned right.
19 Fill down this formula for all cells in the table.
20 Insert a row below the last shrub listed.
21 Add one additional item into your newly added row with a type "Shrub," description "Wing Ding \#5," quantity " 30 ," and cost/unit "11.99."

22 Type Total in cell A20.
23 Insert a formula to calculate the total cost of all roses into cell E20.
24 Format cell E20 to align right with a top and double bottom border.
25 Save the file as ch2-08_student_name (replacing student_name with your name).

26 Print the completed worksheet in Value view, with portrait orientation with your name and date printed in the lower left footer and file name in the lower right footer.

## Financial Statement Analysis

## In this chapter you will learn:

- How to perform a vertical financial analysis
- How to create a pie chart of expenses
- How to perform a horizontal financial analysis
- How to create a column chart of expenses
- How to calculate financial ratios


## Case: What SUP, Inc.

Nathan and Meagan are ready to evaluate the company's performance, examine trends and relationships, and assess liquidity and solvency. Kyle suggests three forms of analysis that can provide information to Nathan and Meagan for business decision making: vertical, horizontal, and ratio analysis.

You recall learning about these three methods of analysis while studying financial accounting. Kyle reminds you that Excel is a great tool for preparing these analyses and suggests that you take the lead in explaining the formulas used in creating these types of worksheets.
"Can Excel also help us prepare charts? We have to prepare some information for our bankers, and they seem to prefer both numbers and charts," Nathan asks. "Most definitely!" Kyle answers. "We'll use Excel to look at the financial information we recently created, and then we'll compute vertical, horizontal, and ratio analyses as well as prepare charts to describe important relationships and trends."


DEMO 3A Vertical analysis with a pie chart

## Vertical Analysis

Vertical analysis, often referred to as component analysis, is used to express each item on a particular financial statement as a percentage of a single base amount. In an income statement, the base is sales revenue. Each expense is expressed as a percentage of sales revenue. Meagan seems very interested in comparing what percentages of revenues are spent on various expenses and how that compares from one period to the next.

## To create a vertical analysis on an income statement:

1 Click File and then click Open.

2 Navigate the Open window to the location of this text's student files. (The location would be the CD provided with the text or from your computer lab's server.)
3 Double-click the file ch3-01, which should be located in a Ch 03 folder.
4 Click the Income Statement tab.
5 Right-click column $\mathbf{C}$ and click Insert to insert a new column.
6 Click cell $\mathbf{C 4}$ and type $\%$ as a label to the new column.
7 Click cell $\mathbf{C} 5$ and type the formula $=\mathbf{B} 5 / \$ \mathbf{B} \$ 5$; then press [Enter]. (Note: use an absolute reference in the denominator so you can fill down the formula later.)
8 Click cell C5 again and reformat the cell by clicking the \% tool in the Number group of the Home tab.
9 Resize column C to reveal all values.
10 Fill down the formula in C5 to C16 by dragging the handle in the lower right corner of cell C 5 to C 16 . (Note: this will also copy down the formatting from cell C 5 , removing border formats that you can fix later.)
11 Eliminate the formula from cell C 8 by clicking the cell and pressing [Delete], then [Enter].
12 Add appropriate border formats to cells C6, C13, and C16.
13 Repeat Steps 6 to 11 in column E, substituting E for C in all column references. Substitute D for B in the formulas. Your worksheet should look like Figure 3.1.

| 4 | A | B | C | D | E | - |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |
| 2 | Income Statement |  |  |  |  |  |
| 3 | For the Year Ended |  |  |  |  |  |
| 4 |  | 12/31/15 | \% | 12/31/16 | \% |  |
| 5 | Sales Revenue | \$ 850,511.65 | 100\% | \$ 975,814.10 | 100\% |  |
| 6 | Less: Cost of Goods Sold | 442,619.87 | 52\% | 595,413.84 | 61\% |  |
| 7 | Gross Margin | 407,891.78 | 48\% | 380,400.26 | 39\% |  |
| 8 | Expenses: |  |  |  |  |  |
| 9 | Advertising | 20,654.21 | 2\% | 36,148.41 | 4\% |  |
| 10 | Depreciation | 22,000.00 | 3\% | 22,000.00 | 2\% |  |
| 11 | Interest | 30,846.24 | 4\% | 32,338.94 | 3\% |  |
| 12 | Other | 10,000.00 | 1\% | 18,000.00 | 2\% |  |
| 13 | Payroll | 115,365.11 | 14\% | 129,547.97 | 13\% |  |
| 14 | Utilities | 23,541.25 | 3\% | 27,546.16 | 3\% |  |
| 15 | Net income before taxes | 185,484.97 | 22\% | 114,818.78 | 12\% |  |
| 16 | Income taxes | 65,218.98 | 8\% | 67,000.00 | 7\% |  |
| 17 | Net income | \$ 120,265.99 | 14\% | S 47,818.78 | 5\% |  |
|  | , Income Statement | Balance Sheet | $\pm$ | (1) |  |  |

14 Click File again and then click Save As. (This preserves your original student and provides a unique name for your file.)

Figure 3.1
Income Statement Vertical Analysis

15 Change the file name to reflect the vertical analysis just performed and your name by using the underscore key as before. In this example, the file will be saved as ch3-01_Vertical_Analysis_student_name (replace student_name with your name). Save your file to a location (e.g., a USB drive) from which you can retrieve it later.

16 Switch to a Page Layout view. Place your name in the left section of the footer. Note that the file name is already in the right section of the footer.
17 Switch back to a Normal view.
18 Click File and then click Print to make sure the worksheet will print the way you want.
19 Click Print to print your analysis.
20 Save your file once again but do not close it.

Meagan is pleased that Excel can produce these amounts so quickly. She notes that the firm's gross profit percentage is down from the previous year and that the cost of goods sold as a percentage of sales is higher. This helps explain the reduction in net income as a percentage of sales.
"Is the balance sheet used for vertical analysis as well?" Nathan asks. "Yes," you respond.

In a balance sheet the base is total assets. Each asset, liability, and equity component is expressed as a percentage of total assets.

## To create a vertical analysis on a balance sheet:

1 Click the Home tab and then click the Balance Sheet worksheet tab.
2 Right-click column C and click Insert to insert a new column.
3 Click cell $\mathbf{C 5}$ and type \% as a label to the new column.
4 Click cell $\mathbf{C} 7$ and type the formula $=\mathbf{B 7} / \$ \mathbf{B} \$ 17$, then press [Enter]. (Note: Once again, use an absolute reference in the denominator so you can fill down the formula later.)
5 Click cell C7 again and reformat the cell by clicking the \% tool in the Number group of the Home tab.
6 Resize column C to 61 pixels.
7 Fill down the formula in C7 to C17 by dragging the handle in the lower right corner of cell C7 to C17. (Note: This will also copy down the formatting from cell C 7 , removing border formats that you can fix later.)

8 Eliminate the formula from cell C12 by clicking the cell and pressing [Delete], then [Enter].
9 Add appropriate border formats to cell C17.
10 Repeat Steps 3 to 9 in column E, substituting E for C in all column references. The asset part of your worksheet should look like Figure 3.2.

| 4 | A | B | C | D | E |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |
| 2 | Balance Sheet |  |  |  |  |  |
| 3 | as of |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 | Assets | 12/31/15 | \% | 12/31/16 | \% |  |
| 6 | Current Assets: |  |  |  |  |  |
| 7 | Cash | \$ 27,532.89 | 4\% | \$ 18,481.56 | 3\% |  |
| 8 | Accounts Receivable | 84,245.25 | 12\% | 102,544.24 | 14\% |  |
| 9 | Inventory | 125,351.45 | 18\% | 152,154.21 | 21\% |  |
| 10 | Prepaid Expenses | 15,625.26 | 2\% | 15,241.75 | 2\% |  |
| 11 | Supplies | 10,245.15 | 2\% | 6,578.24 | 1\% |  |
| 12 | Property, Plant, and Equipment: |  |  |  |  |  |
| 13 | Land | 120,000.00 | 18\% | 120,000.00 | 17\% |  |
| 14 | Building | 300,000.00 | 44\% | 315,000.00 | 44\% |  |
| 15 | Equipment | 65,000.00 | 10\% | 70,000.00 | 10\% |  |
| 16 | Less: Accumulated Depreciatior | $(68,000.00)$ | -10\% | (90,000.00) | -13\% |  |
| 17 | Total | \$ 680,000.00 | 100\% | \$ 710,000.00 | 100\% |  |
|  | Income Statement Bal | Balance Sheet | ! | 1 |  | - |

11 Save your work.
12 Click cell $\mathbf{C} 22$ and type the formula $=\mathbf{B 2 2} / \$ \mathbf{B} \$ 29$; then press [Enter]. (Note: Again, use an absolute reference in the denominator.)

13 Click cell C22 again and reformat the cell by clicking the \% tool in the Number group of the Home tab.
14 Fill down the formula in C22 to C29 by dragging the handle in the lower right corner of cell C22 to C29. (Note: This will also copy down the formatting from cell C7, removing border formats that you can fix later.)
15 Eliminate the formula from cell C26 by clicking the cell and pressing [Delete], then [Enter].
16 Add appropriate border formats to cell C29.
17 Repeat Steps 12 to 16 in column E , substituting E for C in all column references. The liability and equity part of your worksheet should look like Figure 3.3.
18 Switch to a Page Layout view. Place your name in the left section of the footer. Note that the file name is already in the right section of the footer.
19 Switch back to a Normal view.
20 Click File and then click Print to make sure the worksheet will print the way you want.

Figure 3.2
Balance Sheet Assets Vertical Analysis

Figure 3.3
Balance Sheet Liabilities and Equities Vertical Analysis

| 4 | A | B | C | D | E |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 19 | Liabilities and Stockholders' Equity |  |  |  |  |  |
| 20 | Liabilities |  |  |  |  |  |
| 21 | Current Liabilities: |  |  |  |  |  |
| 22 | Accounts Payable | \$ 50,182.10 | 7\% | \$ 82,305.11 | 12\% |  |
| 23 | Notes Payable | \$ 25,000.00 | 4\% | \$ 19,000.00 | 3\% |  |
| 24 | Payroll Liabilities | 2,120.54 | 0\% | 8,178.75 | 1\% |  |
| 25 | Long-Term Debt | 400,000.00 | 59\% | 350,000.00 | 49\% |  |
| 26 |  |  |  |  |  |  |
| 27 | Common Stock | 10,000.00 | 1\% | 10,000.00 | 1\% |  |
| 28 | Retained Earnings | 192,697.36 | 28\% | 240,516.14 | 34\% |  |
| 29 | Total | \$ 680,000.00 | 100\% | \$ 710,000.00 | 100\% |  |
| 30 |  |  |  |  |  |  |
| 31 |  |  |  |  |  |  |
| 32 |  |  |  |  |  |  |
| 33 |  |  |  |  |  |  |
| 34 |  |  |  |  |  |  |
| 35 |  |  |  |  |  |  |
|  | , Income Statement | ance Sheet | ) | 1 |  |  |

21 Click Print to print your analysis.
22 Save your file but do not close it.

Once again Meagan notes some interesting facts from the vertical analysis of the balance sheet. A larger percentage of total assets are invested in accounts receivable and inventory than in the prior year. Yet long-term debt is down, offset by an increase in retained earnings as a percentage of total assets.

To complete the vertical analysis, you offer to demonstrate Excel's charting capability by creating a pie chart of expenses for the year ended December 31, 2016.

## Pie Charts

"Excel's chart wizard makes creating a chart from a worksheet a breeze," you remark. "This will give you a graphical picture of the firm's expenses as a percentage of revenues."

## To create a pie chart of expenses:

1 Click on Income Statement worksheet tab and select cells D9 through D14.
2 Click the Insert tab on the Ribbon and then click the Pie Chart tool on the Charts group.

3 Select 3-D Pie as shown in Figure 3.4. Trouble? If your window is too small you may not see Pie as an option in the Charts group and instead will only see the text Charts. Widen the window to reveal the chart options available or click the Charts group and select Pie.


4 In the Chart Layouts group select Style 6. See Figure 3.5. Your window may look different if it is sized larger. If so just select Layout 6 from the Chart Layouts group.


Figure 3.4
Creating a New Pie Chart

Figure 3.5
Modifying a Chart Layout

5 Double-click the text Chart Title and then type 2016 Expenses as the new chart title.

6 Click the Select Data tool in the Data group.
7 Click Edit under the text Horizontal (Category) Axis Labels as shown in Figure 3.6.

Figure 3.6
Editing the Pie Chart Axis Labels


8 Type =‘Income Statement'!\$A\$9:\$A\$14 as the Axis label range and then click OK. (Alternatively, you could click the button on the righthand side of the window and then select the range A9:A14 instead of typing the cell location.)

9 Click OK to close the Select Data Source window.
10 Click anywhere in the chart and, holding the mouse button down, drag the new chart so that it appears below the data.

11 Click in the lower right-hand corner of the chart and, holding the mouse button down, resize the chart so that it fits in the window; see Figure 3.7.
12 With the chart still selected, click File and then click Print to make sure the chart will print the way you want.

13 Click Print to then print the chart.
14 Save your work and then close the file.


You have now completed the vertical analysis. Nathan and Meagan are eager to examine the percentages and the chart more carefully, but not until they see how horizontal and ratio analyses can be created in Excel.

## Horizontal Analysis

Horizontal analysis examines trends over time. This can include comparisons of months, quarters, or years for both the income statement and the balance sheet. Income statements and balance sheets for two or more periods are compared side by side, and a percentage increase or decrease is computed between periods.
"Isn't that what we just did in vertical analysis?" Meagan asks. Kyle replies: "The percentages computed in vertical analysis are usually done for just one period, although they are often compared period to period. Remember, vertical analysis compares each statement element with a single base amount, such as sales or total assets, whereas horizontal analysis compares elements side by side with other periods."

## To create a horizontal analysis on an income statement:

1 Open ch3-01 (This is the same file you opened for vertical analysis. It should still look the same, because the changes you made were saved under another file name.)
2 Click the Home tab on the Ribbon and then click the Income Statement worksheet tab.
3 Click cell D4 and type \% Change as a label to the column.
4 Format cell D4 bold, center, bottom align, and with a bottom border.
5 Click cell D5 and type the formula $=(\mathbf{C 5}-\mathbf{B 5}) / \mathbf{B 5}$; then press [Enter].
6 Format cell D5 as Percent Style by clicking cell D5 and selecting the Percent Style tool on the Number group on the Home tab.
7 Use the fill-down procedure to copy the formula from D5 to D17.
8 Delete the formula in cell D8.
9 Format cells D6 and D14 with a bottom border.
10 Format cell D17 with a top and double bottom border.
11 Resize column D to 96 pixels. Your completed income statement with horizontal analysis should look like Figure 3.8.
Figure 3.8
Income Statement Horizontal Analysis

| 4 | A | B | C | D | $\bullet$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |
| 2 | Income Statement |  |  |  |  |
| 3 | For the Year Ended |  |  |  |  |
| 4 |  | 12/31/15 | 12/31/16 | \% Change |  |
| 5 | Sales Revenue | S $850,511.65$ | \$ 975,814.10 | 15\% |  |
| 6 | Less: Cost of Goods Sold | 442,619.87 | 595,413.84 | 35\% |  |
| 7 | Gross Margin | 407,891.78 | 380,400.26 | -7\% |  |
| 8 | Expenses: |  |  |  |  |
| 9 | Advertising | 20,654.21 | 36,148.41 | 75\% |  |
| 10 | Depreciation | 22,000.00 | 22,000.00 | 0\% |  |
| 11 | Interest | 30,846.24 | 32,338.94 | 5\% |  |
| 12 | Other | 10,000.00 | 18,000.00 | 80\% |  |
| 13 | Payroll | 115,365.11 | 129,547.97 | 12\% |  |
| 14 | Utilities | 23,541.25 | 27,546.16 | 17\% |  |
| 15 | Net income before taxes | 185,484.97 | 114,818.78 | -38\% |  |
| 16 | Income taxes | 65,218.98 | 67,000.00 | 3\% |  |
| 17 | Net income | \$ 120,265.99 | \$ 47,818.78 | -60\% | $\checkmark$ |
|  | - Income Statement | Balanct ... $\dagger$ | : 1 |  |  |

12 Click File and then click Save As. (Again, this preserves the original file by giving a unique name to your file.)
13 Change the file name to include a reference to your horizontal analysis, and then add your name to the file name using the underscore key as before. In this example, the file will be saved as ch3-01_Horizontal_Analysis_student_name (replace student_name with your name). Save your file to a location from which it can be retrieved later.
14 Switch to a Page Layout view. Place your name in the left section of the footer. Note that the file name is already in the right section of the footer.
15 Switch back to a Normal view.

16 Click File and then Print to make sure the worksheet will print the way you want.
17 Click Print to print your analysis.
18 Save your file but do not close it.
"The trends shown here are good and bad," Nathan says. "The analysis reveals an increase in sales of 15 percent but a 35 percent increase in the costs of goods sold."

Kyle explains that the income statement analysis reveals operational and profitability performance and trends while the balance sheet reflects financial stability and solvency trends. The horizontal analysis on the balance sheet compares current balances for each asset, liability, and equity element with the same element in the prior period.

## To create a horizontal analysis on a balance sheet:

1 Click the Home tab on the Ribbon and then click the Balance Sheet worksheet tab.

2 Click in cell D5 and type \% Change as a label to the column.
3 Format cell D5 bold, center, bottom align, and with a bottom border.
4 Click in cell D7 and type the formula $=(\mathbf{C} 7-\mathbf{B} 7) / \mathbf{B} 7$; then press [Enter].
5 Format cell D7 as Percent Style.
6 Use the fill-down procedure to copy the formula from D7 to D29.
7 Delete the formula in cells D12, D18-D21, and D26.
8 Format cells D17 and D29 with a top and double bottom border.
9 Resize column D to 93 pixels. Your completed balance sheet horizontal analysis should look like Figure 3.9.
10 Switch to a Page Layout view. Place your name in the left section of the footer. Note that the file name is already in the right section of the footer.

11 Switch back to a Normal view.
12 Click File and then Print to make sure the worksheet will print the way you want.
13 Click Print to print your analysis.
14 Save your file once again.

Figure 3.9
Balance Sheet Horizontal Analysis

| 4 | A | B | C | D |
| :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |
| 2 | Balance Sheet |  |  |  |
| 3 | as of |  |  |  |
| 4 |  |  |  |  |
| 5 | Assets | 12/31/15 | 12/31/16 | \% Change |
| 6 | Current Assets: |  |  |  |
| 7 | Cash | \$ 27,532.89 | \$ 18,481.56 | -33\% |
| 8 | Accounts Receivable | 84,245.25 | 102,544.24 | 22\% |
| 9 | Inventory | 125,351.45 | 152,154.21 | 21\% |
| 10 | Prepaid Expenses | 15,625.26 | 15,241.75 | -2\% |
| 11 | Supplies | 10,245.15 | 6,578.24 | -36\% |
| 12 | Property, Plant, and Equipment: |  |  |  |
| 13 | Land | 120,000.00 | 120,000.00 | 0\% |
| 14 | Building | 300,000.00 | 315,000.00 | 5\% |
| 15 | Equipment | 65,000.00 | 70,000.00 | 8\% |
| 16 | Less: Accumulated Depreciatior (68,000.00) |  | $(90,000.00)$ | 32\% |
| 17 | Total | \$ 680,000.00 | \$ 710,000.00 | 4\% |
| 18 |  |  |  |  |
| 19 | Liabilities and Stockholders' Equity |  |  |  |
| 20 | Liabilities |  |  |  |
| 21 | Current Liabilities: |  |  |  |
| 22 | Accounts Payable | \$ 50,182.10 | S 82,305.11 | 64\% |
| 23 | Notes Payable | \$ 25,000.00 | \$ 19,000.00 | -24\% |
| 24 | Payroll Liabilities | 2,120.54 | 8,178.75 | 286\% |
| 25 | Long-Term Debt | 400,000.00 | 350,000.00 | -13\% |
| 26 | Stockholders' Equity |  |  |  |
| 27 | Common Stock | 10,000.00 | 10,000.00 | 0\% |
| 28 | Retained Earnings | 192,697.36 | 240,516.14 | 25\% |
| 29 | Total | \$ 680,000.00 | \$ 710,000.00 | 4\% |
| 30 |  |  |  |  |
|  | Income Statement $\quad \mathrm{Ba}$ | Balance Sheet | ¢ : | - |

"I'm a little concerned about the 22 percent growth in accounts receivable, the 21 percent growth in inventory, and the 33 percent decrease in cash," Meagan says. Kyle reminds her that, when those events occurred, long-term debt decreased 13 percent and retained earnings increased 25 percent. "Excel can also provide some graphical evidence of these trends by creating column charts using the chart wizard," Kyle says.

## Column Charts

Previously you created a pie chart of expenses using Excel's Chart Wizard. Now it is time to create a column chart comparing expenses from one period to the next. This column chart will illustrate expenses side by side for the two years ended December 31, 2015, and December, 31, 2016.

## To create a column chart comparing expenses:

1 Click the Income Statement worksheet tab.
2 Select cells A9 through C14 (expenses for both periods).
3 Click the Insert tab on the Ribbon and then click the Column chart tool from the Charts group.
4 Select 3-D Column as the chart type as shown in Figure 3.10.


5 Click and hold down the mouse on the top border of the chart created; then move the chart to a location below the data.
6 Scroll down the worksheet so that row 8 is at the top of your screen and the chart is fully visible, as shown in Figure 3.11.

Figure 3.10
Creating a Column Chart

Figure 3.11
Modifying a Column Chart


7 Note that the Design tab is now selected and Chart Tools are visible in the Ribbon.

8 Click Select Data from the Data group.
9 Click Series1 from the Legend Entries (Series) section (see Figure 3.12).


Figure 3.12
Editing a Data Source

## 10 Click Edit.

11 Click inside the Series name text box and the click in cell B4. This should enter the formula ="Income Statement"!\$B\$4 the Series name text box. Click OK.
12 Click Series2 from the Legend Entries (Series) section.
13 Click Edit.
14 Click inside the Series name text box and the click in cell C4. This should enter the formula $=$ "Income Statement" $!\$ C \$ 4$ into the Series name text box. Click OK.

15 Click OK again in the Select Data Source window.
16 Click Quick Layout from the Charts Layouts group and then Click Layout 1. Your window may look different if it is sized larger. If so just select Layout 1 from the Chart Layouts group.
17 Type Expense Comparison as the new chart title.
18 Click File and then click Save As.
19 Change the file name to include a reference to column charts, and add your name to the file name using the underscore key as you have done previously. In this example, the file will be saved as ch3-01_ Column_Chart_student_name (replace student_name with your name). Be sure to save your file to a location that you can access later.
20 Click File and then click Print, and, then click Print again to print the worksheet with the chart. Your printout should look like Figure 3.13.

Figure 3.13
Printed Income Statement with Expense Comparison Chart


21 Save your work again.
"All of this is very interesting," says Nathan. "I'll bet there's more. Am I right?" "Yes, we still need to do a ratio analysis in order to complete our financial statement analyses portfolio," Kyle responds.

## Ratio Analysis

Kyle explains that several standard ratios are often used to assess a company's profitability, liquidity, and solvency. Profitability represents the company's ability to generate a profit to investors. Liquidity represents the company's ability to pay its bills currently. Solvency represents the company's ability to stay in business given its debt structure. A chart of each ratio's formula follows.

| Profitability |  |
| :--- | :--- |
| Return on owners' investment | Net income $\div$ Average stockholders' equity |
| Return on total investment | Net income before interest expense $\div$ <br>  <br> Average total assets |
| Profit margin | Net income $\div$ Sales |
| Gross margin | Gross margin $\div$ Sales |
| Liquidity |  |
| Current ratio | Current assets $\div$ Current liabilities <br> (Cash + Accounts receivable + Short-term <br> Quick ratio <br> investments) $\div$ Current liabilities <br> Receivable turnover <br> Inventory turnover |
| Sales $\div$ Average accounts receivable |  |
| Solvency | Cost of goods sold $\div$ Average inventory |
| Debt-to-equity |  |
| Liability | Total liabilities $\div$ Total equity |
|  | Total liabilities $\div$ Total assets |

In Excel, each of these amounts is a part of a given financial statement or can easily be computed. Therefore, you can create a new worksheet that has formulas referencing these amounts. Kyle suggests you create a new worksheet to compute these ratios.

## To calculate the first financial ratio on a new worksheet (refer to preceding ratio table for the return on owners' investment formula):

1 Right-click the Income Statement tab of your workbook and click Insert . . .; then click Worksheet and then OK to insert a new worksheet.
2 Double-click the Sheet1 tab and rename the worksheet Ratio Analysis.
3 Format the Ratio Analysis worksheet like Figure 3.14 with a heading and listing of ratios as shown. To center and merge the title, select the range of cells A1:B1 and then click the Merge and Center button from the Alignment group on the Home tab of the Ribbon. Repeat these steps for the ranges $\mathrm{A} 2: \mathrm{B} 2$ and $\mathrm{A} 3: \mathrm{B} 3$.
4 Click in cell B6 and type the following =‘Income Statement'!C17/ (('Balance Sheet’!B27+‘Balance Sheet’!B28+‘Balance Sheet’!C27+ 'Balance Sheet'!C28)/2) to compute return on owners' investment.

5 Alternatively, you could utilize multiple worksheet referencing. Type $=$ in cell B6, then activate the income statement worksheet and click cell C17.

6 Type /(( (the forward slash and two left parentheses, which determine the all-important order of calculation).
7 Activate the balance sheet worksheet and click cell B27.
8 Type + , then click cell C27.
9 Type +, then click cell B28.
10 Type + , then click cell C28.

Figure 3.14
Format for Ratio Analysis


11 Type )/2) to end the summation of equity accounts and divide the result by 2 to derive an average.
12 Press [Enter] to end your formula.
13 Format cell B6 in a percent style.
Trouble? If you choose to type the formula as written here and forget an apostrophe or exclamation point or misspell a word, then Excel will give you an error message and you'll have to debug your formula. Also, if you don't have the correct number of parentheses, Excel will give you an error message. Note that when you edit the formula, Excel changes the color of each set of parentheses so that you can clearly see which is which. Also be careful when typing formulas to use the apostrophe and not the accent key to create formulas. The apostrophe key is usually located next to the Enter key on your keyboard, and the accent key is usually located above the Tab key.
"The point-and-click method of cell referencing on multiple worksheets is sure easier than typing the references themselves," you comment. "Otherwise I would have to type all of those apostrophes and exclamation points. With my typing skills, I would probably forget one of them and create an error in the formula."
"Good point," Kyle says. "Let's finish the profitability ratios next."

## To enter remaining formulas for profitability analysis (refer to the ratio table for these formulas):

1 Click cell B7 and type =.
2 Use the values at cells C17 and C11 on the income statement to compute net income before interest expense, which is the numerator of the return on total investment ratio.

3 Use the values at cells B17 and C17 on the balance sheet to add total assets, and then divide the result by 2 to obtain average total assets.
4 Once your formula is typed, press [Enter] to compute the ratio. Your formula should look like this: =('Income Statement'!C17+'Income Statement'! C11)/((‘Balance Sheet'!B17+‘'Balance Sheet'! C17)/2). Be careful to use the correct parentheses.
5 Format the cell in percent style.
6 In cell B8, use the values at cells C16 and C5 on the income statement to compute the profit margin. (Use the ratio table to enter the appropriate formula.) Your formula should look like this: ='Income Statement'! $\mathbf{C 1 7 /}$ 'Income Statement'! C5.

7 Format the cell in percent style.
8 In cell B9, use the values at cells C7 and C5 on the income statement to compute the gross margin. (Use the ratio table to enter the appropriate formula.) Your formula should look like this: = 'Income Statement'!C7/ 'Income Statement'!C5.

9 Format the cell in percent style. Your window should look like Figure 3.15.


10 Click File then click Save As.
11 Change the file name to include a reference to ratios, and then add your name to the file name using the underscore key as before. In this example, the file will be saved as ch3-01_Ratios_student_name (replace student_name with your name). Be sure to save your file to a safe location.

Figure 3.15
Profitability Analysis Completed

Remember, profitability ratios measure the company's ability to generate a profit to investors. In this case, Nathan and Meagan are fairly satisfied with their profitability in comparison to other companies of their size and type of business. They are eager to see if their liquidity ratios are equally as positive.

Kyle encourages you to continue with your ratio analysis.

## To compute the liquidity ratios:

1 In cell B11, use the values in cells C7 through C11 (current assets) and C22 through C23 (current liabilities) on the balance sheet to compute the current ratio. (Use the ratio table to find the appropriate formula.) Your formula could be $=$ ('Balance Sheet'!C7+'Balance Sheet'!C8+ ‘Balance Sheet'!C9+‘Balance Sheet'!C10+‘Balance Sheet'!C11)/ ('Balance Sheet'!C22+‘Balance Sheet'!C23+‘Balance Sheet'!C24), where current assets and current liabilities are added up separately; or you could use the SUM function and write the formula as $=\mathbf{S U M}$ ('Balance Sheet'!C7:C11)/SUM('Balance Sheet'!C22:C24).
2 Format the cell in comma style.
3 In cell B12, use the values in cells C7-C8 (cash and accounts receivable) and C22-C23 (current liabilities) on the balance sheet to compute the quick ratio. (Refer to the ratio table for the appropriate formula.) Your formula could be either =('Balance Sheet'!C7+‘Balance Sheet'! C8)/(‘Balance Sheet'!C22+‘Balance Sheet'!C23+‘Balance Sheet'! C24) or =SUM('Balance Sheet'!C7:C8)/SUM('Balance Sheet'! C22:C24).
4 Format the cell in comma style.
5 In cell B13, use the values in cell C5 (sales revenue) on the income statement and cells B8 and C8 (accounts receivable) on the balance sheet to compute the receivable turnover ratio. (Use the ratio table to find the appropriate formula.) Your formula should look like this: =‘'Income Statement'!C5/(('Balance Sheet'!B8+‘Balance Sheet'!C8)/2).
6 Format the cell in comma style.
7 In cell B14, use the values in cell C6 (cost of goods sold) on the income statement and cells B9 and C9 (inventory) on the balance sheet to compute the inventory turnover ratio. (Use the ratio table to find the appropriate formula.) Your formula should look like this: ='Income Statement'!C6/(('Balance Sheet'!B9+‘Balance Sheet'!C9)/2).
8 Format the cell in comma style.
9 Save your work.

Remember, the liquidity ratios measure the company's ability to pay its bills currently. In this case, Nathan and Meagan are surprised at how good their current and quick ratios are. Usually, their current ratio is around 2:1, which is
normal. The 2.69 current ratio and the 1.11 quick ratio indicate they have plenty of resources to meet their current liabilities. Receivable turnover is a little low, given they have 30-day credit terms, but this is still a healthy report. Inventory turnover is a little slow at 4.29 , but this is fairly common in their business. They are eager to see if the solvency ratios continue the favorable trend.

## To compute the solvency ratios:

1 In cell B16, use the values in cells C22 through C25 (accounts payable, notes payable, payroll liabilities, and long-term debt) and C26 and C27 (common stock and retained earnings) on the balance sheet to compute the debt-to-equity ratio. (Refer to the ratio table for the appropriate formula.) Your formula should look like this: =SUM('Balance Sheet'! C22:C25)/SUM('Balance Sheet'!C27:C28).
2 Format the cell in percent style.
3 In cell B17, use the values in cells C22 through C25 (accounts payable, notes payable, payroll liabilities, and long-term debt) and C17 (total assets) on the balance sheet to compute the liability ratio. (Refer to the ratio table for the appropriate formula.) Your formula should look like this: =SUM('Balance Sheet'!C22:C25)/‘Balance Sheet'!C17.
4 Format the cell in percent style. Your completed work should look like Figure 3.16.


Figure 3.16
Completed Ratio Analysis

5 Save your work.

Now the news is not as good. It turns out the positive liquidity ratio is somewhat offset by the solvency ratios, which indicate that debt is 183 percent of equity. The company is financed heavily with debt, and this can lead to problems if the return on investment doesn't exceed the cost of the debt. The liability ratio reflects the same problem in that 65 percent of the company's assets are financed with debt versus equity. Nathan's business plan calls for a reduction in debt over the next several years as profits provide the necessary cash.
"This is great," Meagan says. "Although the solvency ratios are high, they do reflect our business plan. As long as we continue to generate profits and cash flow, we should be able to improve the solvency ratios."

## End Note

You've applied some of what you learned in the first two chapters to create a set of useful worksheets that identify trends and relationships. Plus you've created them in a reusable format for future periods.

In the next chapter, you will learn how to use Excel to perform depreciation calculations and prepare depreciation schedules.

## Chapter 3 Questions

1 What is another term for vertical analysis?
2 What base amount is used for vertical analysis of an income statement?
3 What base amount is used for vertical analysis of a balance sheet?
4 What base amount is used for horizontal analysis of both income statements and balance sheets? Give an example.

5 What do profitability ratios represent?
6 What do liquidity ratios represent?
7 What do solvency ratios represent?
8 Why is the point-and-click method of cell referencing easier than typing references directly into worksheet cells?

9 Which ratios are usually formatted as percentages?
10 Which ratios are usually formatted as numbers?

## Chapter 3 Assignments

1 Create a Financial Analysis for What SUP, Inc. as of December 31, 2016.
You are to create this financial analysis as of December 31, 2016, from the information found on file ch3-02.xls. This file contains three worksheets, which are labeled Income Statement, Balance Sheet, and Ratios.

Following the Chapter 3 examples, create a vertical analysis of both the income statement and balance sheet for December 31, 2016, only. Then create a horizontal analysis of both the income statement and balance sheet. (Note: The horizontal analysis will compare December 31, 2015, with December 31, 2016.) In addition, create a pie chart of expenses for the year ended December 31, 2016; a column chart (in a format of your choice) of expenses for the years ended December 31, 2015, and 2016; and a ratio analysis as of December 31, 2016. Save the file as ch3-02_student_name.xls (replacing student_name with your name).
a. Print each completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print each completed worksheet in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.

2 Create a Financial Analysis for What SUP, Inc. as of December 31, 2017.

You are to create What SUP's financial analysis as of December 31, 2017, from the information found on file ch3-03.xls. This file contains three worksheets, which are labeled Income Statement, Balance Sheet, and Ratios.

Following the Chapter 3 examples, create a vertical analysis of both the income statement and balance sheet for December 31, 2017, only. Then create a horizontal analysis of both the income statement and balance sheet. (Note: The horizontal analysis will compare December 31, 2016, with December 31, 2017.) In addition, create a pie chart of expenses for the year ended December 31, 2016; a column chart (in a format of your choice) of expenses for the years ended December 31, 2016, and 2017; and a ratio analysis as of December 31, 2018. Save the file as ch3-03_student_name.xls (replacing student_name with your name).
a. Print each completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print each completed worksheet in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 3 Case Problem 1: KELLY'S BOUTIQUE

You are to create Kelly's Boutique's financial analyses as of December 31, 2014, and as of December 31, 2015. Following the Chapter 3 examples, use the student file ch3-04.xls to create a vertical and horizontal analysis of the balance sheet and income statement in the columns provided. (Note: The horizontal analysis will compare December 31, 2014, with December 31, 2015.) Also create a pie chart of expenses for the year ended December 31, 2015; a column chart of expenses for the years ended December 31, 2014, and December 31, 2015; and a ratio analysis as of December 31, 2015. Save the file as ch3-04_student_name.xls (replacing student_name with your name).
a. Print each completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print each completed worksheet in Formula view, with gridlines and row and column headings, portrait orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 3 Case Problem 2: WINE DEPOT

You are to create Wine Depot's financial analyses as of December 31, 2015, and as of December 31, 2016. Following the Chapter 3 examples, use the student file ch3-05.xls to create a vertical and horizontal analysis of the balance sheet and income statement in the columns provided. (Note: The horizontal analysis will compare December 31, 2015 with December 31, 2016.) Also create a pie chart of expenses for the year ended December 31, 2016; a column chart of expenses for the years ended December 31, 2015, and December 31, 2016; and a ratio analysis as of December 31, 2016. Save the file as ch3-05_student_name.xls (replacing student_name with your name). Note: You will have to use Excel's help feature to create the column chart, because the columns are not adjacent to one another as in the chapter example. Use whatever chart layout you prefer.
a. Print each completed worksheet in Value view, with landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer. Use Excel's help feature to move charts on your worksheet so that they print on a separate page.
b. Print each completed worksheet in Formula view, with gridlines and row and column headings, landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 3 Case Problem 3: <br> SNICK'S BOARD SHOP

You are to create a financial analysis for Snick's Board Shop as of December 31, 2011, and December 31, 2012. Following the Chapter 3 examples, use the student file ch3-06.xls to create a vertical and horizontal analysis of the balance sheet and income statement in the columns provided. (Note: The horizontal analysis will compare December 31, 2011, with December 31, 2012.) Also create a pie chart of expenses for the year ended December 31, 2012, formatted in a manner similar to your chapter work; a column chart of expenses for the years ended December 31, 2011, and December 31, 2012, formatted in a manner similar to your chapter work; and a ratio analysis as of December 31, 2012. Save the file as ch3-06_student_name.xls (replacing student_name with your name). Note: You will have to use Excel's help feature to create the column chart, because the columns are not adjacent to one another as in the chapter example. Use whatever chart layout you prefer.
a. Print each completed worksheet in Value view, with landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print each completed worksheet in Formula view, with gridlines and row and column headings, landscape orientation, scaling to fit to 1 page wide by 1 page tall, and with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 3 Case Problem 4: ROSEY'S ROSES

You are to create a financial analysis for Rosey's Roses as of December 31, 2013, and December 31, 2014. Following the Chapter 3 examples, use the student file ch3-07.xls to create a vertical analysis of the balance sheet and income statement as of December 31, 2013, and December 31, 2014—as well as a horizontal analysis of both the income statement and balance sheet comparing December 31, 2013, with December 31, 2014. Place the vertical analysis in columns D and G on the income statement labeled \% of Sales in cells D5 and G5. Place the vertical analysis in columns D and G on the balance sheet labeled \% of Assets in cells D5 and G5. Place the horizontal analysis in column I labeled \% Change in cell I5 for both the income statement and balance sheet.

Also create a pie chart of expenses for the year ended December 31, 2014, formatted in a manner similar to your chapter work; a column chart of expenses for the years ended December 31, 2013, and December 31, 2014, formatted in a manner similar to your chapter work; and a ratio analysis as of December 31, 2014. Note: You will have to use Excel's help feature to create the column chart, because the columns are not adjacent to one another as in the chapter example. Use whatever chart layout you prefer.

Save the workbook as ch3-07_student_name (replacing student_name with your name). Print all worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Depreciation

```
In this chapter you will learn:
    - How to calculate straight-line depreciation using Excel's built-in function
    - How to use what-if analysis with the depreciation function
    - How to create a depreciation summary for many assets
    - How to calculate depreciation using double declining balance and sum-of-the-
    year's digits methods using Excel's built-in functions
    - How to create charts to illustrate depreciation expense
```


## Case: What SUP, Inc.

Worksheets are used for more than financial statement preparation and analysis. For the accountant, worksheets serve a useful supporting schedule role. Nathan and Meagan want to make sure that you are fully trained on all aspects of Excel's use in accounting for their business.

## Depreciation Calculations

The financial statements you analyzed in the preceding chapter didn't just appear. They were created using the company's trial balance, which in turn was prepared from the accounts in the general ledger. Prior to financial statement preparation, accounts in the general ledger needed adjustment to properly present accrual accounting. One of those adjustments, of course, is the depreciation of a company's fixed assets.

You recall learning that depreciation is the allocation of a firm's investment in fixed assets in a systematic and rational manner. The easiest of several generally accepted methods of depreciating these assets is called the straight-line method.
"How can Excel help us with depreciation?" Nathan asks.
"Excel has some built-in functions that, when given the appropriate information, can calculate depreciation for you." Kyle responds.
"What about salvage value, useful life, et cetera?" you ask. "Aren't those important factors in determining depreciation?"
"Indeed they are," Kyle says. "That's the appropriate information that I am referring to. In order to calculate depreciation, the Excel function requires information about the asset's cost, estimated salvage value, and economic useful life."

Kyle explains that Excel's built-in function for calculating straight-line depreciation is written as follows: $=\operatorname{SLN}($ Cost, Salvage Value, Useful Life), where

SLN stands for straight-line depreciation. Inside the parentheses are three arguments separated by commas. The first argument identifies the asset's cost, the second its salvage value, the third its useful life. You can type the dollar cost, salvage value, and number of years into the function or you can point the function to the cell locations where the cost, salvage value, and useful life are located. This second alternative is much more effective because the cell references can then be duplicated across several cells.

Kyle suggests that you use a template he's created to compute depreciation for one asset. You are up to the challenge and proceed with the task. The asset you'll depreciate—number 1001, Display Racks—was acquired January 1, 2014, for $\$ 25,000$. It has no salvage value and has an economic useful life of 5 years.

## To calculate depreciation using Excel's built-in function:

1 Start Excel and open file ch4-01.xls.
2 Activate the Asset 1001 worksheet; it should look like Figure 4.1. (Note: You'll use the summary worksheet later.)

Figure 4.1
Depreciation Calculation Worksheet


3 Enter the appropriate information on the worksheet: the asset number, date acquired, depreciation method (use S/L for straight-line), salvage value, and estimated useful life.

4 Enter the formula $=\mathbf{S L N}(\mathbf{B B} \mathbf{6}, \mathbf{\$ B} \mathbf{\$ 8}, \mathbf{\$ B} \$ 9)$ in cell B 12 , and then press the [Enter] key. B6 is the location of the asset's cost, B8 is the location of its salvage value, and B9 is the location of its useful life. (Note: Entering these references as absolute values using the $\$$ will help later as we replicate the formula for each year.)

5 Fill the formula in cell B12 down to cells B13 through B16.
6 Enter the formula $=\mathbf{B} 12$ into cell C12.

7 Enter the formula $=\mathbf{C 1 2}+\mathbf{B 1 3}$ into cell $\mathbf{C 1 3}$ and fill this formula down to cells C14 through C16. These formulas create a running total of depreciation over the years. Your worksheet should now look like Figure 4.2.


Figure 4.2
Completed Depreciation Calculation Worksheet for Asset 1001

8 Save your work to ch4-01_SLN_student_name.xls (replacing student_name with your name).

Meagan offers to create another depreciation worksheet. The company purchased chairs on January 1, 2014, for $\$ 8,000$. These assets were designated as asset $\# 1002$, have a $\$ 300$ salvage value, and were estimated to have a 5 -year useful life.

## To create another deprecation worksheet:

1 Right-click the Asset $\mathbf{1 0 0 1}$ tab to reveal the Shortcut menu.
2 Click Move or Copy.
3 Check the Create a Copy checkbox, and then click OK.
4 Change the name of the newly created worksheet to Asset 1002.
5 Modify the appropriate information on the worksheet to reflect the new asset: the asset number, date acquired, depreciation method (use S/L for straight-line), salvage value, and estimated useful life. Your completed worksheet should look like Figure 4.3.

Figure 4.3
Depreciation Worksheet for Asset 1002


6 Save your work.

Meagan asks: "How is using the SLN function and all the cell references different from using a calculator or just typing the values into the function?" Kyle responds that Excel's power is in its sensitivity or what-if analysis capability, which he offers to illustrate next.

## Conducting a What-If Analysis with the Depreciation Function

What-if analysis helps you determine the consequences of changes in your assumptions or variables. For instance, what if Asset 1001 did have some salvage value. How would that change the depreciation calculation each year?

## To utilize the what-if capabilities of Excel:

1 Activate the worksheet for Asset 1001.
2 Change the salvage value in your deprecation worksheet by entering 1000 into cell B8. Note the change in depreciation expense each period and the resulting change in accumulated depreciation.
3 Now change the cost of the asset from $\$ 25,000$ to $\$ 28,000$. Note the change in depreciation expense each period and the resulting change in accumulated depreciation.
4 Now change the cost back to $\$ 25,000$ and the salvage value back to 0 ; then save your file again.


Figure 4.4
Depreciation Summary Worksheet

Kyle explains that the only thing missing is a way for collecting similar asset cost, depreciation, and accumulated depreciation to support the financial statement.

## Creating a Depreciation Summary

A depreciation summary is designed to capture all the costs, depreciation, and accumulated depreciation from similar assets and thus facilitate preparation of financial statements on an annual basis. Kyle sketches out a worksheet design (shown in Figure 4.4) that he suggests could be used for this purpose.

Using Excel, Kyle demonstrates how multiple worksheets can be summarized.

## To create a depreciation summary worksheet:

1 Activate the Summary worksheet. (Note: This worksheet is preformatted for you without formulas. Observe also that your workbook should contain three worksheets: Summary, Asset 1001, and Asset 1002.)
2 In cell A5, enter the formula ='Asset 1001'!B4. (Remember from previous chapters that you can either type this formula or type $=$ and then click in the Asset 1001 worksheet at cell B4 and press [Enter].)
3 Using either method, continue the same process to include the date acquired, cost, and depreciation method in cells B5, C5, and D5, respectively. Adjust column widths as needed and format without decimal places.
4 In cell E5, enter the formula =‘Asset 1001’!B12. This enters the depreciation for 2014 on Asset 1001.
5 In cell F5, enter the formula =‘Asset 1001'!C12. This enters the accumulated depreciation for Asset 1001 as of the end of 2014.
6 Continue the same process for cells G5, H5, I5, and J5, referencing depreciation and accumulated depreciation for years 2015 and 2016.

7 In cell A6, enter the formula =‘Asset $\mathbf{1 0 0 2 ’ ! B 4 . ~ ( N o t e ~ t h a t ~ t h i s ~ c l o s e l y ~}$ resembles the formula used in cell A5 except now you are referencing a different asset, Asset 1002.)
8 Continue referencing formulas from Asset 1002 to the summary worksheet. Your completed worksheet should look like Figure 4.5.

Figure 4.5
Completed Depreciation Summary Worksheet


9 Save your work again.

What SUP uses the straight-line method of depreciation, but Kyle explains that there are alternative methods, such as declining balance and sum-of-the-year's digits.

## Calculating Depreciation Using Other Methods

You inform Nathan and Meagan that, even though you are familiar with the declining balance and sum-of-the-year's digits methods, you've never used a worksheet to calculate depreciation.

Kyle explains how easy it is, given that you've already invested the time and energy creating the worksheet itself. He suggests you make a copy of one of the depreciation worksheets and just change the depreciation formula to include the new depreciation function.

## To create depreciation worksheets using the declining balance method:

1 Click the File menu and select Save As.
2 Type ch4-01_DDB_student_name as the file name (replacing student_name with your name).
3 Click the Asset 1001 tab.
4 Change cell B7 to read DDB (for double declining balance)

5 Change cell B12 to read $=\mathbf{D D B}(\$ \mathbf{B} \$ \mathbf{6}, \$ \mathbf{B} \$ \mathbf{8}, \$ \mathbf{B} \$ 9,1)$. Once again, the depreciation function DDB takes arguments located within the parentheses. The first three arguments are the same as the SLN function: cost, salvage value, and useful life. All three of these arguments have been set for absolute referencing so that later, when you copy them down the worksheet, they will continue to reference the appropriate cells. The fourth argument is the period for which the asset is being depreciated (e.g., the first, second, or third period).

6 Change cell B13 to read $=\mathbf{D D B}(\mathbf{\$ B} \mathbf{6}, \mathbf{\$ B} \mathbf{8 8}, \mathbf{\$ B} \mathbf{9}, \mathbf{2})$. Note that the only difference between B13 and B12 is the fourth argument.
7 Continue to place the DDB formula in cells B14, B15, and B16, changing only the last argument. This is best accomplished by filling down the formula and then going back to edit each cell individually. Upon completion, your worksheet should look like Figure 4.6.


Figure 4.6
Initial Calculation of Declining Balance Depreciation for Asset 1001

8 Save your work.

You, however, raise a question. "I remember that when using the double declining balance depreciation method we ignore the salvage value, but in this case shouldn't your accumulated depreciation at the end of 5 years be equal to the cost, since your salvage value was zero?"
"Right you are," Kyle responds. "Generally accepted accounting principles for this method of depreciation require that we switch to straight-line depreciation once that method would calculate depreciation expense greater than that calculated by the double declining balance method. That then assures us that the asset is fully depreciated to its salvage value."

Kyle explains that he'll have to modify the existing worksheet to include a calculation of what the straight-line deprecation would be for each year based on the asset's cost (less salvage value) divided by its remaining useful life. Then he will create a "switch" column that will test to see if the straight-line depreciation method produces a higher depreciation amount than the double declining balance method. Then he will create a new depreciation expense column that will establish if the previous period required a switch or not. If it did,
then the depreciation expense will be that previously calculated by the straightline method. If not, the formula will indicate if a switch should take place in the current period. If a switch is appropriate, then the straight-line depreciation amount will be entered; otherwise, the double declining balance depreciation amounts previously calculated will be used. Kyle will then add a new accumulated depreciation column based on the new depreciation expense calculations.

To do all this, Kyle will need to use a built-in Excel function called IF. The IF function tests a condition and returns a value of "true" if the test is true or a value if "false" if the test is not true. The formula is written $=\mathrm{IF}$ (condition, value if true, value if false) where the three arguments result in some value. For example $=\mathrm{IF}(10>4,5 \mathrm{~A}, 6 \mathrm{~A})$ would return 5 A since 10 is greater than 4 .

Kyle points out that he can use the basic IF function to determine if a switch is necessary by comparing calculated depreciation amounts. To determine which amount to use will depend on two things. First, he will have to determine whether the switch was made in the previous period or not. Second, he will have to determine whether it is appropriate to switch in the current period. This will require the use of what are known as nested IF statements.
"This is getting pretty complicated!" you comment.
"I agree, but it's well worth the trouble once we're finished," Kyle responds.
Kyle offers to show you how to modify this worksheet to calculate the proper depreciation method using the double declining balance method.

## To modify this worksheet to properly calculate double declining depreciation:

1 Change the width of column D to 18 pixels.
2 Type Straight-Line Test in cell E11.
3 Type Switch in cell F11.
4 Type Depreciation Expense in cell G11.
5 Type Accumulated Depreciation in cell H11.
6 Increase the column width of columns E, F, G, and H to that all values are visible.
7 Type $=\mathbf{S L N} \mathbf{( \$ \mathbf { B } \mathbf { 6 } , \mathbf { \$ B } \mathbf { 8 } , \mathbf { \$ B } \mathbf { 8 } ) \text { into cell E12. (Note that this is the }}$ same calculation we performed before to calculate straight-line depreciation expense.)
8 Type $=\mathbf{S L N}(\$ \mathbf{B} \mathbf{6} \mathbf{- C 1 2 , \$ \mathbf { B } \mathbf { 8 } , \mathbf { B } \$ \mathbf { 9 - 1 } ) \text { into cell E13. (This is the same }}$ calculation we performed before to calculate straight-line depreciation expense minus the previous period's accumulated depreciation and with one less year of useful life.)
9 Type $=\mathbf{S L N}(\mathbf{B B} \mathbf{6} \mathbf{- C 1 3}, \mathbf{\$} \mathbf{\$ 8}, \mathbf{\$ B} \mathbf{9 - 2}$ ) into cell E14. (Again, this is the same calculation as for straight-line depreciation expense minus the previous period's accumulated depreciation and with one less year of useful life.)

10 Type $=\mathbf{S L N}(\$ B \mathbf{6}-\mathbf{C 1 4 , \$ B} \$ 8, \$ B \$ 9-3)$ into cell E15.
11 Type $=\mathbf{S L N}(\$ \mathbf{B} \mathbf{6}-\mathbf{C} 15, \$ B \$ 8, \$ B \$ 9-4)$ into cell E16. Your window should look like Figure 4.7.

| 4 | A | B | C | D | E | - |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. Deprec | ilation Schedule |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 | Asset \# | 1001 |  |  |  |  |
| 4 | Asset | Display Racks |  |  |  |  |
| 5 | Date acquired | 1/1/2014 |  |  |  |  |
| 6 | Cost | \$ 25,000.00 |  |  |  |  |
| 7 | Depreciation method | DDB |  |  |  |  |
| 8 | Salvage value | \$ |  |  |  |  |
| 9 | Estimated useful life | 5 |  |  |  |  |
| 10 |  |  |  |  |  |  |
| 11 | Year | Depreciation Expense | Accumulated <br> Depreciation |  | Straight-Line Test |  |
| 12 | 2014 | \$10,000.00 | \$10,000.00 |  | \$5,000.00 |  |
| 13 | 2015 | \$6,000.00 | \$16,000.00 |  | \$3,750.00 |  |
| 14 | 2016 | \$3,600.00 | \$19,600.00 |  | \$3,000.00 |  |
| 15 | 2017 | \$2,160.00 | \$21,760.00 |  | \$2,700.00 |  |
| 16 | 2018 | \$1,296.00 | \$23,056.00 |  | \$3,240.00 | $\checkmark$ |
|  | - ... Asset 1001 | Asset 1002 S ... | ( ) |  |  |  |

12 Observe that straight-line depreciation is greater than the calculated double declining balance depreciation in 2017. Type $=\mathbf{I F}(\mathbf{E 1 2}>\mathbf{B 1 2}$, "X","-") in cell F12 to determine if the straight-line depreciation method produces an expense greater than from the double declining balance depreciation method. (Note: Kyle has chosen to place an X in the Switch column if this is true and a dash (hyphen) in the Switch column if the condition is not true. The quotes indicate that the entry is text, not a number.)

13 Format cell F12 to center the text by clicking the Center text button in the Alignment group of the Ribbon.
14 Fill that formula down from cell F12 to cell F16. (Note: Kyle points out that an X appears in the 2017 and 2018 rows.)
15 Type $=\mathbf{I F}\left(\mathbf{F} 12={ }^{\prime} \mathbf{X} \mathbf{X}, \mathbf{E 1 2 , B 1 2}\right.$ ) in cell G12. (This will test to see if a switch to straight-line depreciation method is appropriate for the current period.)
16 Fill that formula down from cell G12 to G13.
17 Edit the formula in G13 so that it reads exactly as follows: $=\mathbf{I F}(\mathbf{F} 12=" \mathbf{X} ", \mathbf{G 1 2 , I F}(\mathbf{F} 13=" \mathbf{X} ", \mathbf{E 1 3}, \mathbf{B 1 3}))$. (Note: Here we test to see if we used straight-line deprecation in the previous year. If we did, then we'll use that same amount for the current year; otherwise, we'll use the amount calculated by testing to see if a switch is necessary for the current year.)

Figure 4.7
DDB Depreciation Schedule with StraightLine Test

Figure 4.8
DDB Depreciation Schedule with New Depreciation Amounts

18 Fill this new formula down from cell G13 to G16.
19 Type $=\mathbf{G 1 2}$ in cell H12, and then type $=\mathbf{H 1 2 + G 1 3}$ into cell H13.
20 Fill down the formula in H13 to cell H16 and then format columns G and H as currency. Your screen should look like Figure 4.8.


21 Follow the same steps to modify Asset 1002 for double declining balance depreciation. Your completed screen for Asset 1002 should look like Figure 4.9. (Observe that a switch was also necessary in this case.)

Figure 4.9
DDB Depreciation Schedule for Asset 1002


22 Save your work and then close the workbook.

A third common depreciation method is called sum-of-the-year's digits. Like the double declining balance method, this is an accelerated method that places more depreciation expense in the first few years of use than in later years. For a 5 -year asset, the method sums up the years: $1+2+3+4+5=15$. In the first year of depreciation, $5 / 15$ of the depreciable cost is recorded as depreciation expense; in the next year, $4 / 15$ of the depreciable cost is recorded; and so forth. Kyle offers to show you how to create a worksheet to calculate the depreciation using the sum-of-the-year's digits method built into Excel.

## To create a sum-of-the-year's digits depreciation schedule:

1 Open the straight-line depreciation workbook you created earlier in the chapter named ch4-01_SLN_student_name.xls.
2 Save this workbook with a new name: ch4-01_SYD_student_name.xls (replacing student_name with your name).
3 Activate the Asset 1001 worksheet.
4 Type SYD in cell B7.
5 Change cell B12 to read $=\mathbf{S Y D} \mathbf{( \$ B} \mathbf{6}, \mathbf{\$} \mathbf{\$ 8}, \mathbf{\$ B} \$ \mathbf{9}, \mathbf{1})$. Once again, the depreciation function SYD takes arguments located within the parentheses. The first three arguments are the same as the SLN function: cost, salvage value, and useful life. All three of these arguments have been set for absolute referencing so that later, when you copy them down the worksheet, they will continue to reference the appropriate cells. The fourth argument is the period for which the asset is being depreciated: the first, second, third, etc.
6 Change cell B13 to read $=\mathbf{S Y D}(\mathbf{B} \mathbf{\$ 6}, \mathbf{B} \mathbf{\$ 8}, \mathbf{B} \mathbf{B} \mathbf{9}, \mathbf{2})$. Note that the only difference between B13 and B12 is the fourth argument.
7 Continue to place the SYD formula in cells B14, B15, and B16, changing only the last argument. This is best accomplished by filling down the formula and then going back to edit each cell individually. Upon completion, your worksheet should look like Figure 4.10.


8 Save your work.
9 Follow the same steps for Asset 1002. When complete, your worksheet should look like Figure 4.11.

Figure 4.10
SYD Depreciation Schedule for Asset 1001

Figure 4.11
SYD Depreciation Schedule for Asset 1002


10 Save your work.
"This makes calculating depreciation fairly easy!" you say.
"That's the idea," Kyle responds.
Kyle points out that the charting feature you've used previously can also be used to help illustrate the effects of different depreciation methods.

## Charting Depreciation Expense

You have created three files calculating depreciation expense for Asset 1001. Kyle states that, by using the charting feature of Excel, you can easily see the accounting impacts of the three different methods: straight-line, double declining balance, and sum-of-the-year's digits. First he suggests you create a simple chart illustrating the straight-line depreciation of Asset 1001.

## To create a chart illustrating the straight-line depreciation of Asset 1001:

1 Open all three workbooks: ch4-01_SLN_student_name, ch4-01_DDB_student_name, and ch4-01_SYD_student_name.
2 Click File and then select New.
3 Double-click Blank Workbook to create a new workbook.
4 Save the workbook as ch4-01_Chart_student_name (replacing student_name with your name).
5 Click the Insert tab and then click the Line icon from the Charts group.
6 Click the 3-D Line chart.
7 Click Select Data from the Data group.
8 Click Add from the Legend Entries (Series) section.
9 Type SL (to represent straight-line depreciation) in the Series name: text box.

10 Remove whatever text is in the Series values: text box and then select the Select Range icon in the Series values: text box.
11 Press and hold the [Alt] key, then press the [Tab] key as many times as necessary until the ch4-01_SLN_student_name file is active.
12 Select cells B12 through B16 from the Asset 1001 worksheet located in the ch4-01_SLN_student_name workbook. Your screen should look like Figure 4.12.


## Figure 4.12

Creating a Line Chart
13 Click OK in the Edit Series window.
14 Click Edit in the Horizontal (Category) Axis Labels section of the Select Data Source window.
15 Press and hold the [Alt] key, then press the [Tab] key as many times as necessary until the ch4-01_SLN_student_name file is active.
16 Select cells A12 through A16 from the Asset 1001 worksheet located in the ch4-01_SLN_student_name workbook.
17 Click OK in the Axis Labels window and then click OK in the Select Data Source window.

18 Move the chart to fit in the upper left-hand corner of the worksheet.
19 Click and hold the mouse in the lower right-hand corner of the chart, and then drag it down and to the right until it covers the range from cell A1 to H16.
20 With the chart still selected, click Layout 3 from the Chart Layouts group as shown in Figure 4.13 . Then change the name of the
worksheet to Asset 1001. Your window make look different if it is larger. If so, just select Layout 3 from the Chart Layouts group.
Figure 4.13
Asset 1001 Straight-Line Depreciation Chart


21 Select the chart title and type Asset 1001 Depreciation Comparison.
22 Save your work.

Kyle then explains how to make the depreciation chart comparative. Once the original chart is created, all that is needed is to add lines that depict depreciation based on the double declining balance and sum-of-the-year's digits methods. Adding a new series of data to an existing chart is simple: first you select the chart and then, using Chart Tools, you add data from existing workbooks you've already created.

Kyle suggests that you now add data from the double declining and sum-of-the-year's digits files that you saved before.

## To modify an existing chart to show comparative depreciation methods:

1 Click and select the chart you created previously.
2 From the Design tab, click Select Data from the Data Group as you did before.
3 Click Add from the Legend Entries (Series) section.

4 Type DDB (for double declining balance depreciation) in the Series name: text box.
5 Select whatever text appears in the Series values: text box.
6 Press and hold the [AIt] key, then press the [Tab] key as many times as necessary until the ch4-01_DDB_student_name file is active.
7 Select cells G12 through G16 from the Asset 1001 worksheet located in the ch4-01_DDB_student_name workbook.
8 Click OK in the Edit Series window.
9 Click Add from the Legend Entries (Series) section.
10 Type SYD (for sum-of-the-year's digits depreciation) in the Series name: text box.
11 Select whatever text appears in the Series values: text box.
12 Press and hold the [Alt] key, then press the [Tab] key as many times as necessary until the ch4-01_SYD_student_name file is active.
13 Select cells G12 through G16 from the Asset 1001 worksheet located in the ch4-01_SYD_student_name workbook.
14 Click OK in the Edit Series window.
15 Click OK in the Select Data Source window.
16 Click and hold the mouse in the lower right-hand corner of the chart, and then drag it down and to the right until it covers the range from cell A1 to H21. Your new comparative depreciation chart should look like Figure 4.14.


Figure 4.14
Asset 1001 Comparative Depreciation Chart

17 With the chart still selected, click File.
18 Click Print.
19 Make sure that Print Selected Chart is selected in the Settings section and then click Print to print the chart.
20 Save your work and close all windows.
"That's just like I remember from my college classes," you comment.
Kyle points out that straight-line depreciation will always produce a horizontal line, reflecting a constant depreciation expense. The double declining balance method will always produce a curved line, reflecting larger depreciation in the first years with declines thereafter. Finally, sum-of-the-year's digits always produces a straight line that goes down from left to right, reflecting larger depreciation in the first years with a constant decline each year thereafter.

## End Note

You've applied some of what you learned in the first three chapters to a specific accounting problem, the depreciation of fixed assets. In the next chapter, you will learn how to use Excel to create loan amortization schedules.

## Chapter 4 Questions

1 What function is built-into Excel to help you calculate straight-line depreciation?

2 What arguments does the SLN function take?
3 Should the arguments in the SLN function be values or references?

5 Should references used as arguments to the SLN function be absolute or relative?

6 What is the purpose of a depreciation summary?
7 What other depreciation functions are built into Excel?
8 What additional argument is added for these depreciation functions?
9 How do you add a new series of data to an existing chart?
10 Describe the shape of the three lines in a depreciation comparison chart depicting straight-line, double declining balance, and sum-of-the-year's digits depreciation.

## Chapter 4 Assignments

1 Modify What SUP's Straight-Line Depreciation Schedule
You are to add another depreciation schedule for What SUP. Use the ch4-01_SLN_student_name.xls worksheet you created in this chapter. Add a new depreciation worksheet, labeled Asset 1003, using the Move or Copy Shortcut menu. The asset to be depreciated is a forge purchased on January 1, 2015, for $\$ 65,000$. It has an estimated salvage value of $\$ 6,150$ and is to be depreciated over 4 years using the straight-line method. Update the summary worksheet to include information on this new asset. (Be careful to note the date this asset was acquired.) Save the file as ch4-02_SLN_student_name (replacing student_name with your name).
a. Print the newly completed worksheet for Asset 1003 and the modified Summary worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print each worksheet from part a (above) in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.

2 Modify What SUP's Double Declining Balance Depreciation Schedule
You are to add another depreciation schedule for What SUP. Use the ch4-01_DDB_student_name worksheet you created in this chapter. Add a new depreciation worksheet, labeled Asset 1003, using the Move or Copy Shortcut menu. The asset to be depreciated is the forge purchased on January 1, 2015, for $\$ 65,000$ (again, its estimated salvage value is $\$ 6,150$ ). The forge is to be depreciated (over 4 years) using the double declining balance method. Update the summary worksheet to include information on this asset. (Be careful to note the date this asset was acquired.) Save the file as ch4-02_DDB_student_name (replacing student_name with your name).
a. Print the newly completed worksheet for Asset 1003 and the modified Summary worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print each worksheet from part a (above) in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.

3 Modify What SUP's Sum-of-the-Year's Digits Depreciation Schedule
You are to add another depreciation schedule for What SUP. Use the ch4-01_SYD_student_name worksheet you created in this chapter. Add a new depreciation worksheet, labeled Asset 1003, using the Move or Copy Shortcut menu. The asset to be depreciated is the forge purchased on January 1, 2015, for $\$ 65,000$ (again, its estimated salvage value is $\$ 6,150$ ). The forge is to be depreciated (over 4 years) using the sum-of-the-year's digits method. Update the summary worksheet to include information on this asset. (Be careful to note the date this asset was acquired.) Save the file as ch4-02_SYD_student_name (replacing student_name with your name).
a. Print the newly completed worksheet for Asset 1003 and the modified Summary worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print each worksheet from part a (above) in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## 4 What SUP's Depreciation Comparison Chart for Asset 1002

You are to add another depreciation chart for What SUP. Use the ch4-01_Chart_student_name workbook you created in this chapter. Add a new depreciation chart by changing the name of Sheet2 to Asset 1002. Following the steps shown in the chapter, create a new chart comparing straight-line, double declining balance, and sum-of-the-year's digit
depreciation amounts for Asset 1002. Save the workbook as ch4-02_Asset 1002_Chart_student_name (replacing student_name with your name). Print then newly created chart.

## 5 What SUP's Depreciation Comparison Chart for Asset 1003

You are to create a depreciation chart for What SUP for Asset 1003. After completing assignments 1,2 , and 3 , and following the steps shown in the chapter, create a new chart comparing straight-line, double declining balance, and sum-of-the-year's digits depreciation amount for Asset 1003. Save the workbook as ch4-02_Asset 1003_Chart_student_name (replacing student_name with your name). Then print the newly created chart.

## Chapter 4 Case Problem 1: KELLY'S BOUTIQUE

Kelly's Boutique owned the following fixed assets as of December 31, 2015:

| Description |  |  |  |
| :--- | :--- | :--- | :--- |
| Asset \# | 101 | 102 | 103 |
| Asset | Building | Computer System | Phone System |
| Date acquired | $1 / 1 / 12$ | $1 / 1 / 14$ | $1 / 1 / 14$ |
| Cost | $\$ 700,000$ | $\$ 75,000$ | $\$ 96,500$ |
| Salvage value | $\$ 22,000$ | $\$ 2,000$ | $\$ 6,000$ |
| Estimated useful life | 25 years | 4 years | 5 years |

You are to create a fixed asset depreciation summary and individual depreciation worksheets for Kelly's Boutique using the straight-line depreciation method based on the information tabulated above. Be sure to pay close attention to the date of purchase for each asset so that your summary sheet is correct. The summary sheet need only include depreciation from 2012 through 2015. Individual assets must show depreciation over their entire useful life. Follow the text examples for formatting. Label your worksheets as follows: Summary SL, Asset 101 SL, Asset 102 SL, and Asset 103 SL.

In the same workbook, create Kelly's Boutique's fixed asset depreciation summary and individual depreciation worksheets using the double declining balance method and based on the tabulated information. Again, pay close attention to the date of purchase for each asset so that your summary sheet is correct. Label your worksheets: Summary DDB, Asset 101 DDB, Asset 102 DDB, and Asset 103 DDB.

In the same workbook, next create Kelly's Boutique's fixed asset depreciation summary and individual depreciation worksheets using the sum-of-theyear's digits method and based on the tabulated information. Pay close attention to the date of purchase for each asset so that your summary sheet is correct. Label your worksheets: Summary SYD, Asset 101 SYD, Asset 102 SYD, and Asset 103 SYD.

In the same workbook, you should now create a chart of Asset 101's depreciation (over its 25 -year estimated useful life) that compares the straight-line,
double declining balance, and sum-of-the-year's digits methods of calculating depreciation. Label this worksheet: Chart. Choose any 2D line chart and chart layout that you like.

Save the workbook as ch4-03_student_name (replacing student_name with your name). Print all worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 4 Case Problem 2: WINE DEPOT

The Wine Depot owned the following fixed assets as of December 31, 2015:

| Description |  |  |  |
| :--- | :--- | :--- | :--- |
| Asset \# | 101 | 102 | 103 |
| Asset | Equipment | Truck | Portable |
| Date acquired | $1 / 1 / 12$ | $1 / 1 / 13$ | $1 / 1 / 14$ |
| Cost | $\$ 925,000$ | $\$ 150,500$ | $\$ 200,000$ |
| Salvage value | $\$ 25,000$ | $\$ 4,500$ | $\$ 12,000$ |
| Estimated useful life | 5 years | 10 years | 15 years |

You are to create Wine Depot's fixed asset depreciation summary and individual depreciation worksheets using the straight-line depreciation method and based on the information in the preceding table. Be sure to pay close attention to the date of purchase for each asset so that your summary sheet is correct. The summary sheet need only include depreciation from 2012 through 2015. Individual assets must show depreciation over their entire useful life. Follow the text examples for formatting. Label your worksheets as follows: Summary SL, Asset 101 SL, Asset 102 SL, and Asset 103 SL.

In the same workbook, create Wine Depot's fixed asset depreciation summary and individual depreciation worksheets using the double declining balance method and based on the same tabulated information. Again, pay close attention to the date of purchase for each asset so that your summary sheet is correct. Label your worksheets: Summary DDB, Asset 101 DDB, Asset 102 DDB, and Asset 103 DDB.

In the same workbook, next create Wine Depot's fixed asset depreciation summary and individual depreciation worksheets using the sum-of-the-year's digits method and based on the tabulated information. Be sure to pay close attention to the date of purchase for each asset so that your summary sheet is correct. Label your worksheets: Summary SYD, Asset 101 SYD, Asset 102 SYD, and Asset 103 SYD.

In the same workbook, you should now create a chart of Asset 103 's depreciation (over its 15 -year estimated useful life) that compares the straight-line, double declining balance, and sum-of-the-year's digits methods of calculating depreciation. Label this worksheet: Chart. Choose any 2D line chart and chart layout that you like.

Save the workbook as ch4-04_student_name (replacing student_name with your name). Print all worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 4 Case Problem 3: SNICK'S BOARD SHOP

Snick's Board Shop owned the fixed assets shown below as of December 31, 2012:

| Asset \# | Shelving | Cash Register | Computer |
| :--- | :--- | :--- | :--- |
| Date acquired | $1 / 1 / 11$ | $1 / 1 / 11$ | $1 / 1 / 11$ |
| Cost | $\$ 2,000$ | $\$ 7,000$ | $\$ 1,900$ |
| Salvage value | $\$ 0$ | $\$ 500$ | $\$ 400$ |
| Estimated useful life | 10 years | 8 years | 3 years |

You are to create Snick's fixed asset depreciation worksheets using the straight-line depreciation method and based on the information in the preceding table. No summary sheet is required. Individual assets must show depreciation over their entire useful life. Follow the text examples for formatting. Label each worksheet Shelving SL, Cash Register SL, and Computer SL.

In the same workbook, create Snick's fixed asset depreciation worksheets using the double declining balance method and based on the same table. No summary sheet is required. Individual assets must show depreciation over their entire useful life. Follow the text examples for formatting. Label each worksheet Shelving DDB, Cash Register DDB, and Computer DDB.

In the same workbook, create Snick's fixed asset depreciation worksheets using the sum-of-the-year's-digits method and based on the same table. No summary sheet is required. Individual assets must show depreciation over their entire useful life. Follow the text examples for formatting. Label each worksheet Shelving SYD, Cash Register SYD, and Computer SYD.

In the same workbook, you should now create a chart of each asset's depreciation that compares the straight-line, double declining balance, and sum-of-the-year's digits methods of calculating depreciation. Label each worksheet Shelving Chart, Cash Register Chart, and Computer Chart. Choose any line chart and chart layout that you like.

Save the workbook as ch4-05_student_name (replacing student_name with your name). Print all worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 4 Case Problem 4: <br> ROSEY'S ROSES

Rosey's Roses owned the fixed assets shown below as of December 31, 2014:

| Asset | Building \#1 | Building \#2 | Equipment |
| :--- | :--- | :--- | :--- |
| Date acquired | $1 / 1 / 13$ | $1 / 1 / 14$ | $1 / 1 / 13$ |
| Cost | $\$ 55,000$ | $\$ 20,000$ | $\$ 7,500$ |
| Salvage value | $\$ 4,000$ | $\$ 1,000$ | $\$ 500$ |
| Estimated useful life | 15 years | 5 years | 4 years |

This assignment has no beginning student file. You are to create Rosey's fixed asset depreciation worksheets from a blank worksheet using the straight-line
depreciation method and based on the information in the preceding table. No summary sheet is required. Individual assets must show depreciation over their entire useful life. Follow the text examples for formatting. Label each worksheet Building \#1 SL, Building \#2 SL, and Equipment SL.

In the same workbook, create Rosey's fixed asset depreciation worksheets using the double declining balance method and based on the same table. No summary sheet is required. Individual assets must show depreciation over their entire useful life. Follow the text examples for formatting. Label each worksheet Building \#1 DDB, Building \#2 DDB, and Equipment DDB.

In the same workbook, create Rosey's fixed asset depreciation worksheets using the sum-of-the-year's-digits method and based on the same table. No summary sheet is required. Individual assets must show depreciation over their entire useful life. Follow the text examples for formatting. Label each worksheet Building \#1 SYD, Building \#2 SYD, and Equipment SYD.

In the same workbook, you should now create a chart of each asset's depreciation that compares the straight-line, double declining balance, and sum-of-the-year's-digits methods of calculating depreciation. Label each worksheet Building \#1 Chart, Building \#2 Chart, and Equipment Chart. Choose any line chart and chart layout that you like.

Save the workbook as ch4-06_student_name (replacing student_name with your name). Print all worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Loan and Bond Amortization

## In this chapter you will learn:

- How to use the payment function to calculate payments to retire a loan
- How to create a loan amortization schedule
- How to use a what-if analysis with the payment function
- How to use names in a worksheet
- How to use the present value function to calculate the proceeds of a bond
- How to create a bond amortization schedule
- How to use Excel's what-if analysis and goal-seeking capabilities with the present value function
- How to use Excel's Scenario Manager
- How to integrate monthly periods into loan or bond amortization analyses


## Case: What SUP, Inc.

Nathan and Meagan have been contemplating the prospect of opening several new locations. They are somewhat strapped for cash and are interested in looking into their financing alternatives. On the one hand, they could borrow funds from their local banker. Alternatively, they could borrow money by issuing bonds to local investors. They are curious whether Excel could help them analyze the alternatives or at least help them determine the payments required to pay back a loan or bond.
"Can Excel perform these types of loan calculations?" Meagan asks.
"Yes," Kyle responds, "not only can Excel help you with the calculations, it can also help you with what-if sensitivity analyses to determine interest costs, loan payments, and balances."

## Loan Calculations

Kyle explains that loans usually involve some constant periodic payment that pays both interest and principal over a specified period of time. Banks usually want to see some principal payment rather than the interest-only payments often associated with bonds. Excel has a built-in function that calculates the payment on a loan given three variables: interest rate, period, and loan amount. The PMT function takes three arguments and is written $=$ PMT (rate, nper, pv), where rate is the periodic interest rate, nper is the number of periods, and $p v$ is the present value (usually the loan amount). Kyle suggests that you create a
worksheet to calculate the annual payment necessary on a 3-year, $\$ 100,000$ loan at an interest rate of 10 percent.

## To calculate a loan payment using Excel's built-in function:

1 Start Excel and open file ch5-01. The worksheet should look like Figure 5.1.

Figure 5.1


2 Type $\mathbf{1 0 0 0 0 0}$ in cell B4, $\mathbf{1 0}$ in cell B5, and $\mathbf{3}$ in cell B6.
3 Type $=\mathbf{P M T}(\mathbf{B 5}, \mathbf{B 6}, \mathbf{B 4})$ in cell B7, and then press [Enter]. Note that the resulting amount is a negative number. This is Excel's way of indicating that cash must be paid out to repay the loan proceeds received.
4 Place a negative sign in front of the function PMT so that the formula reads as follows: $=-\mathrm{PMT}(\mathrm{B} 5, \mathrm{~B} 6, \mathrm{~B} 4)$. This has the effect of making the payment a positive number.
5 Save your work to ch5-01_student_name (replacing student_name with your name).

Thus, a payment of $\$ 40,211.48$, when made at the end of each year for 3 years, will repay the loan and interest charges.
"How much of those payments is interest and how much principal?" Nathan asks.
"Good question." Kyle responds. "That's why it is helpful to create a loan amortization schedule with each worksheet."

## Loan Amortization Schedule

Kyle explains how a loan amortization schedule answers Nathan's question. The schedule breaks down each payment into the components of interest and principal. You remind Kyle that interest expense, based on the accrual accounting principal, is calculated as the balance owed multiplied by the periodic
interest rate. The amount of payment that exceeds the interest owed is applied to the principal and so reduces the loan amount.
"I can do that," you say.

## To add a loan amortization schedule to your worksheet:

1 Type = B4 in cell E11. This places the loan amount at the beginning of the schedule.

2 Type $=\$ \mathbf{B} \$ 7$ in cell B12. This places the loan payment in the schedule. (This reference is absolute so that it can be replicated later.)
3 Type $=\mathbf{E} 11 * \mathbf{B} \$ \mathbf{5}$ in cell $\mathbf{C} 12$. This formula calculates interest expense as the loan amount multiplied by the interest rate. (The reference to the interest rate is absolute so that it can be replicated later.)

4 Type $=\mathbf{B 1 2 - C 1 2}$ in cell D12. This formula calculates the amount of the payment that reduces the loan amount, otherwise known as principal.
5 Type =E11-D12 in cell E12. This formula calculates the new loan balance after the loan payment as the previous loan balance less principal reduction.
6 Replicate formulas located at cells B12 through E12 down through row 14.

7 The resulting worksheet should look like Figure 5.2.

| $\triangle$ | A | B | C | D | E |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |
| 2 | Loan Amortization Schedule |  |  |  |  |
| 3 \| ${ }^{2}$ |  |  |  |  |  |
| 4 | Amount | \$ 100,000.00 |  |  |  |
| 5 | Rate | 10\% |  |  |  |
| 6 | Term | 3 |  |  |  |
| 7 | Payment | \$40,211.48 |  |  |  |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |
| 10 | Payment \# | Payment | Interest | Principal | Balance |
| 11 |  |  |  |  | \$100,000.00 |
| 12 | 1 | \$40,211.48 | \$10,000.00 | \$30,211.48 | \$ 69,788.52 |
| 13 | 2 | \$40,211.48 | \$ 6,978.85 | \$33,232.63 | S 36,555.89 |
| 14 | 3 | \$40,211.48 | \$ 3,655.59 | \$36,555.89 | S |
| 15 |  |  |  |  |  |
|  | + | Sheet1 Sheet2 | \| ... $\oplus$ | : 1 | $\square \square$ |

Figure 5.2
Loan Amortization Schedule for a $\$ 100,000$ Loan at 10\%

8 Save your work.

Kyle points out that, at the end of the loan period, the balance should (of course) be zero, which it is in the worksheet.
"What is the payment if the interest rate is higher or lower?" Meagan asks.
"Another good question," Kyle comments. "That leads us into the sensitivity features of Excel that we've worked on previously."

## What-If Analysis and the Payment Function

Kyle explains that, because you built the loan amortization worksheet with cell references, a what-if analysis is easy. To investigate the effects of changing interest rates or different loan balances, Kyle suggests he determine the effect on the loan payment of interest rates of 11 percent and 9 percent as well as loan balances of $\$ 150,000$ or $\$ 75,000$.

Using Excel, Kyle demonstrates how these variable changes affect the loan payment.

## To perform a what-if analysis using the payment function:

1 Type 11 in cell B5, and then press [Enter]. Note the change in payment.
2 Type 9 in cell B5, and then press [Enter]. Again, note the change in payment. Your worksheet should look like Figure 5.3.

Figure 5.3
Loan Amortization Schedule for a $\$ 100,000$ Loan at 9\%

| 4 | A | B | C | D | E | $\star$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |
| 2 | Loan Amortization Schedule |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 | Amount | \$ 100,000.00 |  |  |  |  |
| 5 | Rate | 9\% |  |  |  |  |
| 6 | Term | 3 |  |  |  |  |
| 7 | Payment | \$39,505.48 |  |  |  |  |
| 8 |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |
| 10 | Payment \# | Payment | Interest | Principal | Balance |  |
| 11 |  |  |  |  | \$100,000.00 |  |
| 12 | 1 | \$39,505.48 | \$ 9,000.00 | \$30,505.48 | \$ 69,494.52 |  |
| 13 | 2 | \$39,505.48 | S $6,254.51$ | \$33,250.97 | S 36,243.56 |  |
| 14 | 3 | \$39,505.48 | S 3,261.92 | \$36,243.56 | S |  |
| 15 |  |  |  |  |  | $\checkmark$ |
|  | + * | Sheet1 Sheet2 | \| ... $\dagger$ | (1) |  |  |

3 Type 10 in cell B5, and then press [Enter].
4 Type 150000 in cell B4, then press [Enter]. Note the change in payment.
5 Type 75000 in cell B4, then press [Enter]. Note the change in payment. Your worksheet should look like Figure 5.4.

Figure 5.4
Loan Amortization Schedule for a \$75,000 Loan at 10\%


6 Type $\mathbf{1 0 0 0 0 0}$ in cell B4.
"Fascinating!" Meagan exclaims. "This is a great tool!"
"Yes, but these formulas get a bit confusing," Nathan comments. "I have trouble understanding what the payment function is doing with B5, B6, and B4. Isn't there a better way of describing the arguments to functions or what these cell references mean?"

Kyle decides to introduce the concept of named ranges to you, Nathan, and Meagan. He explains that cell references can also be named for clearer analysis.

## Names in a Worksheet

Excel provides a naming feature in every worksheet that allows you to define a cell or cells with a name that can then be used elsewhere in the worksheet. There are two steps involved in changing an existing worksheet from cell references to named references. Step 1 is defining cell names; Step 2 is applying those names throughout the worksheet. Kyle suggests that you first name the variables Amount, Rate, Term, and Payment and then apply those names throughout the loan amortization worksheet.

## To use names in the loan amortization worksheet:

1 Select the cell range A4 through B7.
2 Click Create from Selection from the Defined Names group of the Formulas tab.
3 Click in the check box next to Left column as shown in Figure 5.5. (Note: This will name the cells in B4 through B7 with the corresponding name in the left column.)


## 4 Click OK.

5 Click in cell E11.
6 Click Use in Formula from the Defined Names group on the Formulas tab.
7 Click Amount and then press [Enter]. (Note: This action only replaces the reference to B4 in cell E11 with the newly defined name Amount.)

8 Click in cell B12. Click Use in Formula like you did before and this time click Payment and then press [Enter]. Then fill this new formula down to cell B14.
9 Click in any blank cell and then click the down arrow next to Define Name and then click Apply Names and then click OK from the Apply Names window. (Note: This action replaces all references to B4, B5, B6, and B7 with the respective new names of Amount, Rate, Term, and Payment.)
10 Click in cell B7. Observe that the new argument references the payment function: $=-$ PMT(Rate,Term,Amount).
11 Save your work.

Kyle explains that not all cell references will be replaced, since you defined only four cells. However, all references to those cells will now refer to the names instead of specific cells such as B4 and B5.
"This looks much better," Nathan says. "Now I can clearly see that the payment function takes three arguments: Rate, Term, and Amount."

Kyle further explains that these named cells can be used in other ways as well. For example, Excel provides you with a Name Box that lists all the named cells and ranges on the worksheet. He suggests that you explore the use of names further.

## To explore the use of named cells and ranges:

1 Click on the drop-down arrow of the Name box located next to the formula text box to reveal the named cells on the worksheet. Then highlight Rate but don't click; see Figure 5.6.
Figure 5.6
Name Box

| Rate |  | $\times \quad$ | $f_{\text {fx }}$. $10 \%$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Amount Payment |  | B | C | D | E |
|  |  | Inc. |  |  |  |
| Rate |  | rtization Schedule |  |  |  |
| Term |  |  |  |  |  |
| 4 | Amount | \$ 75,000.00 |  |  |  |
| 5 | Rate | 10\% |  |  |  |
| 6 | Term | 3 |  |  |  |
| 7 | Payment | \$30,158.61 |  |  |  |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |
| 10 | Payment \# | Payment | Interest | Principal | Balance |
| 11 |  |  |  |  | S 75,000.00 |
| 12 | 1 | \$30,158.61 | S 7,500.00 | \$22,658.61 | S 52,341.39 |
| 13 | 2 | \$30,158.61 | \$ 5,234.14 | \$24,924.47 | S 27,416.92 |
| 14 | 3 | \$30,158.61 | \$ 2,741.69 | \$27,416.92 | \$ (0.00) |

2 Now click Rate. (Note how Excel now positions the active cell as B5, the location of the name Rate.)
3 Save and close this file.

Once names have been created, they can be used throughout the worksheet as you'll see in the next section. Kyle suggests that you now explore the use of worksheets as tools for bond calculations.

## Present Value and Bonds

You recall having lots of trouble with present value and bonds while in school and are leery of using them in a worksheet. However, Kyle calms your fears by explaining how the use of a worksheet actually helped him better understand bonds and the concept of present value.
"Whoa now!" Meagan comments. "Why should I learn about present values?"
"Present values are very helpful to an accountant and businessperson," Kyle explains. "In fact, you were using present value concepts when you computed the loan payment above!"

Kyle reminds you that bonds are financial instruments that usually require constant interest payments to the bondholder and then a lump-sum payment equal to the bond's face value at the end of a specified term. The proceeds from a bond's sale, however, depend on the market interest rate at the time of sale.

Kyle explains that Excel's present value function can compute those proceeds based on the following variables: market interest rate, term, periodic interest payment, and lump-sum face value payment. The present value function is written: PV (rate,nper,pmt,fv), where rate is the market rate of interest, nper is the number of periods, pmt is the periodic interest payment, and fv is the future value that is paid at the end of the bond term.

You recall that, if the stated rate of interest on a bond differs from the market rate of interest, then the bond's proceeds won't match its face value. If the stated rate is lower than the market rate, then buyers will pay less than the face value, resulting in a discount; if the stated rate is higher than the market rate, then buyers will pay more than the face value, resulting in a premium.

Kyle suggests you use Excel to calculate proceeds of a $\$ 100,000$ bond paying 10 percent per year for 5 years, given an 11 percent market interest rate at the time of the bond's issuance.

## To calculate bond proceeds:

1 Open file ch5-02. The worksheet should look like Figure 5.7.
2 Type $\mathbf{1 0 0 0 0 0}$ in cell B4 to identify the bond face value.
3 Type $\mathbf{1 0}$ in cell B5 to identify the bond's stated interest rate.
4 Type $\mathbf{1 1}$ in cell B6 to identify the market interest rate.

Figure 5.7
Bond Worksheet


5 Type 5 in cell B7 to identify the bond term.
6 Type $=\mathbf{B 4} 4$ B5 in cell B8 to calculate annual interest payment.
7 Type $=-\mathbf{P V}(\mathbf{B 6}, \mathbf{B} 7, \mathbf{B 8}, \mathbf{B 4})$ in cell B9 to calculate bond proceeds. (Don't forget the minus sign in front of PV to make the proceeds positive.)

8 Type =B9-B4 in cell B10 to calculate the bond discount or premium. Your worksheet should look like Figure 5.8.

Figure 5.8
Calculating Bond Proceeds

|  | A | B |
| :---: | :--- | ---: |
| 1 | What SUP, Inc. |  |
| 2 | Bond Amortization Schedule |  |
| 3 |  |  |
| 4 | Amount | $\$ 100,000.00$ |
| 5 | Stated Rate | $10.00 \%$ |
| 6 | Market Rate | $11.00 \%$ |
| 7 | Term | 5 |
| 8 | Interest Payment | $\$ 10,000.00$ |
| 9 | Proceeds | $\$ 96,304.10$ |
| 10 | (Discount) / Premium | $(\$ 3,695.90)$ |

9 Name the cells located at B4 through B10.
10 Apply the names you just defined. (Hint: If you need help doing this, review the Names in a Worksheet section of this chapter.)

11 Click on cell B9. The new formula should read as follows: =-PV(Market_Rate,Term,Interest_Payment,Amount).
12 Save the file as ch5-02_student_name (replacing student_name with your name).

Next you need to create a bond amortization schedule to summarize interest payments, interest expense, bond amortization, and remaining carrying value.

## Bond Amortization Schedule

A bond amortization schedule is, in essence, a reconciliation of interest payments and bond accounting. Interest expense, usually recorded using the "effective interest" method, is based on the market rate of interest and the carrying value of the debt.

Kyle suggests that you complete the bond amortization table using the named cell ranges that you've already created. In addition to the effective interest formula described previously, you'll need to compute the bond discount/premium amortization as the difference between the interest expense recorded and the interest payment. The ending carrying value for each period will then be the previous period carrying value plus or minus the remaining discount or premium amortization.

## To create the bond amortization schedule:

1 Select cell E13.
2 Click Use in Formula from the Defined Names group of the Formulas tab.
3 Click Discount_Premium from the drop-down list of names and then press [Enter]. (Note: This is one way to use previously defined names.)
4 Type $=$ Amount + E13 in cell F13. Then replicate this formula down to cell F18. This calculation represents the sum of the discount or premium left to be amortized plus the face value of the note.
(Note: Typing a name is another way of using previously defined names.)
5 Type =Interest_Payment in cell B14. Replicate this formula down to cell B18.
6 Type $=$ F13*Market_Rate in cell C14. Replicate this formula down to cell C18. These cells will calculate interest expense as the previous period carrying value multiplied by the market rate of interest.
7 Type =B14-C14 in cell D14. Replicate this formula down to cell D18. These cells will calculate the amortization for the period as the amount by which interest expense differs from the interest payment.
8 Type =E13-D14 in cell E14. Replicate this formula down to cell E18. These cells will calculate the remaining amount of bond discount or premium to be amortized in future periods.

9 Type $=\mathbf{S U M}(\mathbf{B 1 4 : B 1 8})$ in cell B19 to sum interest payments.
10 Format the cell with a top and double bottom border.
11 Replicate the formula to cell D19 to sum interest expense and amortization.

12 Select cell B19, then click Define Name from the Defined Names group on the Formulas tab of the Ribbon.
13 Type Total_Interest_Payments in the Name: text box and then click OK.
14 Select cell C19, then click Define Name from the Defined Names group on the Formulas tab of the Ribbon.
15 Type Total_Interest_Expense in the Name: text box and then click OK. (Note: You'll use this name later.)

16 The resulting amortization table should look like Figure 5.9.
Figure 5.9
Bond Amortization at a Market Rate of $11 \%$

| 3 | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |
| 2 | Bond Amortization Schedule |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 | Amount | \$ 100,000.00 |  |  |  |  |
| 5 | Stated Rate | 10.00\% |  |  |  |  |
| 6 | Market Rate | 11.00\% |  |  |  |  |
| 7 | Term | 5 |  |  |  |  |
| 8 | Interest Payment | \$10,000.00 |  |  |  |  |
| 9 | Proceeds | \$96,304.10 |  |  |  |  |
| 10 | (Discount) / Premium | (\$3,695.90) |  |  |  |  |
| 11 |  |  |  |  |  |  |
| 12 | Payment \# | Interest <br> Payment | Interest <br> Expense | Amortization | (Discount) <br> Premium | Carrying Value |
| 13 |  |  |  |  | (\$3,695.90) | \$96,304.10 |
| 14 | 1 | \$10,000.00 | \$10,593.45 | (S593.45) | $(53,102.45)$ | \$96,897.55 |
| 15 | 2 | \$10,000.00 | \$10,658.73 | (\$658.73) | (\$2,443.71) | \$97,556.29 |
| 16 | 3 | \$10,000.00 | \$10,731.19 | (\$731.19) | ( $\$ 1,712.52$ ) | \$98,287.48 |
| 17 | 4 | \$10,000.00 | \$10,811.62 | (\$811.62) | (\$900.90) | \$99,099.10 |
| 18 | 5 | \$10,000.00 | \$10,900.90 | (\$900.90) | \$0.00 | \$100,000.00 |
| 19 |  | \$50,000.00 | \$53,695.90 | (\$3,695.90) |  |  |

17 Save the file.
"I'll bet we can use this schedule to do some what-if analyses like we did with the loan amortization schedule," you suggest.
"Exactly!" Kyle responds. "Let's see the impact of changing the effective interest rate on bond proceeds and interest expense."

## What-If Analysis and Goal Seeking

Nathan is curious about the impact that different market interest rates will have on the proceeds from a bond issuance and on the company's interest expense. He suggests you try interest rates of 9 percent and 12 percent.

## To assess the effect of different market rates:

1 Type 9 into cell B6. Note the effect on bond proceeds and total interest expenses, as shown in Figure 5.10.

|  | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |
| 2 | Bond Amortization Schedule |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 | Amount | \$ 100,000.00 |  |  |  |  |
| 5 | Stated Rate | 10.00\% |  |  |  |  |
| 6 | Market Rate | 9.00\% |  |  |  |  |
| 7 | Term | 5 |  |  |  |  |
| 8 | Interest Payment | \$10,000.00 |  |  |  |  |
| 9 | Proceeds | \$103,889.65 |  |  |  |  |
| 10 | (Discount) / Premium | \$3,889.65 |  |  |  |  |
| 11 |  |  |  |  |  |  |
| 12 | Payment \# | Interest <br> Payment | Interest <br> Expense | Amortization | (Discount) <br> Premium | Carrying Value |
| 13 |  |  |  |  | \$3,889.65 | \$103,889.65 |
| 14 | 1 | \$10,000.00 | \$9,350.07 | \$649.93 | \$3,239.72 | \$103,239.72 |
| 15 | 2 | \$10,000.00 | \$9,291.57 | \$708.43 | \$2,531.29 | \$102,531.29 |
| 16 | 3 | \$10,000.00 | \$9,227.82 | \$772.18 | \$1,759.11 | \$101,759.11 |
| 17 | 4 | \$10,000.00 | \$9,158.32 | \$841.68 | \$917.43 | \$100,917.43 |
| 18 | 5 | \$10,000.00 | \$9,082.57 | \$917.43 | \$0.00 | \$100,000.00 |
| 19 |  | \$50,000.00 | \$46,110.35 | \$3,889.65 |  |  |

Figure 5.10
Bond Amortization at a Market Rate of 9\%

2 Type 12 into cell B6. Note the effect on bond proceeds and total interest expenses.
"Wow, that sure is useful." Nathan says. "We can use this information for our accounting record keeping as well as for financial planning."
"Quite true," Kyle responds. "Excel also has a goal seek feature to help determine a stated rate given needed bond proceeds. Let's assume the company wants to issue a 5 -year, $\$ 100,000$ bond when the market interest rate is 8 percent. If the company needs at least $\$ 95,000$ from the proceeds, what must be the bond's stated rate of interest?"
"I'll use the existing worksheet and try different stated rates to see how close I can get to $\$ 95,000$," you comment.
"Not necessary," Kyle explains. "We can use the existing worksheet formulas and simply use Excel's goal seek feature. First you change the variable information, such as the market rate of interest. Then you invoke the goal seek command, set the location of the desired value (B9), specify the desired value $(95,000)$, and identify the location of the variable that should be changed to achieve the desired value (B5). In this case, that location is the cell containing the stated interest rate."
"I'll try that," Meagan says.

## To use the goal seek feature:

1 Type $\mathbf{8}$ into cell B6. Observe the effect on bond proceeds (the old stated rate of $10 \%$ implied payment of a bond premium).
2 Now click What-If Analysis from the Data Tools group of the Data tab of the Ribbon.

3 Select Goal Seek from the drop-down menu.
4 Type Proceeds in the Set cell: edit box. (Alternatively, you could click in the Set cell: edit box and then click cell B9.)
5 Type 95000 in the To value: edit box.
6 Type Stated_Rate in the By changing cell: edit box, as shown in Figure 5.11.

Figure 5.11
Goal Seek Window

|  | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP, Inc. |  |  |  |  |  |
| 2 | Bond Amortization Schedule |  |  |  |  |  |
| 3 |  |  |  | Goal Ser | (8) $x$ |  |
| 4 | Amount | \$ 100,000.00 |  | Set cell: |  |  |
| 5 | Stated Rate | 10.00\% |  |  | Proceeds | [國] |
| 6 | Market Rate | 8.00\% |  | To value: | 95000 |  |
| 7 | Term | 5 |  | By changing cell: | Stated_Ratel | [國] |
| 8 | Interest Payment | \$10,000.00 |  |  | Cance |  |
| 9 | Proceeds | \$107,985.42 |  |  |  |  |
| 10 | (Discount) / Premium | \$7,985.42 |  |  |  |  |
| 11 |  |  |  |  |  |  |
| 12 | Payment \# | Interest <br> Payment | Interest Expense | Amortization | (Discount) <br> Premium | Carrying <br> Value |
| 13 |  |  |  |  | \$7,985.42 | \$107,985.42 |
| 14 | 1 | \$10,000.00 | \$8,638.83 | \$1,361.17 | \$6,624.25 | \$106,624.25 |
| 15 | 2 | \$10,000.00 | \$8,529.94 | \$1,470.06 | \$5,154.19 | \$105,154.19 |
| 16 | 3 | \$10,000.00 | \$8,412.34 | \$1,587.66 | \$3,566.53 | \$103,566.53 |
| 17 | 4 | \$10,000.00 | \$8,285.32 | \$1,714.68 | \$1,851.85 | \$101,851.85 |
| 18 | 5 | \$10,000.00 | \$8,148.15 | \$1,851.85 | \$0.00 | \$100,000.00 |
| 19 |  | \$50,000.00 | \$42,014.58 | \$7,985.42 |  |  |

7 Click OK. The Goal Seek Status window should appear as shown in Figure 5.12, indicating that a solution has been found.
8 Click OK in the Goal Seek Status window.
9 Save your work.


Figure 5.12
Goal Seek Status Window and Goal Seek Solution

Kyle remarks that the goal seek solution indicates that a stated rate of 6.75 percent yields the $\$ 95,000$ proceeds needed, given an 8 percent market rate for a 5 -year, $\$ 100,000$ bond. In reality, the stated rate necessary to produce exactly $\$ 95,000$ in proceeds is slightly smaller than 6.75 . The B5 cell is formatted to show only two decimal places. If you formatted the cell to read additional decimal places it would have shown $6.74771772716582 \%$. However, Kyle contends that 6.75 percent is close enough!
"This is very cool," Nathan comments, "but I wish I could see the effects of the different market rates on the bond proceeds in one worksheet at one time."

Kyle responds: "Sounds like I need to demonstrate the Scenario Manager to you."

## Scenario Manager

Scenarios are part of a suite of commands called what-if analysis tools. When you use scenarios, you are performing what-if analysis. As we've seen, what-if analysis is the process of changing the values in cells to see how those changes will affect the outcome of formulas on the worksheet. The values in cells are independent variables but formulas, by their very nature, yield dependent variables. That is, the value generated by a formula is dependent on the values in the worksheet's cells that are specified in that formula. You can use scenarios to create and save different sets of independent variable values and switch between them. You can also create a scenario summary report, which combines all the scenarios into one worksheet.

Kyle suggests you use the Scenario Manager to create a scenario describing the effects a change in the market interest rate (an independent variable) on the proceeds from issuing a bond (a dependent variable) and the related total interest expense (another dependent variable) over the term of the bond.

## To use the Scenario Manager:

$\mathbf{1}$ Type $\mathbf{1 0 0 0 0 0}$ in cell B4, $\mathbf{1 0 \%}$ in cell B5, and $\mathbf{1 1 \%}$ in cell B6 to return to the original bond proposal.
2 Click What-If-Analysis from the Data Tools group of the Data tab on the Ribbon.
3 Click Scenario Manager.
4 Click Add to add a new scenario.
5 Type 1 in the Scenario name: text box.
6 Type Market_Rate in the Changing cells: text box. Your window should look like Figure 5.13.

Figure 5.13
Adding a Scenario


## 7 Click OK.

8 Type $\mathbf{0 . 1 2}$ for the Market_Rate, as shown in Figure 5.14. (Note: 0.12 represents interest at 12 percent.)

Figure 5.14
Entering Scenario Values


## 9 Click OK.

10 Continue the same process by adding scenarios 2,3 , and 4 , which change the Market_Rate cell to $0.10,0.09$, and 0.08 respectively. Your window should now look like Figure 5.15.
11 Click Summary.
12 Select the Scenario summary option button and then type Proceeds, Total_Interest_Expense in the Result cells text box. (Note: This action specifies the target variables affected by the change in interest rate-namely, bond proceeds, located in cell B9, and total interest expense, located in cell C19.) See Figure 5.16.


## 13 Click OK.

14 A new worksheet should appear, entitled Scenario Summary, that looks like Figure 5.17.


15 Save your work.

Figure 5.15
Scenario Manager with Four Scenarios

Figure 5.16
Scenario Summary Options

Figure 5.17
Scenario Summary

You explain to Nathan and Meagan how the Scenario Manager is just an extension of the what-if analysis capabilities of Excel. The ability to compare alternative outcomes based on variations in market rates should prove most helpful in planning and future decision making.

## Monthly Periods

So far you have created annual loan and bond amortization schedules and have determined loan payments and bond proceeds based on annual payments. Nathan is curious how this analysis would change if you were confronted with a monthly payment situation.

Kyle offers to help you modify your worksheets for monthly payments. He suggests you take the previous loan workbook you created-a 3 -year loan of $\$ 75,000$ with interest at 10 percent and payments due every year-and convert it to a 3 -year loan at 10 percent with 36 monthly payments. Kyle explains that the PMT function was used to determine annual payments; converting to monthly payments requires that the arguments in the payment function be changed from annual to monthly. The first argument is the periodic interest rate. The annual rate is 10 percent, so we need only divide by 12 to obtain the monthly interest rate. The second argument is the term. Since the term is 3 years, we simply multiply 3 by 12 to obtain the number of monthly periods: 36 .

## To modify your worksheets from annual to monthly:

1 Open your previously saved workbook, ch5-01_student_name.
2 Change the name of Sheet1 to Annual.
3 Right-click the Annual sheet tab and then click Move or Copy.
4 Select the Create a copy check box and then select Sheet 2 to insert a copy of your worksheet before Sheet2; then click OK.
5 Change the name of Annual (2) to Monthly.
6 Type $=-\mathbf{P M T}($ Rate/12,Term*12,Amount) as the formula for cell B7.
7 Select cells A13 and A14, then fill down the column so that payment numbers 1 through 36 show.
8 Type $=$ E11*Rate/12 as the new formula in cell C12
9 Fill that formula down to cell C14.
10 Select cells B14 through E14.
11 Fill the formulas in those cells down through B47 through E47.
12 Click File and then click Print to view a print preview.
13 Click Page Setup and click the Page tab (if it is not already selected) then choose the Fit to: option to scale the worksheet to 1 page wide by 1 page tall.
14 Click OK and then click Print. Your printout should look like Figure 5.18.
15 Save your work.

"I see," Nathan says. "Not only is the payment reduced, but the loan is fully amortized after the 36 th payment."
"Exactly," responds Kyle. "Note how the interest portion of each payment diminishes with each payment while the principal portion increases."

Meagan and Nathan are impressed with Excel's robust features and functionality. You and Kyle point out that you've barely scratched the surface and that more is to come.

## End Note

You've applied some of what you learned in the first four chapters to better understand how Excel can be used to analyze loans and bonds. In addition, you've learned some new functions-conditional (IF), payment (PMT) and present value (PV)—as well as two new features, goal seeking and Scenario Manager. In the next chapter, you'll explore cash flow budgets.

## Chapter 5 Questions

1 Explain the difference between a loan and a bond.
2 What function is used to calculate a loan payment?
3 What arguments does the loan payment function take?
4 Why does the payment function result in a negative number?
5 What does a loan amortization schedule do?
6 Describe the formula for computing interest expense each period for a loan.
7 What function is used to calculate bond proceeds, and what arguments does that function take?

8 Describe the formula computing interest expense each period for a bond.
9 Describe the goal seek process.
10 Describe the Scenario Manager.

## Chapter 5 Assignments

1 Create a new What SUP Loan Amortization Schedule
Using the ch5-03 file to start your work, create a worksheet (similar to the one created in this chapter) that calculates the required annual payment for a $\$ 945,500,7$-year loan at 4 percent and includes a loan amortization schedule. (Be sure to use names in the worksheet, as illustrated in the chapter. You will also need to format the cells.) Save your file as ch5-03_student_name (replacing student_name with your name).
a. Print the newly completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print the worksheet from part a (above) in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.
c. Use the Scenario Manager to create a scenario using rates of 10,9 , 7, and 6 percent to calculate alternative payments. Print the resulting summary worksheet.
d. Use Excel's goal seek feature to calculate the amount the company could borrow if it could afford a payment of $\$ 100,000$ per year assuming the original loan assumptions. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## 2 Create a new What SUP Bond Amortization Schedule

Using the ch5-04 file to start your work, create a worksheet (similar to the one created in this chapter) that calculates the bond proceeds for a $\$ 1,500,000,10$-year, 3 percent stated interest bond issued when the market interest rate is 2.8 percent. Include a bond amortization schedule and use names in the worksheet, as illustrated in the chapter (You will also need to format the cells.) Save your file as ch5-04_student_name (replacing student_name with your name).
a. Print the newly completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print the worksheet from part a (above) in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.
c. Use the Scenario Manager to create a scenario using stated rates of $2,2.5,3.1$, and 3.5 percent to calculate alternative annual interest payments and bond proceeds. Print the resulting summary worksheet.
d. Use Excel's goal seek feature to calculate the stated interest rate it would have to pay under the original bond analysis (in part a) to achieve bond proceeds of $\$ 1,450,000$. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 5 Case Problem 1: KELLY'S BOUTIQUE

Kelly's Boutique is contemplating several alternative means of financing an expansion. One alternative is to borrow $\$ 300,000$ from a local bank; another alternative is to borrow this amount from investors by issuing bonds. Both alternatives involve a 5 -year debt period. Modify the workbook file ch5-05 to compute a loan and bond analysis. Name and format cell ranges as appropriate. Assume an initial loan rate of 3 percent, an initial bond stated rate of 3 percent, and a market interest rate of 2.9 percent.
a. Print the newly completed loan and bond worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print the worksheets from part a (above) in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.
c. Use the Scenario Manager to create two loan scenarios called Best Case and Worst Case. In the Best Case, the rate would be 2.8 percent and the loan amount would be $\$ 325,000$; in the Worst Case, the rate would be 3.2 percent and the loan amount would be $\$ 280,000$.
(Hint: You'll need to place two cell references, separated by a comma, in the Changing cells: text box.) The resulting comparison values you're trying to predict are Payment, Total Payments, and Total Interest. Print the resulting summary worksheet.
d. Use the Scenario Manager to create two bond scenarios called Best Case and Worst Case. In the Best Case, the market rate would be 2.5 percent and the stated rate would be 2 percent; in the Worst Case, the market rate would be 3.2 percent and the stated rate would be 3.1 percent. (Again, you'll need to place two cell references, separated by a comma, in the Changing cells: text box.) The resulting comparison values you're trying to predict are Proceeds, Total Interest Payments, and Total Interest Expense. Print the resulting summary worksheet.
e. Use Excel's goal seek feature to calculate the interest rate that the company would have to negotiate under the original loan analysis (in part a) to achieve a payment of $\$ 63,000$. Round the interest rate to two decimal places. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
f. Use Excel's goal seek feature to calculate the market rate necessary to achieve bond proceeds of $\$ 310,000$. Round the interest rate to two decimal places. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 5 Case Problem 2: WINE DEPOT

Wine Depot is considering several alternative means of financing an expansion. One alternative is to borrow $\$ 300,000$ from a local bank, but another alternative is to borrow this amount from investors by issuing bonds. Both alternatives involve a 3 -year debt period with quarterly payments. Modify the workbook ch5-06 to compute a loan and bond analysis, naming and formatting cell ranges as appropriate. Assume an annual loan rate of 4 percent, an annual bond stated rate of 4 percent, and a market annual interest rate of 3.5 percent.
a. Print the newly completed loan and bond worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print the worksheets from part a, above, in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.
c. Use the Scenario Manager to create two loan scenarios called Best Case and Worst Case. In the Best Case, the rate would be 3 percent and the loan amount would be $\$ 350,000$; in the Worst Case, the rate would be 5 percent and the loan amount would be $\$ 200,000$.
(Hint: You'll need to place two cell references, separated by a comma, in the Changing cells: text box.) The resulting comparison values you're trying to predict are Payment, Total Payments, and Total Interest. Print the resulting summary worksheet.
d. Use the Scenario Manager to create two bond scenarios called Best Case and Worst Case. In the Best Case, the market rate would be 3.75 percent and the stated rate would be 5 percent. In the Worst Case, the market rate would be 4.5 percent and the stated rate would be 3.25 percent. (Again, you'll need to place two cell references, separated by a comma, in the Changing cells: text box.) The resulting comparison values you're trying to predict are Proceeds, Total Interest Payments, and Total Interest Expense. Print the resulting summary worksheet.
e. Use Excel's goal seek feature to calculate the interest rate the company would have to negotiate under the original loan analysis (in part a) to achieve a quarterly payment of $\$ 26,000$. Round the interest rate to two decimal places. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
f. Use Excel's goal seek feature to calculate the market rate necessary to achieve bond proceeds of $\$ 315,000$. Round the interest rate to two decimal places. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 5 Case Problem 3: SNICK'S BOARD SHOP

Snick's Board Shop is considering several alternative means of financing an expansion. One alternative is to borrow $\$ 400,000$ from a local bank, but another alternative is to borrow this amount from investors by issuing bonds. Both alternatives involve a 2 -year debt period with monthly payments. Modify the workbook ch5-07 to compute a loan and bond analysis, naming and formatting cell ranges as appropriate. Assume an initial loan rate of 8 percent, an initial bond stated rate of 8 percent, and a market interest rate of 8.5 percent.
a. Print the newly completed loan and bond worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print the worksheets from part a, above, in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer.
c. Use the Scenario Manager to create two loan scenarios called Best Case and Worst Case. In the Best Case, the rate would be 7 percent and the loan amount would be $\$ 350,000$; in the Worst Case, the rate
would be 9 percent and the loan amount would be $\$ 450,000$. (Hint: You'll need to place two cell references, separated by a comma, in the Changing cells: text box.) The resulting comparison values you're trying to predict are Payment, Total Payments, and Total Interest. Print the resulting summary worksheet.
d. Use the Scenario Manager to create two bond scenarios called Best Case and Worst Case. In the Best Case, the market rate would be 7.75 percent and the stated rate would be 7 percent. In the Worst Case, the market rate would be 8.75 percent and the stated rate would be 8.25 percent. (Again, you'll need to place two cell references, separated by a comma, in the Changing cells: text box.) The resulting comparison values you're trying to predict are Proceeds, Total Interest Payments, and Total Interest Expense. Print the resulting summary worksheet.
e. Use Excel's goal seek feature to calculate the interest rate that the company would have to negotiate under the original loan analysis (in part a) to achieve a monthly payment of $\$ 17,000$. Round the interest rate to two decimal places. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
f. Use Excel's goal seek feature to calculate the market rate necessary to achieve bond proceeds of $\$ 410,000$. Round the interest rate to two decimal places. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 5 Case Problem 4: ROSEY'S ROSES

Rosey's Roses is considering several alternative means of financing an expansion. One alternative is to borrow $\$ 600,000$ from a local bank, but another alternative is to borrow this amount from investors by issuing bonds. Both alternatives involve a 10 -year debt period with annual payments. Modify the workbook ch5-08 to compute a loan and bond analysis, naming and formatting cell ranges as appropriate. Assume an initial loan rate of 7 percent, an initial bond stated rate of 7 percent, and a market interest rate of 6.5 percent.
a. Print the newly completed loan and bond worksheets in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Use the Scenario Manager to create two loan scenarios called Best Case and Worst Case. In the Best Case, the rate would be 6 percent and the loan amount would be $\$ 550,000$; in the Worst Case, the rate would be 8 percent and the loan amount would be $\$ 650,000$. The resulting comparison values you're trying to predict are Payment, Total Payments, and Total Interest. Print the resulting summary worksheet.
c. Use the Scenario Manager to create two bond scenarios called Best Case and Worst Case. In the Best Case, the market rate would be 6 percent and the stated rate would be 6.5 percent. In the Worst Case, the market rate would be 8.25 percent and the stated rate would be 8 percent. The resulting comparison values you're trying to predict are Proceeds, Total Interest Payments, and Total Interest Expense. Print the resulting summary worksheet.
d. Use Excel's goal seek feature to calculate the interest rate that the company would have to negotiate under the original loan analysis (in part a) to achieve a monthly payment of $\$ 80,000$. Round the interest rate to two decimal places. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
e. Use Excel's goal seek feature to calculate the market rate necessary to achieve bond proceeds of $\$ 650,000$. Round the interest rate to two decimal places. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Cash Budgeting

## In this chapter you will learn:

- How to prepare a budget for operating activities that includes a
- Sales budget
- Operating cash receipts budget
- Purchases budget
- Sales and administrative expenses budget
- Operating cash payments budget
- How to prepare a budget for investing and financing activities
- How to finalize and format the cash budget with grouping
- How to utilize what-if analysis and goal seeking with a cash budget


## Case: What SUP, Inc.

Nathan and Meagan have been contemplating an expansion of their business to include stand up paddle board repair, which will require some new equipment. Nathan is certain they don't have the cash resources necessary to pull it off. Meagan believes that, with the right financing, they'll be okay. At Kyle's suggestion, they have contacted their bankers, who recommended that they prepare a budget for the next year that specifically addresses their cash needs.
"You'll need to complete an operating activities budget that includes forecasts of sales, purchases, selling and administrative expenses, operating cash receipts, and operating cash payments for the year," Kyle informs them. "In addition, you'll need to budget for investing activities such as equipment purchases and sales as well as a budget for financing activities such as loan proceeds and repayments."
"I'll bet we could use Excel to help us!" Meagan responds. "However, since I'm not much of an accountant, I'll need help."
"I did some budgeting in my accounting classes," you comment. "If Kyle can help me get started I'm sure this can be done on Excel."
"The first place to start is with the operating activities budget," Kyle says.

## Operating Activities Budget

Kyle explains that the operating activities budget will include an operating cash receipts budget and an operating activities cash payments budget. However,
before you can complete either, you must first determine your sales and purchases budgets.
"What is the difference between operating cash receipts and sales?" Meagan asks.
"The sales budget will estimate the service revenues you expect to earn and the products you expect to sell during the year; however, not all of those revenues will be collected in cash during the year. Also, some of the sales you made on account in the previous year will be collected in the current year," Kyle answers. "So the first thing we need to do is create a sales budget."

## Sales Budget

Kyle explains that most budgets are broken into periods smaller than a year. He suggests that you prepare a quarterly budget with an annual summary column. He reminds you that you'll need to plan for both product and repair revenue and that no cost of goods sold or expenses will appear on this part of the sales budget.

Nathan estimates product sales revenue to be $\$ 425,000, \$ 400,000, \$ 375,000$, and $\$ 450,000$ for the first through fourth quarters, respectively. During these periods, Nathan thinks he'll bill $1,500,1,600,1,700$, and 1,800 hours of standup paddle board repair (respectively) at $\$ 50$ per hour.

Kyle suggests that you place most of your assumptions that you might consider changing at a later date in a special section of the worksheet called Assumptions. This makes it easy to locate these assumptions in case you want to do some what-if analysis after the budget is created.

## To prepare a sales budget:

1 Start Excel and open file ch6-01. The worksheet should look like Figure 6.1.

Figure 6.1
Cash Budget Worksheet


2 Type Operating activities in cell A4 and then type Operating cash receipts into cell A5. Then type Estimated repair hours into cell A6.
3 Type $\mathbf{1 5 0 0}$ into cell B6, $\mathbf{1 6 0 0}$ into cell C6, $\mathbf{1 7 0 0}$ into cell D6, and 1800 into cell E6.
4 Type $=\mathbf{S U M}(\mathbf{B 6}: \mathbf{E 6})$ into cell F6 and then press [Enter] to sum estimated repair hours.
5 Format cells B6 to F6 with commas and no decimals. (Hint: Use the comma style and decimal tools.)

6 Format cells B6 to F6 with a bottom border by selecting those cells, clicking the Border tool located in the Font group of the Home tab of the Ribbon, and then selecting the Bottom Border tool. (Note: This is done to indicate that the number is not summed in later formulas.)
7 Type Assumptions in cell and then type Hourly repair rate in cell A42.
8 Type 50 into cell B42 and format that cell with commas and no decimals.
9 Define cell B42 as the Hourly repair rate by selecting cells A42 to B42. From the Defined Names group in the Formula tab of the Ribbon, click Create from Selection. With the Left column check box checked, click OK.
10 Type Professional services revenue in cell A7.
11 Type = B6* into cell B7 but do not press the [Enter] key.
12 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula, select Hourly_repair_rate, and then press [Enter] to compute professional services revenue. (Observe how the formatting from B6 is transferred to cell B6.) Fill the formula across to cells B7 through E7.
13 Type $=\mathbf{S U M}(\mathbf{B} 7: \mathbf{E} 7)$ into cell F7 and then press [Enter] to sum estimated repair hours.
14 Type Product sales revenue into cell A8.
15 Type the product sales revenue estimates 425000, 400000, 375000, and $\mathbf{4 5 0 0 0 0}$ into cells B8 through E8, respectively.
16 Type $=\mathbf{S U M}(\mathbf{B 8}: \mathbf{E 8})$ into cell F8 and then press [Enter] to sum Professional services revenues.
17 Format cells B8 to F8 with commas and no decimals and a bottom border.
18 Type Total revenue into cell A9.
19 Type the formula $=\mathbf{B} 7+\mathbf{B 8}$ into cell B 9 to calculate total revenue. Fill the formula across to cells C9 through E9.
20 Type $=\mathbf{S U M}(\mathbf{B 9}: \mathbf{E 9})$ into cell F9 and then press [Enter] to sum revenues.
21 Format cells B9 to F9 with commas and no decimals and a bottom border.

22 The completed worksheet should look like Figure 6.2.
23 Save your work to ch6-01_student_name (replacing student_name with your name as before).

Figure 6.2
Sales Budget

| 4 | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP | 1st | 2nd | 3rd | 4th |  |
| 2 | Cash Budget | 昷 (Ctrl) | Quarter | Quarter | Quarter | Year |
| 3 |  |  |  |  |  |  |
| 4 | Operating activities |  |  |  |  |  |
| 5 | Operating cash receipts |  |  |  |  |  |
| 6 | Estimated repair hours | 1,500 | 1,600 | 1,700 | 1,800 | 6,600 |
| 7 | Professional services revenue | 75,000 | 80,000 | 85,000 | 90,000 | 330,000 |
| 8 | Product sales revenue | 425,000 | 400,000 | 375,000 | 450,000 | 1,650,000 |
| 9 | Total revenue | 500,000 | 480,000 | 460,000 | 540,000 | 1,980,000 |

Now that you have created the sales budget, you can create the operating cash receipts budget.

## Operating Cash Receipts Budget

Kyle explains that the operating cash receipts budget must account for the timing of revenue collection. Whenever a company offers terms to customers (i.e., payment at other than the time of sale, such as "net 30 "), the budget must take into consideration when revenue will actually be collected.
"Based on the last two years, our customers usually pay 80 percent of what we've invoiced them in the quarter when sales were earned and 20 percent in the next quarter" says Nathan. "At the end of last year we had a balance of $\$ 81,000$ in accounts receivable."

Kyle suggests that you use that information, along with the data provided in the sales budget, to calculate an operating cash receipts budget.

## To create the operating cash receipts budget:

1 To add the new assumptions just discussed, type Pct. collections in current quarter in cell A43.

2 Type $\mathbf{8 0 \%}$ in cell B43.
3 Type Pct. collections in subsequent quarter in cell A44.
4 Type $\mathbf{2 0 \%}$ in cell B44.
5 Type Beginning accounts receivable in cell A45.
6 Type $\mathbf{8 1 0 0 0}$ in cell B45 and then format the cell in comma format with no decimals.
7 Define names for cells B43 through B45 as you have done before.
8 Type Current quarter collections in cell A10.
9 Type Subsequent quarter collections in cell A11.
10 Type Operating cash receipts in cell A12.
11 Type $=\mathbf{B 9 *}$ into cell B10 but do not press the [Enter] key.

12 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula, select Pct._collections_in_current_quarter, and then press [Enter] to compute current quarter collections. Fill the formula across to cells C10 through E10.
13 Type $=\mathbf{S U M}(\mathbf{B 1 0}: \mathbf{E 1 0})$ into cell F10 and then press [Enter] to sum current quarter collections.
14 Type $=$ into cell B11 but do not press the [Enter] key.
15 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula, select Beginning_accounts_receivable, and then press [Enter]. Format the cell in comma format with no decimals.
16 Type $=\mathbf{B 9 *}$ into cell C11 but do not press the [Enter] key.
17 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula, select Pct._collections_in_subsequent_quarter, and then press [Enter] to compute subsequent quarter collections. Fill the formula across to cells C11 through E11.
18 Type $=\mathbf{S U M}(\mathbf{B 1 1}: \mathbf{E 1 1})$ into cell F11 and then press [Enter] to sum subsequent quarter collections.
19 Place a bottom border in cells B11 through F11.
20 Type $=\mathbf{B 1 0}+\mathbf{B} 11$ into cell B12 and then fill this formula across to cells C12 through E12.
21 Type $=\mathbf{S U M}(\mathbf{B 1 2 : E 1 2})$ into cell F12 and then press [Enter] to sum operating cash receipts.
22 Place a bottom border in cells B12 through F12. Your cash budget so far should look like Figure 6.3.

| A | B | $C$ | C | E | F |  |
| ---: | :--- | ---: | ---: | ---: | ---: | ---: |
| 1 | What SUP | 1st | 2nd | 3rd | 4th |  |
| 2 | Cash Budget | Quarter | Quarter | Quarter | Quarter | Year |
| 3 |  |  |  |  |  |  |
| 4 | Operating activities |  |  |  |  |  |
| 5 | Operating cash receipts |  |  |  |  |  |
| 6 | Estimated repair hours | 1,500 | 1,600 | 1,700 | 1,800 | 6,600 |
| 7 | Professional services revenue | 75,000 | 80,000 | 85,000 | 90,000 | 330,000 |
| 8 | Product sales revenue | 425,000 | 400,000 | 375,000 | 450,000 | $1,650,000$ |
| 9 | Total revenue | 500,000 | 480,000 | 460,000 | 540,000 | $1,980,000$ |
| 10 | Current quarter collections | 400,000 | 384,000 | 368,000 | 432,000 | $1,584,000$ |
| 11 | Subsequent quarter collections | 81,000 | 100,000 | 96,000 | 92,000 | 369,000 |
| 12 | Operating cash receipts | 481,000 | 484,000 | 464,000 | 524,000 | $1,953,000$ |

Figure 6.3
Cash Budget of Operating Cash Receipts

23 Save your work.

Kyle explains that now it is time to move on to budgeting operating cash payments. It is important first to budget purchases to meet sales demand and
then to contemplate when those purchases will be paid for and then to consider what other operating cash payments must be made, such as selling and administrative expenses.

## Purchases Budget

Nathan and Meagan explain that quarterly purchases are dependent on beginning inventory, the cost of expected sales, and the desired amount of ending inventory. They give the following example. Assume a beginning inventory of $\$ 500$ and expected merchandise sales of $\$ 1,500$ (that cost them \$900). Further, assume they would like to keep an inventory of $\$ 400$ on hand for next month's sales. Hence they will need to purchase $\$ 800$ of inventory during the quarter. This is computed using the following formula: cost of expected sales (\$900) + desired ending inventory $(\$ 400)$ - beginning inventory $(\$ 500)=$ required purchases $(\$ 800)$.

Nathan estimates that the cost of most of his inventory is 60 percent of sales. For example, a necklace Coast sells for $\$ 100$ cost them $\$ 60$. Further, he would like to maintain an inventory on hand each month of 80 percent of expected sales in the following month. Inventory at the beginning of the year was $\$ 125,000$, and product sales in the first quarter of the next year are expected to be $\$ 500,000$.

Kyle recommends that you take a shot at producing the desired purchases budget while explaining the process to Meagan and Nathan.

## To create a purchases budget:

1 Type Operating cash payments in cell A13 and format this cell bold.
2 Type Purchases in cell A14.
3 To add the new assumptions discussed above, type Cost of expected sales in cell A46.

4 Type $\mathbf{6 0 \%}$ in cell B46.
5 Type Required ending inventory in cell A47.
6 Type $\mathbf{8 0 \%}$ in cell B47.
7 Type Beginning inventory in cell A48.
8 Type 125000 in cell B48
9 Type Product sales 1st quarter of next year in cell A49.
10 Type 500000 in cell B49.
11 Define names for cells B46 through B49 and format them as you have done before.

12 Type Cost of expected sales in cell A15.
13 Type Required ending inventory in cell A16.
14 Type Beginning inventory in cell A17.
15 Type Purchases in cell A18.
16 Type $=\mathbf{B 8}^{*}$ into cell B15 but do not press the [Enter] key. (Note: This is not total revenue but just product sales revenue.)

17 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula, select Cost_of_expected_sales, and then press [Enter] to compute the cost of expected sales for the quarter.
18 Fill the formula across to cells C15 through E15.
19 Type $=\mathbf{S U M}(\mathbf{B} 15: \mathbf{E} 15)$ into cell F15 and then press [Enter] to sum the cost of expected sales for the year.
20 Type $=\mathbf{C 1 5}$ * into cell B16 but do not press the [Enter] key.
21 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula, select Required_ending_inventory, and then press [Enter] to compute the required ending inventory for the quarter. Fill the formula across to cells C16 through D16.
22 Type = into cell E16 but do not press the [Enter] key.
23 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula.
24 Click Cost_of_expected_sales, then type *. Continue the same process of selecting the Use in Formula command to insert names. When complete your formula in cell E16 should be=Cost_of_expected_sales *Required_ending_inventory* Product_sales_1st_quarter_of_next_year. After entering the formula press [Enter].
25 Type $=\mathbf{E 1 6}$ in cell F16 to indicate that the required ending inventory for the year is the same as the required ending inventory for the fourth quarter.
26 Type $=$ - in cell B17, and then click Use in Formula from the Defined Names group on the Formulas tab of the Ribbon. (Note: Be sure you type the equals sign and the minus sign here to indicate you are going to make this value negative.)
27 Select Beginning_inventory and then press [Enter]. Format the cell.
28 Type $=-\mathbf{B 1 6}$ in cell C17 and then press [Enter] to indicate that the current quarter's beginning inventory is equal to the previous quarter's ending inventory. Fill this formula across from cell D17 to E17.

29 Type $=$ B17 in cell F17 to indicate that the beginning inventory for the year was the same as the beginning inventory for the first quarter.
30 Place a bottom border in cells B17 through F17.
31 Type $=\mathbf{S U M}(\mathbf{B 1 5}: \mathbf{B 1 7})$ in cell B 18 to calculate the first quarter's purchases. Fill this formula across to cell C18 to F18.

32 Place a bottom border in cells B18 through F18. Your completed cash budget, including purchases, should look like Figure 6.4.

Figure 6.4
Cash Budget of Operating Cash Receipts Through Purchases

| 4 | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP | 1st | 2nd | 3rd | 4th |  |
| 2 | Cash Budget | Quarter | Quarter | Quarter | Quarter | Year |
| 3 |  |  |  |  |  |  |
| 4 | Operating activities |  |  |  |  |  |
| 5 | Operating cash receipts |  |  |  |  |  |
| 6 | Estimated repair hours | 1,500 | 1,600 | 1,700 | 1,800 | 6,600 |
| 7 | Professional services revenue | 75,000 | 80,000 | 85,000 | 90,000 | 330,000 |
| 8 | Product sales revenue | 425,000 | 400,000 | 375,000 | 450,000 | 1,650,000 |
| 9 | Total revenue | 500,000 | 480,000 | 460,000 | 540,000 | 1,980,000 |
| 10 | Current quarter collections | 400,000 | 384,000 | 368,000 | 432,000 | 1,584,000 |
| 11 | Subsequent quarter collections | 81,000 | 100,000 | 96,000 | 92,000 | 369,000 |
| 12 | Operating cash receipts | 481,000 | 484,000 | 464,000 | 524,000 | 1,953,000 |
| 13 | Operating cash payments |  |  |  |  |  |
| 14 | Purchases |  |  |  |  |  |
| 15 | Cost of expected sales | 255,000 | 240,000 | 225,000 | 270,000 | 990,000 |
| 16 | Required ending inventory | 192,000 | 180,000 | 216,000 | 240,000 | 240,000 |
| 17 | Beginning inventory | $(125,000)$ | $(192,000)$ | $(180,000)$ | $(216,000)$ | $(125,000)$ |
| 18 | Purchases | 322,000 | 228,000 | 261,000 | 294,000 | 1,105,000 |

33 Save your work.
"As you can see, the purchases budget is based on the sales budget we had previously created and some additional facts and assumptions, such as the relationship between sales and costs of goods sold," Kyle notes.
"How does all this relate to cash flow?" you ask.
"We must now factor in the relationship between when we purchase merchandise and when we actually pay for it," Kyle answers. "Thus, we have to adjust purchases for our payment expectations."

## Operating Cash Payments for Purchases

Kyle explains that, whenever a vendor or supplier does not require immediate payment, the budget must take into consideration when payment is actually paid. In this case, it is expected that 75 percent of purchases are paid in the month of purchase and 25 percent are paid in the month following purchases. He also points out that, at the beginning of the year, the company's accounts payable amount to $\$ 16,000$, which must be paid in the first quarter. He suggests you add the assumptions he just made to your cash budget and incorporate them into your calculation of cash payments for purchases.

## To create a cash payments for purchases budget:

1 Type Current quarter payments in cell A19.
2 Type Subsequent quarter payments in cell A20.

3 Type Cash payments for purchases in cell A21.
4 To add the new assumptions just discussed, type Beginning accounts payable in cell A50.
5 Type $\mathbf{1 6 0 0 0}$ in cell B50. Format the cell.
6 Type Pct. of purchases paid in current quarter in cell A51.
7 Type 75\% in cell B51.
8 Type Pct. of purchases paid in subsequent quarter in cell A52.
9 Type $\mathbf{2 5 \%}$ in cell B52.
10 Define names for cells B50 through B52 as you have done before.
11 Type $=\mathbf{B 1 8}$ * into cell B19 but do not press the [Enter] key.
12 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula, select Pct._of_purchases_paid_in_current_ quarter, and then press [Enter].
13 Fill the formula across to cells C19 through E19.
14 Type $=\mathbf{S U M}(\mathbf{B 1 9 : E 1 9})$ into cell F19 and then press [Enter] to sum the current quarter payments for the year.
15 Type $=$ into cell B20 but do not press the [Enter] key.
16 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula, select Beginning_accounts_payable, and then press [Enter].
17 Format the cell in comma format with no decimals.
18 Type $=\mathbf{B 1 8 *}$ into cell C20 but do not press the [Enter] key.
19 From the Defined Names group in the Formulas tab of the Ribbon, click Use in Formula, select Pct._of_purchases_paid_in_subsequent_quarter, and then press [Enter].
20 Format the cell in comma format with no decimals, and then fill the formula across to cells D20 through E20.
21 Type $=\mathbf{S U M}(\mathbf{B 2 0}: \mathbf{E 2 0})$ into cell F20 and then press [Enter] to sum the subsequent quarter payments for the year.
22 Place a bottom border in cells B20 through F20.
23 Type $=\mathbf{B 1 9}+\mathbf{B} 20$ in cell B21 to sum payments made in the quarter, and then fill the formula across to cells C21 through F21.
24 Place a bottom border in cells B21 through F21. Your modified cash budget should look like Figure 6.5.

Figure 6.5
Cash Budget with Cash Payments for Purchases

| 4 | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP | 1st | 2nd | 3rd | 4th |  |
| 2 | Cash Budget | Quarter | Quarter | Quarter | Quarter | Year |
| 3 |  |  |  |  |  |  |
| 4 | Operating activities |  |  |  |  |  |
| 5 | Operating cash receipts |  |  |  |  |  |
| 6 | Estimated repair hours | 1,500 | 1,600 | 1,700 | 1,800 | 6,600 |
| 7 | Professional services revenue | 75,000 | 80,000 | 85,000 | 90,000 | 330,000 |
| 8 | Product sales revenue | 425,000 | 400,000 | 375,000 | 450,000 | 1,650,000 |
| 9 | Total revenue | 500,000 | 480,000 | 460,000 | 540,000 | 1,980,000 |
| 10 | Current quarter collections | 400,000 | 384,000 | 368,000 | 432,000 | 1,584,000 |
| 11 | Subsequent quarter collections | 81,000 | 100,000 | 96,000 | 92,000 | 369,000 |
| 12 | Operating cash receipts | 481,000 | 484,000 | 464,000 | 524,000 | 1,953,000 |
| 13 | Operating cash payments |  |  |  |  |  |
| 14 | Purchases |  |  |  |  |  |
| 15 | Cost of expected sales | 255,000 | 240,000 | 225,000 | 270,000 | 990,000 |
| 16 | Required ending inventory | 192,000 | 180,000 | 216,000 | 240,000 | 240,000 |
| 17 | Beginning inventory | $(125,000)$ | $(192,000)$ | $(180,000)$ | $(216,000)$ | $(125,000)$ |
| 18 | Purchases | 322,000 | 228,000 | 261,000 | 294,000 | 1,105,000 |
| 19 | Current quarter payments | 241,500 | 171,000 | 195,750 | 220,500 | 828,750 |
| 20 | Subsequent quarter payments | 16,000 | 80,500 | 57,000 | 65,250 | 218,750 |
| 21 | Cash payments for purchases | 257,500 | 251,500 | 252,750 | 285,750 | 1,047,500 |

25 Save your work.
"Operating cash flow encompasses cash inflow from sales as well as cash outflow for purchases and expenses," Kyle explains. "Next up is budget for sales and administrative expenses. The nice thing about these expenses is that they are usually paid in the same period they are incurred."

## Sales and Administrative Expenses Budget

Kyle explains to you, Nathan, and Meagan that the sales and administrative expense budget won't be linked to either sales or purchases. Instead, the budget will be based on expected costs to be incurred for advertising, depreciation, payroll, and utilities. Nathan thinks that advertising expense will be $\$ 25,000$ in the first quarter and then increase $\$ 5,000$ per quarter over the year. Depreciation will be $\$ 8,000$ in the first quarter and then increase $\$ 1,000$ per quarter over the year based on new equipment purchases. Payroll will vary based on the expected expansion of business and seasonal sales but is expected to be $\$ 125,000$ the first quarter, $\$ 150,000$ in the first and second quarter, and then $\$ 185,000$ in the fourth quarter. Utilities will be based on the prior year's actual results, which were $\$ 15,000, \$ 18,000, \$ 17,500$, and $\$ 19,000$ in the first through fourth quarters, respectively.
"How does depreciation affect our cash budget?" you ask. "Isn't depreciation a noncash outlay?"
"As a matter of fact, it is," Kyle answers. "It is still an expense, but we won't include it in our selling and administrative expense budget."

Kyle suggests that you prepare the sales and administrative expense budget based on the data provided-excluding depreciation, as you so aptly pointed out.

## To create the selling and administrative expense portion of your cash budget:

1 Type Selling and administrative expenses in cell A22.
2 Type Advertising expense in cell A23.
3 Type Payroll expense in cell A24.
4 Type Utilities expense in cell A25.
5 Type Selling and administrative expenses in cell A26.
6 Enter the expense information provided by Nathan into cells B23 through E25.
7 Enter formulas to sum quarterly expenses in cells B26 through E26.
8 Enter formulas to sum expenses in cells F23 through F26.
9 Place a bottom border in cells B25 through F25.
10 Place a bottom border in cells B26 through F26. Your modified cash budget should look like Figure 6.6.

| 4 | A | B | $C$ | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP | 1st | 2nd | 3rd | 4th |  |
| 2 | Cash Budget | Quarter | Quarter | Quarter | Quarter | Year |
| 3 |  |  |  |  |  |  |
| 4 | Operating activities |  |  |  |  |  |
| 5 | Operating cash receipts |  |  |  |  |  |
| 6 | Estimated repair hours | 1,500 | 1,600 | 1,700 | 1,800 | 6,600 |
| 7 | Professional services revenue | 75,000 | 80,000 | 85,000 | 90,000 | 330,000 |
| 8 | Product sales revenue | 425,000 | 400,000 | 375,000 | 450,000 | 1,650,000 |
| 9 | Total revenue | 500,000 | 480,000 | 460,000 | 540,000 | 1,980,000 |
| 10 | Current quarter collections | 400,000 | 384,000 | 368,000 | 432,000 | 1,584,000 |
| 11 | Subsequent quarter collections | 81,000 | 100,000 | 96,000 | 92,000 | 369,000 |
| 12 | Operating cash receipts | 481,000 | 484,000 | 464,000 | 524,000 | 1,953,000 |
| 13 | Operating cash payments |  |  |  |  |  |
| 14 | Purchases |  |  |  |  |  |
| 15 | Cost of expected sales | 255,000 | 240,000 | 225,000 | 270,000 | 990,000 |
| 16 | Required ending inventory | 192,000 | 180,000 | 216,000 | 240,000 | 240,000 |
| 17 | Beginning inventory | $(125,000)$ | $(192,000)$ | $(180,000)$ | $(216,000)$ | $(125,000)$ |
| 18 | Purchases | 322,000 | 228,000 | 261,000 | 294,000 | 1,105,000 |
| 19 | Current quarter payments | 241,500 | 171,000 | 195,750 | 220,500 | 828,750 |
| 20 | Subsequent quarter payments | 16,000 | 80,500 | 57,000 | 65,250 | 218,750 |
| 21 | Cash payments for purchases | 257,500 | 251,500 | 252,750 | 285,750 | 1,047,500 |
| 22 | Selling and administrative expenses |  |  |  |  |  |
| 23 | Advertising expense | 25,000 | 30,000 | 35,000 | 40,000 | 130,000 |
| 24 | Payroll expense | 125,000 | 150,000 | 150,000 | 185,000 | 610,000 |
| 25 | Utilities expense | 15,000 | 18,000 | 17,500 | 19,000 | 69,500 |
| 26 | Selling and administrative expenses | 165,000 | 198,000 | 202,500 | 244,000 | 809,500 |

Figure 6.6
Cash Budget with Cash Payments for Expenses

11 Save your work.

## Operating Cash Payments Budget

Kyle remarks that you must now put all the pieces together in order to complete the operating cash payments budget. The budget will consist of the sum of payments made for purchases and payments made for selling and administrative expenses.

## To finalize the operating cash payments budget:

1 Type Operating cash payments in cell A27.
2 Type $=\mathbf{B} 21+\mathbf{B} 26$ in cell B27 to add the first-quarter cash payments for purchases to the first-quarter cash payments for selling and administrative expenses together.
3 Fill this formula across to cells C27 through F27.
4 Place a bottom border in cells B27 through F27.

To finalize the operating portion of the cash budget, all that is left is to subtract the operating cash payments from the operating cash receipts.

## To finalize the operating cash budget:

1 Type Cash from (to) operating activities in cell A28.
2 Type $=\mathbf{B 1 2}-\mathbf{B 2 7}$ in cell B28 to subtract the first-quarter cash payments from the first-quarter cash receipts.
3 Fill this formula across to cells C28 through F28.
4 Place a bottom border in cells B28 through F28. Your completed cash budget for operating activities is shown in Figure 6.7.

Figure 6.7
Completed Cash Budget from Operating Activities

| 4 | A | B | C | D | E | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP | 1st | 2nd | 3rd | 4th |  |
| 2 | Cash Budget | Quarter | Quarter | Quarter | Quarter | Year |
| 3 |  |  |  |  |  |  |
| 4 | Operating activities |  |  |  |  |  |
| 5 | Operating cash receipts |  |  |  |  |  |
| 6 | Estimated repair hours | 1,500 | 1,600 | 1,700 | 1,800 | 6,600 |
| 7 | Professional services revenue | 75,000 | 80,000 | 85,000 | 90,000 | 330,000 |
| 8 | Product sales revenue | 425,000 | 400,000 | 375,000 | 450,000 | 1,650,000 |
| 9 | Total revenue | 500,000 | 480,000 | 460,000 | 540,000 | 1,980,000 |
| 10 | Current quarter collections | 400,000 | 384,000 | 368,000 | 432,000 | 1,584,000 |
| 11 | Subsequent quarter collections | 81,000 | 100,000 | 96,000 | 92,000 | 369,000 |
| 12 | Operating cash receipts | 481,000 | 484,000 | 464,000 | 524,000 | 1,953,000 |
| 13 | Operating cash payments |  |  |  |  |  |
| 14 | Purchases |  |  |  |  |  |
| 15 | Cost of expected sales | 255,000 | 240,000 | 225,000 | 270,000 | 990,000 |
| 16 | Required ending inventory | 192,000 | 180,000 | 216,000 | 240,000 | 240,000 |
| 17 | Beginning inventory | $(125,000)$ | $(192,000)$ | $(180,000)$ | $(216,000)$ | $(125,000)$ |
| 18 | Purchases | 322,000 | 228,000 | 261,000 | 294,000 | 1,105,000 |
| 19 | Current quarter payments | 241,500 | 171,000 | 195,750 | 220,500 | 828,750 |
| 20 | Subsequent quarter payments | 16,000 | 80,500 | 57,000 | 65,250 | 218,750 |
| 21 | Cash payments for purchases | 257,500 | 251,500 | 252,750 | 285,750 | 1,047,500 |
| 22 | Selling and administrative expenses |  |  |  |  |  |
| 23 | Advertising expense | 25,000 | 30,000 | 35,000 | 40,000 | 130,000 |
| 24 | Payroll expense | 125,000 | 150,000 | 150,000 | 185,000 | 610,000 |
| 25 | Utilities expense | 15,000 | 18,000 | 17,500 | 19,000 | 69,500 |
| 26 | Selling and administrative expenses | 165,000 | 198,000 | 202,500 | 244,000 | 809,500 |
| 27 | Operating cash payments | 422,500 | 449,500 | 455,250 | 529,750 | 1,857,000 |
| 28 | Cash from (to) operating activities | 58,500 | 34,500 | 8,750 | $(5,750)$ | 96,000 |

5 Save your work.
"That was interesting," you comment. "I have prepared a statement of cash flows before but never a budget that looked like a statement of cash flows!"
"Ah, but there is more," Kyle responds. "Remember, the other two components of cash flow are investing and financing activities."

## Investing and Financing Activities Budgets

You recall that investing activities usually involve not only the purchase or sale of such long-term assets as land, buildings, and equipment but also the purchase or sale of long-term investments. You also know that financing activities usually involve borrowings or repayment of borrowings, the sale or repurchase of stock, and/or the payment of dividends.
"What are your plans for the coming year?" Kyle asks.
"Well, I'd like to purchase some new equipment in the second quarter for about $\$ 300,000$," Nathan says. "The bank is willing to lend me $\$ 250,000$, provided these budgets support the stories I've been telling them about the business. The quarterly payment on the loan, which includes interest, is about $\$ 20,000$ starting in the third quarter."
"That's all the information we need to create the investing and financing portion of our cash budget," Kyle says. "Let's have our student here finalize the budget."

## To create the investing and financing portion of our cash budget:

1 Type Investing activities in cell A29.
2 Verify that this cell is formatted bold.
3 Type Equipment purchases in cell A30.
4 Type Equipment sales in cell A31.
5 Type Cash from (to) investing activities in cell A32.
6 Type Financing activities in cell A33.
7 Verify that this cell is formatted bold.
8 Type Loan proceeds in cell A34.
9 Type Loan payments in cell A35.
10 Type Cash from (to) financing activities in cell A36.
11 Type $-\mathbf{3 0 0 0 0 0}$ in cell C30 to reflect the equipment purchase in the second quarter.
12 Type 250000 in cell C34 to reflect the proceeds from the loan in the second quarter.
13 Type - $\mathbf{2 0 0 0 0}$ in cells D35 and E35 to reflect payments on the loan made in the third and fourth quarter.


You are very close to completing the cash budget.

## Finalizing and Formatting the Cash Budget

"To finalize the cash budget we need to compute the net change in cash and compare it to beginning cash to determine our forecasted ending cash balance for the year," comments Kyle. "How much cash will you have at the beginning of the budgeted period?" Kyle asks.
"Right now my best estimate is about $\$ 25,000$," Nathan responds.

## To finalize the cash budget:

1 To add the new assumptions discussed above, type Beginning cash in cell A53.

2 Type $\mathbf{2 5 0 0 0}$ in cell B53. Format the cell in comma format with no decimals.
3 Define a name for cell B53 as you've done before.
4 Type Change in cash in cell A37.
5 Type Beginning cash in cell A38.
6 Type Ending cash in cell A39.
7 Type $=\mathbf{B 2 8}+$ B32 + B36 in cell B37 to add operating, investing, and financing cash activities for the first quarter.
8 Fill that formula across from cell C37 to F37.
9 Click in cell B38, click Use in Formula from the Defined Names group on the Formulas tab of the Ribbon, click Beginning_cash, and then press [Enter]. Format the cell in comma format with no decimals.
10 Type $=\mathbf{B} 37+\mathbf{B 3 8}$ in cell B39.
11 Fill that formula across from cell C39 to F39.
12 Type $=\mathbf{B 3 9}$ in cell C38 to reference ending cash from the first quarter to beginning cash in the second quarter.
13 Fill that formula across from cell D38 to E38.
14 Type $=\mathbf{B} 38$ in cell F38 to reference beginning cash from the first quarter to beginning cash for the year.
15 Place a bottom border in cells B38 through F38.
16 Place a bottom double border in cells B39 through F39.
17 Save your work.
18 Click File and then click Print.
19 Click OK to print the cash budget (two pages) shown in Figure 6.9 and Figure 6.10.
20 Press the [Ctrl] and Ì] (grave accent key) keys simultaneously to switch to Formula view. Part of your window should look like Figure 6.11.

21 Click the Microsoft Office button and then click Print.
22 Click Preview and then click Page Setup.
23 Choose the Landscape option for orientation and then click the Fit to: scaling option.
24 Set scaling to 1 page wide by 1 tall and then click $\mathbf{O K}$ in the Page Setup window.
25 Click Print in the Print Preview window and then click OK to print the cash budget in Formula view.


Figure 6.11
Partial Formula View of the Cash Budget

| 4 | A | V B |
| :---: | :---: | :---: |
| 1 | What SUP | 1st |
| 2 | Cash Budget | Quarter |
| 3 |  |  |
| 4 | Operating activities |  |
| 5 | Operating cash receipts |  |
| 6 | Estimated repair hours | 1500 |
| 7 | Professional services revenue | =B6*Hourly_repair_rate |
| 8 | Product sales revenue | 425000 |
| 9 | Total revenue | - $\mathrm{B} 7+\mathrm{B8}$ |
| 10 | Current quarter collections | =Pct._collections_in_current_quarter*B9 |
| 11 | Subsequent quarter collections | =Beginning_accounts_receivable |
| 12 | Operating cash receipts | = $\mathrm{B} 10+\mathrm{B} 11$ |
| 13 | Operating cash payments |  |
| 14 | Purchases |  |
| 15 | Cost of expected sales | =Cost_of_expected_sales*B8 |
| 16 | Required ending inventory | $=$ Required_ending_inventory* C 15 |
| 17 | Beginning inventory | =-Beginning_inventory |
| 18 | Purchases | =SUM(B15:B17) |
| 19 | Current quarter payments | =Pct._of_purchases_paid_in_current_quarter*B18 |
| 20 | Subsequent quarter payments | ='Cash Budget'IB50 |
| 21 | Cash payments for purchases | = 5 UM(B19:B20) |
| 22 | Selling and administrative expenses |  |
| 23 | Advertising expense | 25000 |
| 24 | Payroll expense | 125000 |
| 25 | Utilities expense | 15000 |
| 26 | Selling and administrative expenses | =SUM(B23:B25) |
| 27 | Operating cash payments | - B21+B26 |
| 28 | Cash from (to) operating activities | = B12-B27 |

"I like using names in Excel," says Nathan. "It is much easier to follow the formula logic when I see descriptions of what is going on rather that just cell references."
"I agree," responds Meagan. "It's not much of a hassle to create and use the names, because Excel gives you the 'Create from Selection' option for naming cells and the 'Use in Formula' option for using names."

Excel also has a grouping feature that can dramatically change the way this budget is viewed. Kyle explains that the entire budget can be summarized horizontally (by rows) down to the entries for cash from (to) operating, investing, and financing activities, the net change in cash, beginning cash, and ending cash. The budget can also be grouped vertically to collapse columns and show only the year amounts. Kyle offers to show you Excel's grouping feature by creating five different levels of grouping.


Click here to ungroup your selection
Figure 6.12
Grouping
2 Click Group in the Outline group on the Data tab of the Ribbon. Trouble? What if you accidently group the wrong rows? No problem, just reselect those rows that you grouped and then click Ungroup from the Outline group on the Data tab of the Ribbon.
3 Click and select rows $\mathbf{5}$ through $\mathbf{1 1}$ to group operating cash receipts.
4 Click Group in the Outline group on the Data tab of the Ribbon.
5 Click and select rows $\mathbf{1 4}$ through $\mathbf{1 7}$ to group purchases.
6 Click Group in the Outline group on the Data tab of the Ribbon.
7 Click and select rows $\mathbf{1 4}$ through $\mathbf{2 0}$ to group cash payments for purchases.
8 Click Group in the Outline group on the Data tab of the Ribbon.
9 Click and select rows 22 through 25 to group selling and administrative expenses.
10 Click Group in the Outline group on the Data tab of the Ribbon.
11 Click and select rows $\mathbf{1 3}$ through 26 to group operating cash payments.
12 Click Group in the Outline group on the Data tab of the Ribbon.

13 Click and select rows 4 through 27 to group operating activities.
14 Click Group in the Outline group on the Data tab of the Ribbon.
15 Click and select rows 29 through 31 to group investing activities.
16 Click Group in the Outline group on the Data tab of the Ribbon.
17 Click and select rows 33 through 35 to group financing activities.
18 Click Group in the Outline group on the Data tab of the Ribbon.
19 Click and select columns $\mathbf{B}$ through $\mathbf{E}$ to group quarters.
20 Click Group in the Outline group on the Data tab of the Ribbon.
21 Click 1 to collapse the column group to the first level.
22 Click 1 to collapse the row group to the first level. Your worksheet should look like Figure 6.13.


Figure 6.13
Cash Budget Grouped at Level-1 Rows and Level-1 Columns
23 Click 2 to collapse the column group to the second level.
24 Click 2 to collapse the row group to the second level. Your worksheet should look like Figure 6.14.


Figure 6.14
Cash Budget Grouped at Level-2 Rows and Level-2 Columns
25 Trying clicking the + and - signs to see the different possible levels you can view.
26 Save your work.

The resulting cash budget leaves the company with only $\$ 31,000$ at the end of the fourth quarter-which, as Nathan explains, is not acceptable. "We must have done something wrong. I'm sure the bank will reject my application if I present them this budget," he says.

## Using What-If Analysis and Goal Seeking with the Cash Budget

"Perhaps we can use Excel's What-If feature to manipulate the budget and give us a better ending balance?" Meagan says. "I propose we increase the hourly rate we charge for repairs from $\$ 50$ to $\$ 75$ per hour."
"We can also use the goal seek feature we used before to determine what changes need to be made to achieve a certain target value for ending cash," you suggest. "For instance, if we want an ending cash balance of $\$ 50,000$, what cost of expected sales percentage could you use?"

Kyle suggests you experiment with your newly created cash budget by using what-if analysis and goal seeking for the two scenarios described.

## To use what-if analysis and goal seeking with the cash budget:

1 Change the hourly rate charged for repairs to $\$ 75$ in cell B42.
2 The result should be ending cash of $\$ 187,000$, assuming the change in hourly rate had no effect on the projected repair hours.
3 Change the hourly rate charged for repairs back to $\$ 50$.
4 Use goal seek by setting cell F39 (ending cash) on the cash budget to $\$ 50,000$ by changing cell B46 (the cost of expected sales). The result should be a percent cost of sales of 59 percent (actually, 59.0142671854734 percent before rounding).

5 Close the workbook without saving changes.
"Now, that is a powerful tool." Nathan says. "I think I can shave off a little on the percentage of cost of sales by increasing my markup slightly."

## End Note

You've applied some of what you learned in the first five chapters to better understand how Excel can be used to create a cash budget. In doing so, you created an operating cash receipts budget based on budgeted sales and a predicted pattern of expected cash collections. You also created an operating cash payments budget based on budgeted purchases and a pattern of expected cash payments. To round out the cash budget you created a budget for investing and financing activities and pulled it all together with Excel's grouping feature to create a complete annual cash budget. In addition, you applied the what-if analysis and goal seek features of Excel to answer common questions posed when analyzing budgets. Finally, you used names extensively to better understand formulas and calculations in Excel. In the next chapter, you'll explore some additional ways in which Excel is used in accounting.


## Chapter 6 Questions

1 Why should you locate budget assumptions in a special section of the worksheet?

2 What information is provided in the operating cash receipts portion of the cash budget?

3 Why does the typical cash budget spread collection of sales revenue over more than one month?

4 What information is provided in the operating cash payments portion of the cash budget?

5 What factors determine monthly purchases in the cash budget?
6 Why does the typical cash budget spread payment of purchases over more than one month?

7 What information is provided in the investing activities portion of the cash budget?

8 What information is provided in the financing activities portion of the cash budget?

9 How is the goal seeking feature used in this chapter?
10 How is grouping used with the cash budget?

## Chapter 6 Assignments

1 Create a new What SUP Operating Cash Receipts Budget
Using the ch6-02 file to start your work, create a worksheet similar to the one created in this chapter to budget operating cash receipts by month for 3 months. Place assumption information in the cells provided, and define and use names extensively. The company expects to incur repair hours of 600,700 , and 800 in January, February, and March (respectively) at an expected hourly rate of $\$ 75$. Product sales revenue of $\$ 150,000, \$ 165,000$, and $\$ 175,000$ is expected in January, February, and March, together with interest revenue of $\$ 14,000, \$ 13,000$, and $\$ 17,000$, respectively. Professional service revenue and interest revenue are all collected in the month earned. It is anticipated that 75 percent of product sales revenue will be collected in the same month as earned, 20 percent collected in the next month, and 5 percent in the following month. Product sales revenue last November was $\$ 180,000$ and last December was $\$ 190,000$. (Hint: Use these amounts in your budget to determine cash
collections in the current 3 months of January, February, and March as a function of prior product sales. Use Excel's grouping feature to group "revenues" rows together and to group the three monthly columns together. Save your file as ch6-02_student_name (replacing student_name with your name).
a. Print the newly completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print the worksheet from part a, above, in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only the January cash budget, no assumptions.
c. Collapse all rows and columns and then print the worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only the total cash budget, no assumptions.
d. Expand all rows and columns. Use what-if analysis to calculate operating cash receipts if 85 percent of product sales revenue were collected in the same month as earned, 10 percent in the next month, and 5 percent in the following month. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
e. Reset the collection expectations to their original values (of 75,20 , and 5 percent). Use goal seek to determine what number of repair hours must be worked in January in order to achieve operating cash receipts of $\$ 180,000$ in January. Print the resulting cash budget, no assumptions in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## 2 Create a new What SUP Operating Cash Payments Budget

Using the ch6-03 file to start your work, create a worksheet similar to the one created in this chapter to budget operating cash payments by month for 3 months. Place assumption information in the cells provided, and define and use names extensively. Product sales revenue of $\$ 150,000, \$ 165,000, \$ 175,000$, and $\$ 180,000$ is expected in January, February, March, and April respectively. Purchases cost 65 percent of product sales. The company would like to maintain an ending inventory equal to 60 percent of the next month's cost of sales. At the beginning of January, the company had $\$ 75,000$ in inventory and $\$ 15,000$ in accounts payable; 85 percent of a month's purchases are paid in the current month, with the remaining paid in the following month. Selling expenses are expected to be $\$ 6,000, \$ 7,000$, and $\$ 8,000$ in January, February, and March (respectively), while general and administrative
expenses are expected to remain constant at $\$ 40,000$ per month. All expenses are paid in the month incurred. Use Excel's grouping feature to group purchases, payments for purchases, and expense rows together and to group the three monthly columns together. Save your file as ch603_student_name (replacing student_name with your name).
a. Print the newly completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print the worksheet from part a, above, in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only the January cash budget, no assumptions.
c. Collapse all rows and columns and then print the worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
d. Expand all rows and columns. Use what-if analysis to calculate operating cash payments if 70 percent of purchases are paid in the current month and 30 percent are paid in the following month. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
e. Reset the payments expectations to the original 85 percent and 15 percent values. Use goal seek to determine what cost of expected sales percentage would cause the operating cash payments to be $\$ 500,000$ for the quarter. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.

## Chapter 6 Case Problem 1: KELLY'S BOUTIQUE

Kelly's Boutique is contemplating several means of financing their acquisition of $\$ 200,000$ in special equipment. One alternative is to borrow $\$ 200,000$ from a local bank for 10 years at 12 percent per annum. The bank has asked them to produce a 1-year cash budget broken down by months (January through December). Sales of $\$ 40,000$ are expected in the first month, with each month thereafter increasing 2 percent. Purchases are based on an expected cost of sales of 55 percent and a required ending inventory of 70 percent of next month's cost of sales. Beginning inventory was $\$ 11,000$. Sales for January next year are expected to be $\$ 50,000$. Sales in the previous November and December were $\$ 29,000$ and $\$ 28,000$, respectively. Expenses include advertising expense of $\$ 900$, depreciation expense of $\$ 800$, interest expense of $\$ 1,000$, payroll expense of $\$ 8,000$, supplies expense of $\$ 500$, and utilities expense of $\$ 600$ per month throughout the year. All expenses except depreciation are paid in the month during which they are incurred. Collections in the month of sale are expected to
be 60 percent, collections in the first month following a sale 30 percent, and in the second month 10 percent. Payments in the month of purchase are expected to be 75 percent, payments in the first month following a purchase 15 percent, and payments in the second month to be 10 percent. Purchases in the previous November and December were $\$ 16,000$ and $\$ 17,000$, respectively. Proceeds from the $\$ 200,000$ loan are expected in June, and $\$ 200,000$ of equipment will be purchased in July. Monthly payments of $\$ 1,400$ on the loan also begin in July. The beginning cash balance in January was $\$ 15,000$.

Using the ch6-04 file to start your work, create a cash budget (as you did in the chapter) that is based on the assumptions listed in the previous paragraph. Use Excel's grouping feature to group operating cash receipts, operating cash payment, cash from (to) operating activities, cash from (to) investing activities, and cash from (to) financing activities and also to group the twelve monthly columns together. Save your file as ch6-04_student_name (replacing student_ name with your name).
a. Print the newly completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print the worksheet from part a, above, in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only columns A and B of the cash budget, no assumptions.
c. Collapse rows to level 2 and columns to level 1, and then print the worksheet in Value view with your name and date printed in the lower left footer and the file name in the lower right footer. Print cash budget only, no assumptions.
d. Expand rows to level 3 and columns to level 2, and then use what-if analysis to calculate end-of-year cash if the sales growth each month were 4 percent and payroll expense were $\$ 18,000$ per month. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print cash budget only, no assumptions.
e. Undo the what-if analysis performed in part d. Use goal seek to determine what sales growth would be needed to produce an ending cash balance of $\$ 150,000$. Print the resulting worksheet in Value view with your name and date printed in the lower left footer and the file name in the lower right footer. Print cash budget and assumptions.

## Chapter 6 Case Problem 2: <br> WINE DEPOT

The Wine Depot is contemplating several alternative means of financing their annual acquisition of $\$ 70,000$ in equipment. One option is to borrow $\$ 300,000$ from a local bank for 5 years at 11 percent per annum. The bank has asked them to produce a 4 -year cash budget broken down by year (2015 through
2018). Sales of $\$ 750,000$ are expected in 2015 , with sales increasing each year thereafter by 15 percent. Sales in 2014 were $\$ 600,000$. Purchases are based on an expected cost of sales of 45 percent and a required ending inventory of 10 percent of next year's sales. Purchases in 2014 were $\$ 200,000$, and beginning inventory was $\$ 32,000$. Annual expenses include advertising expense of $\$ 10,000$, marketing expense of $\$ 6,000$, depreciation expense of $\$ 8,000$, interest expense of $\$ 35,000$, salaries expense of $\$ 250,000$, wages expense of $\$ 65,000$, supplies expense of $\$ 7,500$, and utilities expense of $\$ 10,000$. All expenses except depreciation are paid in the year in which they are incurred and are expected to increase 5 percent each year. Collections in the year of sale are expected to be 92 percent, with the remaining 8 percent collected in the next year. Payments in the year of purchase are expected to be 93 percent, with the remaining 7 percent paid in the next year. Proceeds from the $\$ 300,000$ loan are expected in 2015 , and $\$ 70,000$ of facilities will be purchased each year. Proceeds from expected equipment sales each year are expected to amount to $\$ 10,000$. Annual payments of $\$ 81,171$ on the loan also begin in 2015 . The beginning cash balance in 2015 was $\$ 20,000$.

Using the ch6-05 file to start your work, create a cash budget (as you did in the chapter) based on the assumptions just provided. Use Excel's grouping feature to group operating cash receipts, operating cash payment, cash from (to) operating activities, cash from (to) investing activities, and cash from (to) financing activities. Save your file as ch6-05_student_name (replacing student_ name with your name).
a. Print the newly completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer.
b. Print the worksheet from part a, above, in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only columns A, B, and C of the cash budget, no assumptions.
c. Collapse rows to level 2; then print the worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print cash budget only, no assumptions.
d. Collapse rows to level 2, and then use what-if analysis to calculate end-of-year cash if the sales growth each year were 10 percent. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print cash budget only, no assumptions.
e. Undo the what-if analysis performed in part d. Collapse rows to level 2 , and then use goal seek to determine what annual sales growth would be needed to produce an ending cash balance of $\$ 100,000$ in 2018. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print cash budget and assumptions.

## Chapter 6 Case Problem 3: SNICK'S BOARD SHOP

Snick's Board Shop is contemplating several alternative means of financing their acquisition of $\$ 350,000$ in new equipment in year 1 . One option is to borrow $\$ 300,000$ from a local bank. The bank has asked them to produce a 3-year cash budget broken down by year (Year 1, 2, and 3). Sales in the prior year were $\$ 240,000$ and are expected to increase 10 percent each year. Purchases are based on an expected cost of sales of 40 percent and a required ending inventory of 25 percent of next year's sales. Prior year expenses included advertising expense of $\$ 2,500$, depreciation expense of $\$ 1,000$, wages expense of $\$ 56,000$, supplies expense of $\$ 450$, and utilities expense of $\$ 1,600$. All expenses except depreciation are paid in the year in which they are incurred and are expected to increase 8 percent each year. Interest expense is expected to remain constant at $\$ 15,000$ each year for years $1-3$. Collections in the year of sale are expected to be 90 percent, with the remaining 10 percent collected in the next year. Payments in the year of purchase are expected to be 85 percent, with the remaining 15 percent paid in the next year. Proceeds from the $\$ 300,000$ loan are expected in year 1 , and $\$ 350,000$ of equipment will be purchased during year 1 . In subsequent years equipment purchases are expected to be $\$ 1,000$ each year. Proceeds from projected equipment sales each year are expected to amount to $\$ 200$. Annual payments of $\$ 110,000$ on the loan also begin in year 1.

Using the ch6-06 file to start your work, create a cash budget (as you did in the chapter) based on the assumptions just provided. Use Excel's grouping feature to group operating cash receipts, operating cash payment, cash from (to) operating activities, cash from (to) investing activities, and cash from (to) financing activities. Define names as appropriate.

Save your file as ch6-06_student_name (replacing student_name with your name).
a. Print the newly completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only columns A through E of the cash budget, no assumptions.
b. Print the worksheet from part a, above, in Formula view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only columns A through D of the cash budget, no assumptions.
c. Collapse rows to level 2, then print the worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only columns A through E of the cash budget, no assumptions.
d. Collapse rows to level 2, and then use what-if analysis to calculate end-of-year cash if the sales growth each year were 25 percent. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right
footer. Print only columns A through E of the cash budget, no assumptions.
e. Undo the what-if analysis performed in part d. Collapse rows to level 2 , and then use goal seek to determine what annual sales growth would be needed to produce an ending cash balance of $\$ 0$ in year 3. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only columns A through E of the cash budget, no assumptions.

## Chapter 6 Case Problem 4: ROSEY'S ROSES

Rosey's Roses is contemplating several alternative means of financing their acquisition of $\$ 100,000$ in new equipment in year 1 . One option is to borrow $\$ 80,000$ from a local bank. The bank has asked them to produce a 3-year cash budget broken down by year (Year 1, 2, and 3). Sales of $\$ 150,000$ were earned in the prior year and are expected to increase each year thereafter by 15 percent. Purchases are based on an expected cost of sales of 60 percent and a required ending inventory of 20 percent of next year's sales. Prior year expenses included advertising expense of $\$ 15,000$, depreciation expense of $\$ 1,000$, wages expense of $\$ 20,000$, supplies expense of $\$ 1,000$, and utilities expense of $\$ 3,300$. All expenses except depreciation and interest expense are paid in the year in which they are incurred and are expected to increase 10 percent each year. Interest expense is paid in the year incurred and is expected to remain constant at $\$ 4,000$ each year for years $1-3$. Collections in the year of sale are expected to be 85 percent, with the remaining 15 percent collected in the next year. Payments in the year of purchase are expected to be 90 percent, with the remaining 10 percent paid in the next year. Proceeds from the $\$ 80,000$ loan are expected at the beginning of year 1 , and $\$ 100,000$ of equipment will be purchased during year 1 . In subsequent years, equipment purchases are expected to be $\$ 2,000$ each year. Proceeds from projected equipment sales each year are expected to amount to $\$ 500$. Annual payments of $\$ 10,360$ on the loan occur at the end of each year.

Using the ch6-07 file to start your work, create a cash budget (as you did in the chapter) based on the assumptions just provided. Use Excel's grouping feature to group operating cash receipts, operating cash payment, cash from (to) operating activities, cash from (to) investing activities, and cash from (to) financing activities. Define names as appropriate.

Save your file as ch6-07_student_name (replacing student_name with your name).
a. Print the newly completed worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only columns A through E of the cash budget, no assumptions.
b. Collapse rows to level 2, and then print the worksheet in Value view, with your name and date printed in the lower left footer and the file
name in the lower right footer. Print only columns A through E of the cash budget, no assumptions.
c. Collapse rows to level 2, and then use what-if analysis to calculate end-of-year cash if the sales growth each year were 0 percent. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only columns A through E of the cash budget, no assumptions.
d. Undo the what-if analysis performed in part d. Collapse rows to level 2, and then use goal seek to determine what annual sales growth would be needed to produce an ending cash balance of $\$ 50,000$ in year 3. Print the resulting worksheet in Value view, with your name and date printed in the lower left footer and the file name in the lower right footer. Print only columns A through E of the cash budget, no assumptions.

## 7

# Other Topics: Present/ Future Values, Predicting Costs, and Allowance for Uncollectible Accounts 

In this chapter you will learn:<br>- How to use Excel to prepare a present/future value analysis<br>- How to use Excel to predict costs<br>- How to use Excel to calculate an allowance for uncollectible accounts

## Case: What SUP, Inc.

Nathan and Megan are aware that there are other accounting issues that may be aided by using Excel. Kyle explains that this week they will look at how Excel can help them calculate present and future values based on assumptions about interest rates, time, and financial needs. They will also look at predicting future costs based on trends experienced in the current year. They will utilize Excel's ability to visualize cost behaviors: fixed and variable costs based on past experience and Excel's charting ability to examine patterns of cost behavior. Lastly they will look at using Excel to calculate uncollectible accounts expense and an allowance for uncollectible accounts using both the percentage of sales and aging methods.

As the recent accounting graduate in the group, you offer to lend your accounting expertise to using Excel to solve these common business problems.

## Present/Future Value Analysis

The first additional accounting issue Nathan and Megan agree to tackle is the calculation of present and future values. Kyle suggests that they consider using Excel to help them calculate how much they should invest now to be able to meet an expected future equipment purchase need. In this case Excel will calculate the present value of a lump sum payment in the future. Alternatively, they could put some funds away at the end of each year to save up for the equipment purchase. Kyle explains that that approach requires that they calculate an annuity payment they would make into a fund so that at the end of a certain period they would have funds for the purchase.
"This is perfect," says Megan. "We anticipate having to replace equipment we currently use with more modern and efficient equipment in 5 years. We expect it will cost about $\$ 50,000$ at that time."
"Excellent," says Kyle. "We'll approach this problem from both angles: calculating a lump sum to be invested now and calculating an annuity to help save for this future purchase."

You explain that all present value problems have five variables: (1) interest rate, (2) term, (3) annuity payment, (4) future value, and (5) present value. If you know four of the variables, you can always calculate the fifth. Interest rates are currently 6 percent, and Megan indicated the term of 5 years and future cost of $\$ 50,000$. Under scenario 1 , the company wants to know what amount should be invested now to have $\$ 50,000$ in 5 years assuming a 6 percent return on their investment.

The present value function in Excel is written PV(rate,nper,pmt,fv,type). PV stands for present value. The arguments to that function are contained within the parentheses. The rate is the periodic interest rate, nper is the number of periods, pmt is the periodic annuity payment, fv is the lump sum future value, and type represents ordinary annuity or annuity due which basically indicates whether payments are made at the beginning or ending of the period in question. We will assume all payments are made at the end of the period. For this problem the $\mathrm{fv}=\$ 50,000$, rate $=6 \%$, and the nper $=5$ years.

## To calculate a present value of a lump sum:

1 Open Excel.
2 Enter the information with correct formats, as shown in Figure 7.1.


3 In cell A10 type Invest now:
4 In cell B10 type the formula $=\mathbf{P V}(\mathbf{B 7}, \mathbf{B 8}, \mathbf{0}, \mathbf{B 6})$. $\mathbf{B 7}$ is the first argument to the PV function since it is where we have stored the rate. B 8 is the second argument since it is where we have stored the number of periods, 0 is the third argument since this problem doesn't require an annuity payment, and B6 is the fourth argument since that is where we have stored the future value. Now press [Enter].
5 Your screen should look like Figure 7.2 Keep it open.

Figure 7.1
Creating a Lump Sums Worksheet

Figure 7.2
Adding an Invest Now Formula

"Why is the amount negative?" Nathan asks.
"Well," you explain, "that is the amount we have to give up now to have $\$ 50,000$ in 5 years if we can earn 6 percent per year."
"You'll have to prove that to me," Nathan retorts.
"Ok," you answer. "I'll create a column for the year, interest earned, and investment value. I always start with year 0 since that represents the end of last year and the beginning of this year. In the interest column I'll be entering the interest earned each year at 6 percent of the investment balance held during the year. In the final column I'll be entering the end of year balance in the investment, which will be the previous year's balance plus interest earned during the current year.

## To prove the increase in value over the $\mathbf{5}$ years:

1 Create a table in Excel like the one shown in Figure 7.3.
Figure 7.3
Creating a Proof of Lump Sums Calculations


2 Type =-B10 in cell F6 since that is the beginning of the year investment. (Be sure to include the minus sign in front of the cell reference so that values all come out positive).

3 Type $=\mathbf{F 6} * \$ \mathbf{B} \$$ in cell E7. This will calculate the interest earned each year by multiplying the rate (always located in cell B7) times the beginning of year investment.
4 Fill the formula written in cell E7 down to cell E11.
5 Type $=\mathbf{E} 7+$ F6 in cell F7. This will calculate the end of the year balance in the investment account.
6 Fill the formula written in cell F7 down to cell F11.
7 Your screen should look like Figure 7.4.


8 Press [ $\mathbf{C t r l}]$ and $[\sim]$ at the same time to switch to formula view. Your screen should look like Figure 7.5.


9 Press [Ctrl] and [~] at the same time to switch back to value view.
10 Save your file with the name Ch7PV.

Figure 7.4
Completed Proof of Lump Sum Calculations

Figure 7.5
Formula View of Completed Proof of Lump Sum Calculations

After calculating a lump sum to be invested now to achieve a future need, you now turn your attention to calculating an annuity to help save for this future purchase. An annuity is a constant payment either received or paid over a specific period of time. Excel helps you solve this with the payment function (PMT).

The PMT function in Excel is written PMT(rate,nper,pv,[fv],[type]). The arguments to that function are contained within the parentheses. The rate is the periodic interest rate, nper is number of payments, pv is the lump sum present
value, fv is the lump sum future value, and type represents ordinary annuity or annuity due which basically indicates whether payments are made at the beginning or ending of the period in question. We will assume all payments are made at the end of the period. For this problem the pv is $0, \mathrm{fv}=\$ 50,000$, rate $=$ $6 \%$, and the nper $=5$ years.

## To calculate the annuity payment required to meet a future need:

1 Start a new worksheet (don't close the current file) and then enter the information as shown in Figure 7.6.

Figure 7.6
Creating an Annuities Worksheet


2 Type $=\mathbf{P M T}(\mathbf{B} 7, \mathbf{B 8}, \mathbf{0}, \mathbf{B 6})$ into cell B10, being sure to type zero $(\mathbf{0})$ in the third argument to indicate no present value payment is made in this analysis.
3 Press [Enter]. Your resulting worksheet should look like Figure 7.7.
Figure 7.7
Calculated Annuity


4 To prove that an annual payment of $\$ 8,869.82$ earning interest at 6 percent per year will yield the $\$ 50,000$ future value, set up the table below on your worksheet, as shown in Figure 7.8.


5 Type $\mathbf{0}$ in cell G6 since there is no beginning investment amount.
6 Type $=\mathbf{G} \mathbf{6} \boldsymbol{\$ B} \$ 7$ in cell $E 7$ which multiplies the interest rate times the end of year investment amount. Format the cell using the Currency format.
7 Fill the formula just created in E7 down through cell E11.
8 Type $=\mathbf{-} \mathbf{B} \mathbf{\$ 1 0}$ in cell F7 to place the annuity payment in this cell. (Putting the minus sign in front is done to reflect a positive value).
9 Fill the formula just created in F7 down through cell F11.
10 Type $=\mathbf{G 6}+\mathbf{E} 7+\mathbf{F} 7$ in cell G7 to sum the previous year's investment with the current year's interest and annuity payment.
11 Fill the formula just created in G7 down through cell G11. Your worksheet should look like Figure 7.9.


12 Save your file with the name Ch7PVAN.

Figure 7.8
Annuity Table

Figure 7.9
Completed Annuity Table
"Now," you explain, "you know that you can either invest $\$ 37,362.91$ today or you can invest $\$ 8,869.82$ annually to achieve your $\$ 50,000$ in 5 years at 6 percent.
"What if I can only earn a 5 percent return?" Nathan asks.
"I'll show you." you answer. "This requires a what-if analysis. All you have to do is change the interest rate from 6 percent to 5 percent."

Nathan decides to try this himself by typing $\mathbf{5 \%}$ in cell B7 of the Ch7PVAN and Ch7PV worksheet files. His resulting worksheet looks like Figures 7.10 and 7.11 below.

Figure 7.10
Required Investment at 5\%


Figure 7.11
Required Annuity at 5\%

"That makes sense," Nathan comments. "If I can only earn 5 percent I need to invest more now, $\$ 39,176.31$ versus $\$ 37,262.91$ assuming a 6 percent return. Alternatively, I would have to make a larger annuity payment of $\$ 9,048.74$ assuming a 5 percent return versus $\$ 8,869.82$ assuming a 6 percent return."
"What about working the other way around?" Meagan asks. "I would like to know how much I would have in 5 years if I was able to invest either $\$ 10,000$ right now or $\$ 1,000$ per year assuming a 5 percent return on my investment."

You explain that that requires the use of another of Excel's built-in functions. The FV function takes very similar arguments to the PV function you just described. It is written FV (rate, per,pmt,pv,type) where pv and type are optional.
"Let's create a new worksheet for future values," you suggest.

## To create a future value worksheet and table:

1 Enter the information with correct formats as shown in Figure 7.12.
Figure 7.12
Beginning Your Future Value Worksheet

2 Type the formula $=\mathbf{F V}(\mathbf{B 7}, \mathbf{B 8}, 0, \mathbf{B 6})$ into cell B10. This sets the rate at $5 \%$, which is in cell B7; the period to 5 , which is in cell B8; the annuity payment to zero since this part of the problem has no annuity payment; and the present value to the current investment shown in cell B6.
3 Press [Enter].
4 Type =-B6 into cell F15
5 Type $=\mathbf{F 6} \boldsymbol{*} \mathbf{B} \$ 7$ into cell E16 and then fill the formula down to cell E11. This cell calculates the interest earned on the investment balance at the end of the previous year.
6 Type $=\mathbf{E} 7+$ F6 into cell F16 to add the current year interest and prior year investment amounts together and then fill the formula down to cell F11. Your resulting worksheet should look like Figure 7.13. Save your file with the name Ch7FV.


7 Enter the information with correct formats as shown in Figure 7.14.


8 Type the formula $=\mathbf{F V}(\mathbf{B} 7, \mathbf{B 8}, \mathbf{B 6})$ into cell B10. This sets the rate at $5 \%$, which is in cell B7; the period to 5 , which is in cell B8; and the annuity payment to $\$ 1,000$, which is in cell B6.
9 Press [Enter].
10 Type $\mathbf{0}$ into cell G6.
11 Type $=\mathbf{G} \mathbf{6} * \$ \mathbf{B} \$ 7$ into cell E7 and then fill the formula down to cell E11. This cell calculates the interest earned on the investment balance at the end of the previous year.
12 Type $=-\$ \mathbf{B} \$ 6$ into cell F7 and then fill the formula down to F11. This places the annual payment into the cell.

Figure 7.13
Future Value of a Lump Sum

Figure 7.14
Continuing Your Future Value Worksheet

Figure 7.15
Future Value of an Annuity


Meagan and Nathan are both very pleased with their worksheet creation, which tells them the future value of a lump sum investment and the future value of an annual annuity.
"Can we change the interest rates to see the effect of earning either a higher or lower rate?" Meagan asks.
"Sure," you respond.
You change the Interest rates to 7 percent for both the annuity and lump sum to get the results, as shown in Figure 7.16 and 7.17.

Figure 7.16
Future Value of an Initial Investment of \$10,000 at $7 \%$ for 5 years


Figure 7.17
Future Value of an Annual
Annuity Investment of $\$ 1,000$ at $7 \%$ for 5 years

## Predicting Future Costs

Another issue facing What SUP is predicting future costs. They know that, based on past experiences, certain expenses tend to be constant over time while others vary from month to month. Megan explains that her monthly operating expenses seem to vary according to how many days the store is open, and she asks you whether Excel can help predict costs based on this previous cost behavior.

You explain that accountants use two basic methods to predict costs: the HiLo method and the Least Squares/ Regression method.
"The Hi-Lo method is the easiest but least accurate, while the Least Squares/ Regression method is a bit more complicated but much more accurate," you comment. "Excel can do both and we can create a chart to graphically represent the pattern of cost behavior."

You start by gathering data on past experiences. Nathan provides you with the following information showing monthly expenses and days open by month, as shown in Figure 7.18.

| Month | Days Open | Expense |
| :---: | :---: | :---: |
| Jan | 20 | 4,500 |
| Feb | 18 | 4,200 |
| Mar | 21 | 4,600 |
| Apr | 16 | 3,800 |
| May | 22 | 4,800 |
| Jun | 23 | 5,000 |
| Jul | 25 | 6,000 |
| Aug | 26 | 6,100 |
| Sep | 22 | 5,000 |
| Oct | 18 | 4,300 |
| Nov | 17 | 4,100 |
| Dec | 16 | 4,000 |

You decide to enter this information into Excel and then perform a Hi-Lo method analysis. To do so, you first need to enter the data into a new worksheet, calculate the high and low expense and days open, calculate the difference, and then determine the variable and fixed cost behaviors.
"The difference in cost between months must be attributed to a change in variable cost since each month should continue to have the same fixed cost," you explain. "That is the basis of the Hi-Lo method. We'll use the Min and Max functions built-in to Excel to help calculate the high and low costs and days open and then calculate the variable and fixed costs. The variable cost can be calculated by dividing the difference in the high and low costs by the difference in the high and low days open. The fixed costs can be calculated by subtracting variable costs from total costs. After that we'll be able to predict costs in a future month based on the number of days open."

Figure 7.18
Expenses and Days Open by Month

## To create a Hi-Lo method analysis:

1 Open Excel and start a new worksheet.
2 Enter the information with correct formats, as shown in Figure 7.19.
Figure 7.19
Expenses Entered into Excel

3 Type High Expense in cell A18 as a label.
4 Type Low Expense in cell A19 as a label.
5 Type Difference in cell A20 as a label.
6 Type Hi-Lo Method in cell A22 as a label.
7 Type Variable cost/day open in cell A23 as a label.
8 Type Fixed cost in cell A24 as a label.
9 Type $=\mathbf{M A X}(\mathbf{D 5}: D 16)$ in cell D18 to calculate the highest number of days open.
10 Type $=\mathbf{M A X}(\mathbf{E 5}: \mathbf{E 1 6})$ in cell E18 to calculate the highest amount of expense.

11 Type =MIN(D5:D16) in cell D19 to calculate the lowest number of days open.
12 Type $=\mathbf{M I N}(\mathbf{E 5}: \mathbf{E 1 6})$ in cell E19 to calculate the lowest amount of expense.
13 Type =D18-D19 in cell D20 to calculate the difference between the highest and lowest days open.
14 Type $=\mathbf{E 1 8}$-E19 in cell E20 to calculate the difference between the highest and lowest expense.
15 Type $=\mathbf{E 2 0} / \mathbf{D} 20$ in cell C23 to calculate the variable cost per day open.

16 Type $=\mathbf{E 1 8}-(\mathbf{C} 23 *$ D18 $)$ in cell C24 to calculate the fixed cost per month.
17 Type Prediction of expense if open in cell A26.
18 Type 20 in cell B26.
19 Type days = in cell C26.
20 Type $=(\mathbf{B 2 6} * \mathbf{C} 23)+\mathbf{C} 24$ in cell D26 to calculate the total costs assuming a fixed cost as calculated in cell C24, a variable cost as calculated in cell C23, and a number of days open as stated in cell B26.
21 Format your worksheet like the completed worksheet shown in Figure 7.20.
22 Save your work using file name Ch7HiLo.xlsx.

| 4 | A | B | C | D | E | $\sim$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | What SUP |  |  |  |  |  |
| 2 | Predicting Costs |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  | Month | Days Open | Expense |  |
| 5 |  |  | Jan | 20 | 4,500 |  |
| 6 |  |  | Feb | 18 | 4,200 |  |
| 7 |  |  | Mar | 21 | 4,600 |  |
| 8 |  |  | Apr | 16 | 3,800 |  |
| 9 |  |  | May | 22 | 4,800 |  |
| 10 |  |  | Jun | 23 | 5,000 |  |
| 11 |  |  | Jul | 25 | 6,000 |  |
| 12 |  |  | Aug | 26 | 6,100 |  |
| 13 |  |  | Sep | 22 | 5,000 |  |
| 14 |  |  | Oct | 18 | 4,300 |  |
| 15 |  |  | Nov | 17 | 4,100 |  |
| 16 |  |  | Dec | 16 | 4,000 |  |
| 17 |  |  |  |  |  |  |
| 18 | High Expense |  |  | 26 | 6,100 |  |
| 19 | Low Expense |  |  | 16 | 3,800 |  |
| 20 | Difference |  |  | 10 | 2,300 |  |
| 21 |  |  |  |  |  |  |
| 22 | Hi-Lo Method |  |  |  |  |  |
| 23 | Variable cost/day open |  | \$ 230.00 |  |  |  |
| 24 | Fixed cost |  | \$ 120.00 |  |  |  |
| 25 |  |  |  |  |  |  |
| 26 | Prediction of expense if open | 20 | days $=$ | \$ 4,720 |  | $\checkmark$ |
|  | 4 ${ }^{\text {Sheet1 Sheet2 }}$ |  | . $\dagger$ : | 1 |  |  |

Figure 7.20
Hi-Lo Method Worksheet

Megan is delighted with your new worksheet. You explain that by varying the value of cell B26 you can calculate the expected costs for any future month based on the number of days she expects to be open.
"How can we graphically illustrate this pattern of cost behavior?" Meagan asks.
"Easy," you retort, "let me show you."

## To create a chart of cost behavior:

1 Select the range of cells from D4 to E16.
2 Click the Scatter chart from Charts group on the Insert tab of the Ribbon, and then select Scatter with only markers.
3 Select the Expense legend and press the [Delete] key to remove it.
4 Double-click the horizontal axis of the chart and select Axis Options.
5 Set the minimum axis by selecting Fixed and typing $\mathbf{1 5 . 0}$ as the minimum.
6 Set the maximum axis by selecting Fixed and typing $\mathbf{2 7 . 0}$ as the maximum.
7 With the chart selected, click Axis Titles from the Labels group of the Layout tab of the Ribbon.
8 Select Primary Horizontal Axis Title and then select Title Below Axis.
9 Type Days Open as the horizontal axis title.
10 Double-click the vertical axis of the chart and select Axis Options.
11 Set the minimum axis by selecting Fixed and typing $\mathbf{3 0 0 0}$ as the minimum.
12 Set the maximum axis by selecting Fixed and typing $\mathbf{6 5 0 0}$ as the maximum.
13 With the chart selected click Axis Titles from the Labels group of the Layout tab of the Ribbon.
14 Select Primary Vertical Axis Title and then select Vertical Title.
15 Type Expense as the vertical axis title.
16 Select the chart title and change the name by typing Expense/Days Open.
17 On the Layout tab in the Analysis group, click Trendline and then select Linear Trendline. Your chart should look like Figure 7.21.


18 Save your work.

You explain to Nathan and Megan that this trend line uses all 12 data points to predict costs, which is exactly what the Least Squares/Regression method does. The trick now is to determine the slope of that line (otherwise known as the variable cost per unit) and the vertical axis intercept (otherwise known as fixed costs).
"The Slope and Intercept functions of Excel are used in the Least Squares/ Regression method. The Slope function provides the slope of a line (in other words, variable costs per unit) defined by two arguments: known y's and known x's. In our case the known y's are the actual costs and the known x's are actual days open. Both are located on our worksheet in an array of cells located at E5 to E16 and D5 to D16 respectively. The Intercept function takes the same two arguments and provides the value of costs incurred when the days open are zero (in other words, fixed costs)."

Figure 7.21
Chart of Expense/Days Open

## To calculate the variable cost per day open and fixed costs using Excel:

1 Type Least Squares/ Regression Method as a label in cell G22.
2 Type Variable cost/day open as a label in cell G23.
3 Type Fixed cost as a label in cell G24.
4 Type = SLOPE(E5:E16,D5:D16) in cell I23 to calculate the variable cost per unit by using the data provided on the worksheet.

5 Type =INTERCEPT(E5:E16,D5:D16) in cell I24 to calculate the fixed costs by using the data provided on the worksheet.
6 Type Prediction of expense if open in cell G26 as a label.
7 Type 20 in cell H26.
8 Type days = in cell I27 as a label.
9 Type $=\mathbf{T R E N D}(\mathbf{E 5}: \mathbf{E 1 6}, \mathbf{D 5}: \mathbf{D 1 6 , H 2 6})$ to calculate the predicted costs assuming 20 open days.
10 Format your worksheet like Figure 7.22. Save your work.
Figure 7.22
Completed Predicting Costs Worksheet


Megan notes that the two methods predict different expense amounts for 20 open days. She speculates that the Least Squares/ Regression method is more accurate since it used 12 data points whereas the Hi-Lo method, used only two.

You agree and conclude that although the Least Squares/Regression method uses some functions like trend, slope, and intercept (which sound too mathematical to Megan) it does produce the more accurate predictions.

## Calculating an Allowance for Uncollectible Accounts

An additional accounting issue that What SUP is confronting is the need for an allowance for uncollectible accounts. Two years ago Megan had recommended that the business extend credit to customers, which gave them 30 days to pay for their purchases. In doing so she realized the risk associated with granting credit and that some customers, for a variety of reasons, may end up not paying their bills. They have been collecting data on their experience with non-payment and know that, according to generally accepted accounting principles, they needed
to establish an allowance for uncollectible accounts and record some uncollectible accounts expense in the current accounting period.
"There are two common methods for estimating the expense and allowance," you say. "You can either use the percent of sales method or an aging method. Excel can help us with the calculations since in both cases all we are doing is multiplying an estimated uncollectible accounts percentage times either sales or an aging of accounts receivable balances."

Megan provides last year's receivable and sales information. The beginning balance in receivables was $\$ 500,000$. During the year the company had sales of $\$ 5,600,000$ and collections of $\$ 5,280,000$. They wrote off $\$ 20,000$ in accounts receivable during the year. She created an estimate of the allowance at the end of last year of $\$ 25,000$.

## To calculate the allowance using the percent of sales method:

1 Open Excel, click the File menu, and then click New.
2 Double-click Blank Workbook.
3 Enter the information with correct formats as shown in Figure 7.23.


4 Type $\mathbf{. 5 0 \%}$ as the past experience ratio in cell B12.
5 Type $=\mathbf{B 1 2 * B 7}$ in cell B16 to calculate uncollectible accounts expense as current period sales times the past experience ratio.

Figure 7.23
Beginning Your Allowance for Uncollectible Accounts Worksheet

6 Type $=\mathbf{S U M}(\mathbf{B 1 4 : B 1 6})$ in cell B17 to find the balance of allowance for uncollectible accounts.
"That was easy," comments Nathan. "How do we use the Aging method?" "I'll show you," you answer.

## To calculate the allowance using the aging method:

1 Continuing from your previous work, type
$=(\mathbf{D} 26 * \mathbf{D} 28)+(\mathbf{E} 26 * \mathbf{E 2 8})+(\mathbf{F} 26 *$ F28 $)+(\mathbf{G} 26 * \mathbf{G 2 8})+(\mathbf{H} 26 * \mathbf{H 2 8})$ into cell B33. (This adds up the past experience rate for each category of accounts receivable times the amount of accounts receivable in each category.) The result is the required ending balance in the allowance for uncollectible accounts.
2 Type $=\mathbf{B 3 3}-(\mathbf{B 3 0}+\mathbf{B 3 1})$ into cell B32 to determine the amount of uncollectible accounts expense necessary to give you the balance in the allowance you calculated above.
3 The completed worksheet should look like Figure 7.24.

Figure 7.24
Completed Allowance for Uncollectible Accounts


You explain that the two methods are basically the same. The percent of sales method calculates the uncollectible accounts expense, which then dictates the ending allowance for the uncollectible accounts balance. On the other hand, the aging method calculates the ending allowance for the uncollectible accounts balance, which then dictates the uncollectible accounts expense.
"Sweet," comments Nathan. "I'm assuming we can reuse these worksheets in future months?" he asks.
"Yes," you respond. "Now that we have set them up we can just change the data and generate new results."

## End Note

In this chapter you have created worksheets to calculate present and future values, predict future costs based on past experience, and calculate an allowance for uncollectible accounts under both the percent of sales and aging methods.

## 7

## Chapter 7 Questions

1 Identify the five variables in present value problems.
2 Describe the PV function in Excel and its arguments.
3 Describe the PMT function in Excel and its arguments.
4 Describe the FV function in Excel and its arguments.
5 Describe the Excel functions used in the Hi-Lo method of predicting costs.

6 Describe the Excel functions used in the Least Squares/Regression method of predicting costs.

7 Describe how to create a trend line for a chart.
8 Describe how Excel can be used to calculate an allowance for uncollectible accounts using the percent of sales method.

9 Describe how Excel can be used to calculate an allowance for uncollectible accounts using the aging method.

10 Compare the percent of sales and aging methods of determining uncollectible accounts expense and the ending allowance for the uncollectible accounts balance.

## Chapter 7 Assignments

1 Create a new What SUP Present Value Analysis
a. Using the ch7-01 file to start your work, modify that worksheet to do the following:
i. Calculate the annuity payment required at the end of each year for the next 4 years such that the value in 4 years is $\$ 75,000$ and illustrate the annual value of that investment.
ii. Calculate the future value of an investment of $\$ 23,000$ invested for 4 years at a rate of 6 percent and illustrate the annual value of that investment.
iii. Calculate the future value of an investment of $\$ 13,500$ each year for 4 years at a rate of 5 percent and illustrate the annual value of that investment.
iv. Calculate the initial investment required to obtain a future value of $\$ 16,500$, assuming a rate of 7 percent for 4 years and illustrate the annual value of that investment.
b. Save the file as ch7-01_student_name (replacing student_name with your name).
c. Print the resulting worksheet in value view.
d. Print the resulting worksheet in formula view. (Type $\mathbf{C t r l} \sim$ to switch views.)

2 Create a new What SUP Cost Analysis
a. Using the ch7-02 file to start your work, create a worksheet to do the following:
i. Calculate the Hi-Lo Method variable cost/hour open and fixed cost.
ii. Predicted expense under the Hi-Lo Method assuming 500 open hours.
iii. Calculate the Least Squares/Regression Method variable cost/ hour open and fixed cost.
iv. Predicted expense under the Least Squares/Regression Method assuming 500 open hours.
v. Display a chart of Expense/Hours Open with a trend line. (be sure to modify each axis so your scatter diagram is better displayed as you did in the chapter)
b. Save the file as ch7-02_student_name (replacing student_name with your name).
c. Print the resulting worksheet in Value view.
d. Print the resulting worksheet in Formula view. (Type Ctrl $\sim$ to switch views.)

3 Create a new What SUP Allowance for Uncollectible Accounts Analysis
a. Using the ch7-03 file to start your work, create a worksheet to do the following:
i. Calculate uncollectible accounts expense and the allowance for uncollectible accounts using the percent of sales method.
ii. Calculate uncollectible accounts expense and the allowance for uncollectible accounts using the aging method.
b. Save the file as ch7-03_student_name (replacing student_name with your name).
c. Print the resulting worksheet in Value view.
d. Print the resulting worksheet in Formula view. (Type Ctrl ~ to switch views.)

## Chapter 7 Case Problem 1: KELLY'S BOUTIQUE

Kelly's Boutique has several questions for you that Excel can help answer. Kelly is planning for the future and would like you to prepare a present value analysis. Using the file ch7-04 complete a present value analysis for the following situations. Save the file as ch7-04_student_name (replacing student_name with your name). Print both a Value view and Formula view of this completed worksheet. Kelly would like to know the following:
a. How much she would have to pay at the end of each year, assuming a 4 percent rate of return, to yield $\$ 150,000$ at the end of 10 years.
b. How much she would have at the end of 10 years if she invested $\$ 75,000$ today, earning 3 percent per year.
c. How much she would have at the end of 10 years if she invested $\$ 4,785$ at the end of each year, earning 2 percent per year.
d. How much she would have to invest today to have $\$ 204,530$ in 10 years, earning 4 percent per year.

Kelly has a very fluctuating workforce based on seasonal demand. She's ranged from having 10 employees in one month to 35 employees in another month. Some employees are paid a salary, others are paid hourly. She would like to know more about how these costs behave. Use the file ch7-05 to complete a cost prediction worksheet. Save the file as ch7-05_student_name (replacing student_name with your name). The worksheet should do the following:
a. Calculate variable cost per employee, fixed costs, and a prediction of payroll cost with 20 employees using the Hi-Lo method.
b. Calculate variable cost per employee, fixed costs, and a prediction of payroll cost with 20 employees using the Least Squares/Regression method.
c. Display a chart of payroll/employees with a trend line. (Be sure to modify each axis so your scatter diagram is better displayed, as you did earlier in this chapter)

During a recent year Kelly's Boutique had sales on account of $\$ 6,000,000$, collections of $\$ 5,800,000$, write-offs of $\$ 45,000$, a beginning balance in accounts receivable of $\$ 500,000$, and a beginning balance in the allowance for uncollectible accounts of $\$ 37,000$. At year end, $\$ 580,000$ of accounts receivable were current, $\$ 39,000$ were $0-30$ days past due, $\$ 18,000$ were $31-60$ days past due, $\$ 10,000$ were $61-90$ days past due, and $\$ 8,000$ were over 90 days past due. The company believes .7 percent of sales will not be collected. They also have experience that suggests that 4 percent of all current receivables, 8 percent of receivables $0-30$ days past due, 20 percent of receivables $31-60$ days past due, 25 percent of receivables 61-90 days past due, and 50 percent of receivables over 90 days past due will not be collected. Using the file ch7-06, complete the allowance for uncollectible accounts analysis for both standard methods. Save
the file as ch7-06_student_name (replacing student_name with your name). Print both a Value view and Formula view of this completed worksheet.

## Chapter 7 Case Problem 2: WINE DEPOT

The Wine Depot is planning for the future and would like you to prepare a present value analysis. Using the file ch7-07, complete a present value analysis for the following situations. Save the file as ch7-07_student_name (replacing student_name with your name). Print both a Value view and Formula view of this completed worksheet. The Wine Depot would like to know the following:
a. How much they would have to pay at the end of each year, assuming a 4 percent rate of return, to yield $\$ 86,421$ at the end of 7 years.
b. How much they would have at the end of 7 years if they invested $\$ 8,000$ today earning 4 percent per year.
c. How much they would have at the end of 7 years if they invested $\$ 550$ at the end of each year earning 5 percent per year.
d. How much they would have to invest today to have $\$ 12,500$ in 7 years, earning 2 percent per year.

The Wine Depot is trying to better understand the behavior of their selling expenses. They have accumulated selling expenses over the last 6 months and believe units sold are a good predictor of expense behavior. Selling expenses include commissions on sales and advertising. Use the file ch7-08 to complete a cost prediction worksheet. Save the file as ch7-08_student_name (replacing student_name with your name). The worksheet should do the following:
a. Calculate variable cost per unit sold, fixed costs, and a prediction of selling expense when 10,000 units are sold using the Hi-Lo method.
b. Calculate variable cost per unit sold, fixed costs, and a prediction of selling expense when 10,000 units are sold using the Least Squares/ Regression method.
c. Display a chart of selling expense/units sold with a trend line. (Be sure to modify each axis so your scatter diagram is better displayed as you did earlier in this chapter.)

During a recent year, the Wine Depot had sales on account of $\$ 1,601,542$, collections of $\$ 1,523,541$, write-offs of $\$ 23,487$, a beginning balance in accounts receivable of $\$ 758,271$, and a beginning balance in the allowance for uncollectible accounts of $\$ 25,121$. At year end, $\$ 734,539$ of accounts receivable were current, $\$ 45,812$ were $0-30$ days past due, $\$ 21,012$ were $31-60$ days past due, $\$ 6,422$ were $61-90$ days past due, and $\$ 5,000$ were over 90 days past due. The company believes 1.6 percent of sales will not be collected. They also have experience that suggests that 4 percent of all current receivables, 10 percent of receivables $0-30$ days past due, 15 percent of receivables 31-60 days past due, 22 percent of receivables $61-90$ days past due, and 45 percent of receivables
over 90 days past due will not be collected. Using the file ch7-09, complete the allowance for uncollectible accounts analysis for both standard methods. Save the file as ch7-09_student_name (replacing student_name with your name). Print both a Value view and Formula view of this completed worksheet.

## Chapter 7 Case Problem 3: SNICK'S BOARD SHOP

Snick's Board Shop has several questions for you that Excel can help answer. The company is planning for the future and would like you to prepare a present value analysis. Using the file ch7-10, complete a present value analysis for the following situations. Save the file as ch7-10_student_name (replacing student_ name with your name). Print both a Value view and Formula view of this completed worksheet. They would like to know the following:
a. How much they would have to pay at the end of each year, assuming a 3 percent rate of return, to yield $\$ 80,000$ at the end of 5 years.
b. How much they would have at the end of 5 years if they invested $\$ 73,500$ today, earning 3 percent per year.
c. How much they would have at the end of 5 years if they invested $\$ 1,850$ at the end of each year, earning 3 percent per year.
d. How much they would have to invest today to have $\$ 25,100$ in 5 years, earning 3 percent per year.

Snick's Board Shop is trying to better understand the behavior of their utility expenses. They have accumulated utility expenses over the last 9 months and believe hours open per month are a good predictor of expense behavior. Utility expenses include electricity, gas, and water. Use the file ch7-11 to complete a cost prediction worksheet. Save the file as ch7-11_student_name (replacing student_name with your name). The worksheet should do the following:

1. Using the Hi-Lo method, calculate variable cost per unit sold, fixed costs, and a prediction of utility expense when they are open 195 hours in a month.
2. Using the Least Squares/Regression method, calculate variable cost per unit sold, fixed costs, and a prediction of utility expense when they are open 195 hours in a month.
3. Display a chart of selling expense/units sold with a trend line. (Be sure to modify each axis so your scatter diagram is better displayed, as you did earlier in this chapter.)

During a recent year, Snick's Board Shop had sales on account of $\$ 45,000$, collections of $\$ 45,500$, write-offs of $\$ 800$, a beginning balance in accounts receivable of $\$ 5,000$, and a beginning balance in the allowance for uncollectible accounts of $\$ 300$. At year end $\$ 2,400$ of accounts receivable were current, $\$ 700$ were $0-30$ days past due, $\$ 300$ were $31-60$ days past due, $\$ 200$ were $61-90$
days past due, and $\$ 100$ were over 90 days past due. The company believes 1.3 percent of sales will not be collected. They also have experience suggesting that 3 percent of all current receivables, 11 percent of receivables $0-30$ days past due, 16 percent of receivables 31-60 days past due, 25 percent of receivables $61-90$ days past due, and 50 percent of receivables over 90 days past due will not be collected. Using the file ch7-12, complete the allowance for uncollectible accounts analysis for both standard methods. Save the file as ch7-12_student_ name (replacing student_name with your name). Print both a Value view and Formula view of this completed worksheet.

## Chapter 7 Case Problem 4: ROSEY'S ROSES

Rosey's Roses has several questions for you that Excel can help answer. Use student file ch7-13 to solve 3 of these problems. This file has three worksheets labeled: Present and Future Values, Cost Prediction, and Allowance for Uncollectibles. Complete the file answering the questions below and then save the file as ch7-13_student_name (replacing student_name with your name). Print a Value view of each worksheet. (Note: This file has three worksheets.)
a. Present and Future Values (Calculate the answer and then provide a table for each question. Use the first worksheet of the workbook to answer this problem.):

1. How much they would have to pay at the end of each year, assuming a 6 percent rate of return, to yield $\$ 15,000$ at the end of 4 years.
2. How much they would have at the end of 4 years if they invested $\$ 1,000$ at the end of each year, earning 5 percent per year.
3. How much they would have to invest today to have $\$ 15,000$ in 4 years, earning 6 percent per year.
4. How much they would have at the end of 4 years if they invested $\$ 4,000$ today, earning 5 percent per year.
b. Rosey's Roses is trying to better understand the behavior of their delivery expenses. They have accumulated the delivery expenses over the last 24 months and believe that miles driven per month are a good predictor of expense behavior. Use the second worksheet of the workbook to answer this problem:
5. Using the Hi-Lo method, calculate variable cost per mile, fixed costs, and a prediction of delivery expense when they travel 10,000 miles in a month.
6. Using the Least Squares/Regression method, calculate variable cost per mile, fixed costs, and a prediction of delivery expense when they travel 10,000 miles in a month.
7. Display a chart of delivery expense and miles driven with a trend line. (Be sure to modify each axis so your scatter diagram is better displayed, as you did earlier in this chapter.)
c. During a recent year, Rosey's Roses had sales on account of $\$ 345,000$, collections of $\$ 337,000$, write-offs of $\$ 3,700$, a beginning balance in accounts receivable of $\$ 37,000$, and a beginning balance in the allowance for uncollectible accounts of $\$ 1,200$. At year end, $\$ 34,000$ of accounts receivable were current, $\$ 4,900$ were $0-30$ days past due, $\$ 1,500$ were 31-60 days past due, $\$ 500$ were $61-90$ days past due, and $\$ 400$ were over 90 days past due. The company believes 1.3 percent of sales will not be collected. They also have experience suggesting that 3 percent of all current receivables, 10 percent of receivables $0-30$ days past due, 15 percent of receivables 31-60 days past due, 20 percent of receivables 61-90 days past due, and 30 percent of receivables over 90 days past due will not be collected. Use the third worksheet of the workbook to answer this problem:
8. Complete an allowance for uncollectible accounts analysis using the percentage of sales method.
9. Complete an allowance for uncollectible accounts analysis using the aging method.

## Access for Accounting

Chapter 8Access Tour187Chapter 9
Access Basics ..... 199
Chapter 10
Tables ..... 232
Chapter 11
Queries ..... 264
Chapter 12
Forms ..... 308
Chapter 13
Reports ..... 343

## Access Tour

## In this chapter you will learn:

- Access's capabilities and new features
- How to start, navigate, and work with Access files
- How to use Access help
- How Access is used in accounting


## Case: What SUP, Inc.

Nathan and Meagan have expressed an interest in other software that might be able to help them in their business. Kyle asks them what kinds of records they keep for customer orders and inventory control.
"We keep records by hand now, and it is very tedious and problematic," Meagan responds. "I have a file for customers, suppliers, products, et cetera, but often they get misplaced and are frequently out of date. It's difficult to keep track of it all!"
"Well, perhaps a database management system might help you out," suggests Kyle.
"What's a database management system?" asks Nathan.
Kyle explains that, as their business grows, the information available to them will increase as well. A database management system (DBMS) can help. "Essentially, a DBMS is a tool for storing, retrieving, and interpreting information in an effective and useful way. These days, Microsoft's Access program, a relational database management system, has proven to be a very successful tool in combating information overload."
"Hold on," warns Nathan. "What is a relational database?"
"Ok, let's go slowly," responds Kyle. "Let me walk you and our student assistant through the basics and I'll define relational database then."
"Great," you respond. "I know businesses use databases every day, and this way I can get a better insight on how they are created and used."

## Understanding Access's Capabilities and New Features

Access is a DBMS that organizes a collection of related information used for a specific purpose. For example, information about What SUP's customers, its suppliers, and its products could be three different databases in and of
themselves. A relational database is one in which information is divided into separate stacks of logically related information, each of which is stored in a separate table in the file. Thus, tables are a critical part of a DBMS, and the relations among the tables are key to its success.

Tables can be related in three different ways: one-to-many, one-to-one, and many-to-many. For instance, the supervisor of an accounting department may have many employees who work under her; however, all the employees who work for her have only one supervisor. This would be a one-to-many relationship: one supervisor to many employees. Another example is the chief financial officer (CFO), who reports to the chief executive officer (CEO). This is a one-to-one relationship because there is only one CEO and one CFO. Still another example is the construction worker who works on many different jobs and each job requires many different workers. This is an example of a many-to-many relationship. The most common of these, and the ones you'll experience here, are the one-to-many relationships.

The DBMS includes more than just tables, of course. Queries, forms, and reports based on the data stored in tables are what make up the management component of DBMS. Before you get too far, Kyle suggests you learn how to start Access.

What's new in Access 2013? In a word, apps. An Access web app is a new type of database that you build in Access, then use and share with others as a SharePoint app in a web browser. To build an app, you just select the type of data you want to track (contacts, tasks, projects, and so on). Access creates the database structure, complete with views that let you add and edit data. Navigation and basic commands are built-in, so you can start using your app right away.

Microsoft has included Intellisense in the Expression and Query Builder portions of Access. Intellisense helps complete the field names and other items you might use in these areas. This reduces the margin of error when working with queries and expressions, as well as the time spent looking up the spelling of field names in large databases. Access 2013 also allows conditional formatting within reports, showing the information that meets a certain condition or set of conditions. To use or change the conditional formatting rules in a report, open the report, choose the Format tab on the Ribbon, and then select the Conditional Formatting option.

## Starting, Navigating, and Working with Access Files

Kyle asks you if you are familiar with starting programs in Windows XP. Nathan and Meagan don't know much about computers, so you offer to demonstrate. First you explain that starting Access is the same regardless of whether the computer's operating system is Windows 7, 8, XP, or Vista, and then you offer to demonstrate the process for starting Access in Windows XP.

## To start Access:

1 Click the Start button.
2 Click All Programs, then click the Microsoft Office folder, and then click Microsoft Office Access 2013. Your window may look like Figure 8.1.

3 Click Microsoft Office Access 2013 to start the application.
Trouble? Your start menu may be completely different from that shown in Figure 8.1. See your instructor or lab personnel for instructions on starting Access.


Figure 8.1
Starting Access

Nathan's laptop has Access installed as well, so he has been duplicating Kyle's actions on his own computer, whose screen looks somewhat different than Kyle's-in particular, Kyle's Quick Access Toolbar and Ribbon seem different. Kyle explains that screen size can change the appearance of the Ribbon and that, just like Access itself, both its Ribbon and Quick Access Toolbar can be customized.

To illustrate, Kyle starts Access and creates a new blank database file named Database1. He has captured his Access window (see Figure 8.2) and provided callouts and an explanation of the Access window characteristics. He reminds you that the user interface described here is similar to Excel's interface, so much of this will sound familiar.

File Menu - The File menu is where you manage your files and the data about them-creating, saving, inspecting for hidden metadata or personal information, and setting options. In short, it is everything that you do to a file that you don't do in the file.
Quick Access Toolbar - At the top of the Access window is the Quick Access Toolbar, which is designed to provied an easy way to execute the commands used most often. The default setting in Access provides access to the Save, Undo, and Redo commands.


Figure 8.2
The Access Window

Ribbon - There are three basic components of the Ribbon.
1 Tabs: There are several of them across the top depending on whether you have added any add-ins to Access; each represents core tasks you do in Access.

2 Groups: Each tab has groups that show related items together.
3 Commands: A command is a button, a box to enter information, or a menu.

The principal commands in Access are gathered on the second tab, the Home tab. The commands on this tab are those that Microsoft has identified as the most commonly used when people do basic tasks with databases. For example, the Paste, Cut, and Copy commands are arranged first on the Home tab, in the Clipboard group. Font formatting commands are in the Font group. Groups pull together all the commands you're likely to need for a particular type of task, and throughout the task they remain on display and readily available, instead of being hidden within menus. These vital commands are visible above your work space.

The commands on the Ribbon are the ones you use the most. Instead of showing every command all the time, Access 2013 shows some commands in response to an action you take. When you see an arrow (called the Dialog Box

Launcher) in the lower right corner of a group, there are more options available for the group. Click the arrow, and you'll see a dialog box or a task pane.
Navigation Pane - At the left of the Access window is the Navigation Pane. New in Microsoft Office Access 2013. It is a central location from which you can easily view and access all database objects such as tables, queries, forms, and reports. The Navigation Pane replaces the Database window, which was used in earlier versions of Access.
Other Access Window Items - Like all Windows screens, scroll bars control your view of the worksheet (horizontal and vertical).

## To demonstrate some of Access's features, Kyle suggests you follow along while he opens an Access file:

1 Open Access, if you closed it previously.
2 Click the drop-down arrow on the right of the Quick Access Toolbar and then click More Commands.
3 Scroll down the list of popular commands and then double-click the text Open and then click OK. Note that your Quick Access Toolbar now shows a folder icon, which gives you a quick way to open new files.
4 Click the new Open icon in the Quick Access Toolbar to open a new file. (Note: If you are using Access in a computer lab environment, your changes to the Quick Access Toolbar may not reappear the next time you start Access.)
5 Navigate the Open window to the location of this text's student files. (The location would be the CD provided with the text or from your computer lab's server.)
6 Double-click the file ch8-01, which should be located in a Ch 08 folder.
7 Click the Shutter Bar Open/Close button a few times to see how it opens and closes the Navigation pane.
8 With the Shutter Bar Open, select All Access Objects as the category and Object Type as the category view.
9 Click the Table header a few times to see how you hide or show its contents. (Note: This works for all group headers like tables, queries, forms, and reports. The navigation pane does not display empty groups; if this database did not have any reports, the group header would not display.)
10 Double-click the Table Products table. The table shown in Figure 8.3 should appear.
11 Click the File tab and then click the text Save As. Then click the Save Database As button and then select Access Database (*.accdb) as the Database File Type. (This is done to keep your original student file available, in case you need it again, and also to provide a unique name for your file.)
Trouble? The action above was designed to save the entire database with a different file name. It is not the same as clicking the Save Object command, which only saves the current object (table, query, form, report etc.).

Figure 8.3
Sample Table


12 Click Save As and then click Yes when asked if you want Access to close all open objects.
13 Add your name to the file name using the underscore key, as shown in Figure 8.4. In this example the file will be saved as ch8-01 student_name into a folder called My Access Files. You should replace "student_name" with your name.

Figure 8.4


14 Click Save.

Now that you've had a brief view of how to start, navigate, and work with Access files, it's time to become familiar with Access's help features.

## Getting Access Help

Access's help features are quite extensive. Whenever you are working with Access and are not certain how to create tables, queries, forms or reports you should press the [F1] function key or click the blue and white question mark on the Tab bar. To illustrate, Kyle decides to show you Access's help feature while trying to create a new table.

## To view Access's help to create a new table:

1 Press the [F1] function key or click the blue and white question mark to open Access's help window, as shown in Figure 8.5.

Popular searches

| Criteria | Format | Input mask |
| :--- | :--- | :--- |
| Query | Filter | Sum |
| Date | Like | Relationships |

Get started
What's new in Access
Access keyboard shortcuts
Make the switch to Access 2013
Basics and beyond
Basic tasks for an Access 2013 desktop database
Introduction to tables
Introduction to queries
Create an Access form

Trouble? You do not have to be connected to the Internet to get Access help. However, the online help is much more extensive. This example assumes you are connected to the Internet. If you are not connected, click the text Show me offline help from my computer to view Access help, keeping in mind your window may not match the Figures shown in the text.

2 Click Introduction to tables from the Access Help window.

Figure 8.5
Access's Help Window

3 Click the text Overview to expand the help text. The help window shown in Figure 8.6 should appear.

Figure 8.6
Access Help for Tables


4 Note that the text now displayed gives you more information on Access tables. Close the Help window.

Now that you're familiar with Access's help feature, Kyle thinks it would be a good idea to explore how Access is used in the accounting field.

## Examples of How Access Is Used in Accounting

There are an unlimited number of ways Access can be used in accounting. This text will focus on how Access can be used to track inventory, but of course that is just one example.

Accounting programs like QuickBooks and Peachtree are nothing more than sophisticated databases. Each organizes information by accounts, such as assets (cash, accounts receivable, inventory, etc.), liabilities (e.g., accounts payable), and equities (common stock and retained earnings). Revenue and expense transactions are also organized by accounts. A user who wants to create an income statement is simply creating a query that says, in essence, "give me the sum of all revenues and all expenses that occurred for a specific period." Thus the transactions are filtered by date and by account types.

All the major asset and liability accounts are supported by a database. For example, the accounts receivable balance sheet account is supported by a detailed subsidiary ledger that can explain how much each customer owes at any point in time, and a query can be generated that filters the information by date and by customer. Fixed assets accounts (e.g., furniture and fixtures, equipment, buildings) are supported by a detailed subsidiary ledger that can explain the cost of each asset, its economic useful life, its accumulated depreciation, and so forth. The accounts payable balance sheet account is supported by a detailed subsidiary ledger that can explain how much the company owes each vendor at any point in time; a query can be generated that filters the information by date and by vendor. Figure 8.7 shows a report that summarizes a firm's sales for the year. This report was created from an Access database designed to capture business events for a firm. Figure 8.8 illustrates a query of inventory on order the same Access database.

Yearly Sales Report
Saturday, November 16, 2013
2006

| Product | Q1 | Q2 | Q3 | Q4 | Total |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Northwind Traders Coffee | \$14,720.00 | \$230.00 | \$0.00 | \$0.00 | \$14,950.00 |
| Northwind Traders Beer | \$1,400.00 | \$5,418.00 | \$0.00 | \$0.00 | \$6,818.00 |
| Northwind Traders Marmalade | \$0.00 | \$3,240.00 | \$0.00 | \$0.00 | \$3,240.00 |
| Northwind Traders Mozzarella | \$0.00 | \$3,132.00 | \$0.00 | \$0.00 | \$3,132.00 |
| Northwind Traders Clam Chowder | \$1,930.00 | \$868.50 | \$0.00 | \$0.00 | \$2,798.50 |
| Northwind Traders Curry Sauce | \$680.00 | \$1,920.00 | \$0.00 | \$0.00 | \$2,600.00 |
| Northwind Traders Chocolate | \$1,402.50 | \$1,147.50 | \$0.00 | \$0.00 | \$2,550.00 |
| Northwind Traders Boysenberry Spread | \$250.00 | \$2,250.00 | \$0.00 | \$0.00 | \$2,500.00 |
| Northwind Traders Crab Meat | \$0.00 | \$2,208.00 | \$0.00 | \$0.00 | \$2,208.00 |
| Northwind Traders Dried Apples | \$530.00 | \$1,590.00 | \$0.00 | \$0.00 | \$2,120.00 |
| Northwind Traders Ravioli | \$0.00 | \$1,950.00 | \$0.00 | \$0.00 | \$1,950.00 |

Figure 8.7
Sales Report

Payroll is supported by a database as well. Information is collected from employees that includes Social Security number, address, pay rate, exemptions, and deductions. Time-keeping databases collection information about how many hours an employee worked on a particular job, day, or area. All of this information is stored in employee tables and payroll time tables and is then used to compute payroll expenses, withholding, paychecks, and cost distributions. Figure 8.9 shows a form used to collect time data.

The list of database applications for accounting is unlimited, and the illustrations given here are just the tip of the iceberg. However, the goal of this text is to introduce you to the fundamentals of database design and use, so we will focus on how to create tables, queries, forms, and reports that are related to inventory control only.

Figure 8.8


Figure 8.9
Sample Form


## End Note

The three of you are impressed by your first exposure to Access and pleased with your accomplishments so far. You've learned some of Access's capabilities and new features; how to start, navigate, and work with Access files; how to use Access help; and how Access is used in accounting.

In the next chapter you will learn how to create tables, queries, forms, and reports as well as how to print in Access.

## 8

## Chapter 8 Questions

1 What is a DBMS?

2 What is a relational database?
3 How are tables related?
4 Identify some new features in the 2013 version of Access.
5 Why would you use the File menu in Access?
6 What and where is the Quick Access Toolbar?
7 Describe the Ribbon.
8 What and where is the navigation pane?
9 What is the quickest way to access help while in Access?

10 Describe ways in which Access is used in Accounting.

## Access Basics

## In this chapter you will learn:

- How to create and print tables
- How to create and print queries
- How to create and print forms
- How to create and print reports


## Case: What SUP, Inc.

Kyle explains to Nathan, Meagan, and you that the key to understanding how to create and use a database is to understand a database's elements: tables, queries, forms, and reports.

Tables store like information together. Once a table is designed with fields and attributes, information is then collected into tables for later queries, forms, and reports.

Queries allow the database user to ask questions of the information stored in tables. For example, a database user might want to know what inventory balances are for each item as of a particular date or how many units of a particular item were sold to a particular customer.

Forms allow the database user to view, update, add, and delete information stored in tables but organized in traditional forms or source documents like sales invoices, inventory cards, purchase orders, and so forth. Change management experts agree that users of databases prefer information presented in traditional formats even though the raw data might be stored in a different manner (i.e., in tables).

Reports allow the database user to communicate information stored in the database in more usable formats. This might include sorting the information in a certain way-for example, from largest value to smallest value. It might also include grouping the information in a certain way: by customer, salesperson, or product. Finally, reports allow us to "filter" the information and so view only what is needed; examples include sales for a particular month, inventory balances as of a particular date, and accounts receivables for certain specified customers.

Kyle suggests you practice by creating some tables, queries, formats, and reports for What SUP's inventory system.

## Tables

Step 1 in the creation of any database is developing an understanding of the business and its information needs. Initially, this will take the form of table
creation and separation. Rather than placing all information in one table, it's important to separate information into manageable "chunks," or tables. In our inventory example, What SUP has information about its products, product suppliers, and product categories that could be combined. However, since every product has one supplier but some suppliers provide more than one product, a one-to-many relation exists between suppliers and products. Likewise, every product falls under one category, but most categories include many products. Thus, we should separate product, supplier, and category information into three separate tables with the common relationship being the supplier identification (ID) number and category ID number.

Step 2 is deciding what information we need for each table, what form (or data type) that information takes, and what properties exist for each field. This means that, for each table (product, supplier, and category), we must identify fields where information is to be stored. A common technique in database creation is to establish a unique ID number field for each record. This field will also be identified as our Primary Key field, which by definition holds data that uniquely identifies each record in a table. Thus, our first field, common to all information entered into the table, is a product ID. Next would be a product name, description, and so on. For each field, a corresponding data type (number, text, currency, etc.) must be established and, depending on the data type, properties for each field must be identified (field size, format, caption, etc.).

Step 3 is inputting the information into the tables. This is where we gather information about each product, supplier, and category. "How about running all that by me one more time?" you ask.
"I'll do you one better," responds Kyle. "I'll let you watch me create the product table."

## Creating the Product Table

Kyle explains that-in addition to creating fields for a product ID, name, and description-he will create fields that link the product to a specific inventory category supplier and that identify the product's serial number, unit price, reorder level, and required lead time.

## To create the product table:

1 Start Access.
2 Click the File tab, then click New, and then double-click Blank desktop database to create a new database file.
3 Type ch9-01_student_name (replacing "student_name" with your name, as before) into the File Name: text box as shown in Figure 9.1. (In the figure, the file is being saved into the Documents folder on a computer's "C" drive in a folder called My Databases. You should place your newly created file into a folder and drive you will be able to access later. Do this by clicking the folder icon next to the text box and navigating to your desired location.


4 Click Create. A new blank database should open with a new table and with the table tools showing in the ribbon, as shown in Figure 9.2.


5 Click View and then click Design View.
6 Type Product Table as the name of the new table you are about to create and then click OK.
7 Change the first field name from ID to ProductID, leaving the data type as AutoNumber.
8 Enter the additional field information shown in Figure 9.3 exactly as typed. (Note: Each data type has different field property characteristics, but all allow you to specify a caption. Be sure to separate the field name for clarification and enter it as each field's caption; see Figure 9.3, Product ID, for an example.) Continue with the rest of the fields, changing captions ProductName to Product Name, SupplierID to Supplier ID, et cetera. Note: When adding field name Length as a data type number you'll need to specify the field size property as Singe, and the decimal places property as 2 .

Figure 9.1
Creating a New Blank Database

Figure 9.2
New Database Window


Figure 9.3
Product Table

9 Once you have entered all the field names, data types, and correct captions, be sure that ProductID is designated as the Primary Key. If it is not, select the field and then click the Primary Key tool from the Tools group on the Design ribbon.
10 Click the File tab and then click Save.

You have created a placeholder for product information. Now it's time to create a placeholder for supplier information.

## Creating the Supplier Table

As with the product table creation, once again several fields will be required to capture information about each supplier. A supplier ID, supplier name, and contact name are just a few of the critical pieces of information necessary. In addition, Kyle suggests you should also include information about the contact's title, address, and phone and fax numbers.

## To create the supplier table:

1 Click the Create tab on the ribbon.
2 Click Table Design from the Tables group on the ribbon.
3 Enter the information shown in Figure 9.4 exactly as typed. (Note: Each data type has different field property characteristics, but all allow you to specify a caption. Be sure to separate the field name for clarification and enter it as each field's caption.) Continue with the rest of the fields, changing SupplierName to Supplier Name, ContactName to Contact Name, and so forth. (Observe that changing a field's caption does not change the field's name.)


4 Once you have entered all the field names, data types, and correct captions, click the SupplierID field name and then click the Primary Key tool on the ribbon.
5 Click the File tab and then click Save.
6 Type Supplier Table as the table name in the Save As text box and then click OK.

You have now created a placeholder for supplier information. All that is left is to create a table with category information so that you can separate products into identifiable categories.

## Creating a Category Table

The final table necessary to complete the inventory database is a category table, which will consist of only two fields: a category ID and a category name. "Why not just add the category to each product in the product table?" you ask.
"Because," Kyle responds, "in a relational database we try to conserve space and eliminate redundancy."

Figure 9.4
Supplier Table

## To create a category table:

1 Click the Create tab on the ribbon.
2 Click Table Design from the Tables group on the ribbon.
3 Create two fields: CategoryID as Short Text data type and CategoryName as a Short Text data type.
4 Set the CategoryID field as the primary field
5 Click the File tab and then click Save and then type Category Table in the Save As text box and then click OK.

Your table structure is complete. All you need now is information.

## Entering Data into Tables

With the table structure complete, you volunteer to enter information about the company's products, suppliers, and categories. Nathan provides the information for each category, product, and supplier.

## To enter data into the three tables:

1 Double-click the Category Table.
2 Type A as the first Category ID and then type Flatwater as the first Category Name. After you type each record, press the [Enter] key to begin a new category.
3 Type additional categories as shown below in Figure 9.5.

Figure 9.5
Completed Category
Table


4 Close the Category Table window after you have typed all the information.
5 Click Yes if asked to save changes.
6 Click the Supplier Table tab and then click View and then Datasheet View from the Ribbon.

7 Enter the information as specified in Table 9.1. After you type each record, press the [Enter] key to begin a new supplier.

Table 9.1 Supplier Table Information

| Supplier ID | 1 | 2 | 3 | 4 | 5 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Supplier Name | Boardworks | Naish | Bark | Infinity | Ron House |
| Contact Name | Ben Nimitz | Sara Munoz | Nancy Bearfoot | Paul Moo | Kelly O'Leary |
| Contact Title | VP Sales | Sales director | Western sales | Salesman | Regional sales |
| Address | 100 8th Ave. | 909 S. Washington | 111 Macarthur Blva. | 24382 Del Prado | 571 Mount |
|  |  |  |  |  | Pleasant |
| City | New York | Pilot Pt. | Mahwah | Dana Point | Dover |
| Postal Code | 10035 | 76258 | 07430 | 92629 | 07801 |
| State Or Province | NY | TX | NJ | CA | NJ |
| Country | USA | USA | USA | USA | USA |
| Phone Number | $212-555-1354$ | $940-555-0817$ | $201-555-5730$ | $949-555-4166$ | $201-555-3215$ |
| Fax Number | $212-555-6874$ | $940-555-1187$ | $201-555-3872$ | $949-555-9718$ | $201-555-8741$ |

8 Close and save the Supplier Table after you have typed all the information.
9 Double-click the Product Table.
10 Enter the information as specified in Table 9.2. After you type each record, press the [Enter] key to begin a new product.
11 Close and save the Product Table window after you have typed all the information.
"Remember," Kyle says, "in this case every product has one category, but every category may have multiple products. Thus we have a one-to-many relationship."

Next up: establishing relationships among the three tables.

## Establishing Table Relationships

One final step is necessary when you create multiple tables: creating relationships between the tables. Recall our previous discussion (see Chapter 8) about one-toone, one-to-many, and many-to-many relationships. In the What SUP database you created three tables, and now you must define each relationship. For example, every product belongs in a particular category and has a supplier. Thus, there is a one-to-many relationship between the supplier table and the product table and a one-to-many relationship between the category table and the product table.

Kyle suggests you establish those relationships using Access's relationship tool.

## To establish relationships between tables:

1 Select the Relationships tool from the Database Tools tab on the Ribbon.
2 Click each table in the Show Table window and click the Add button so that all three tables appear in the Relationships window.

| Table 9.2 Product Table Information |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Product ID | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 |
| Product | Veneer | Nalu | Shubu | Nalu | Candice | Glide | Slater | Hollow | Joy Ride | Badfish | Badfish | Clear | Makani | BW |
| Name | Raven |  | X | Air | Appleby | GS | Trout | Carbon |  |  | 2 | Wood |  | Hybrid |
| Length | 11.5 | 12.5 | 10 | 10 | 12.5 | 12.5 | 10 | 14 | 11 | 7 | 9 | 12.5 | 8 | 9 |
| Supplier ID | 1 | 2 | 1 | 2 | 3 | 2 | 4 | 5 | 1 | 3 | 3 | 4 | 2 | 1 |
| Category | A | A | B | B | C | C | D | C | E | D | E | C | F | F |
| ID |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Product | 136305 | NA321 | 137814 | NA841 | CA392 | GS233 | ST23141 | 234 | 514102 | BD741 | BD241 | CW94355 | NA112 | 415333 |
| Number |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Unit Cost | 700.00 | 800.00 | 500.00 | 625.00 | 1,150.00 | 810.00 | 690.00 | 1,700.00 | 626.00 | 410.00 | 685.00 | 975.00 | 135.00 | 110.00 |
| Reorder | 5 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 1 | 10 | 20 |
| Level |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lead Time | 10 | 11 | 14 | 10 | 15 | 30 | 30 | 25 | 18 | 10 | 7 | 12 | 3 | 2 |

3 Click Close in the Show Table window.
4 Resize the Product table and the Supplier Table so that all fields are visible and the vertical scroll bars disappear, as shown in Figure 9.6.


5 Click on the Category ID field in the Category Table. Hold the mouse button down and drag to the Category ID field in the Product Table, and then release the mouse button.

6 When the Edit Relationships window appears, click Create.
7 Click on the Supplier ID field in the Supplier Table. Hold the mouse button down and drag to the Supplier ID field in the Product Table; then release the mouse button.
8 When the Edit Relationships window appears, click Create. The Relationships window should now show lines connecting the common fields between each table, as shown in Figure 9.7.
9 Click the Relationship Report tool in the Tools group of the Design tab on the Ribbon. Click Open if a Microsoft Access Security Notice appears.
10 Click Print and then click OK to print the relationships report.


Figure 9.7
Established Relationships

11 Close the Relationships report and click No when asked if you want to save changes to the report.

Figure 9.6
Relationships Window

12 Close the Relationships window and click Yes if asked to save the changes to the relationships.

Now that relations have been established, you can create queries, reports, and forms that use information from one or more tables. However, it is always important to have a physical copy of your tables for backup and reference.

## Printing Tables

Occasionally you may want to print the tables to make sure information has been entered correctly. Later you will use the report feature of Access to print specific information available in the tables in a format that more effectively provides the needed information.

## To print all three tables:

1 Double-click the Category Table.
2 Click the File tab and then click Print and then click Print Preview to view a reduced-size version of the table to be printed.
3 Click once in the table to zoom to a larger size. (Note: You may have to move the scroll bars around to find the table to be printed.) Your screen should look like Figure 9.8.
4 Click the Print button on the Print Preview tab to print a copy of the table, and then click OK to print.

5 Click the Close Print Preview button and then close the Category Table window.

Figure 9.8
Print Preview of the Category Table


6 Double-click the Product Table.
7 Click the File tab and then click Print and then click Print Preview to view a reduced-size version of the table to be printed.
8 Click the Print button on the Print Preview tab to print a copy of the table, and then click OK to print.
9 Click the Close Print Preview button and then close the Product Table window.
10 Double-click the Supplier Table.
11 Click the File tab and then click Print and then click Print Preview to view a reduced-size version of the table to be printed.
12 Click the Print button on the Print Preview tab to print a copy of the table, and then click OK to print.
13 Click the Close Print Preview button and then close the Supplier Table window.

## Queries

Queries are essentially questions about the information stored in the database, such as: What products do we sell? From whom do we buy products? For any query, it is important to identify where the information can be found, what information is required, what criteria have been established, and how the information is reported.

## Creating a Query

Kyle explains that, for each query, tables are identified that contain the information to be requested. He suggests you create a query to list all products. Specifically, he wants you to provide the category name, product name, unit price, supplier name, and supplier phone number.

## To create a query:

1 Click the Create tab on the Ribbon.
2 Click Query Wizard from the Queries group on the Create tab.
3 Select Simple Query Wizard from the New Query window and then click OK. Click Open if a Microsoft Access Security Notice appears.
4 Select Table: Category Table from the Table/Queries drop-down list.
5 Click the field Category Name from the list of available fields, then click the $>$ button. This action will place the field CategoryName into the list of selected fields; see Figure 9.9.

Figure 9.9
Simple Query Wizard


Trouble? If you select the wrong field or click the wrong buttons, you can use the $>$ or < buttons to move fields back and forth between the list of available fields and the list of selected fields.
6 Select Table: Product Table from the Table/Queries drop-down list.
7 Click the field Product Name from the list of available fields, then click the $>$ button. This action will place the field ProductName into the list of selected fields.
8 Click the field Unit Cost from the list of available fields, then click the $>$ button. This action will place the field UnitCost into the list of selected fields.
9 Select Table: Supplier Table from the Table/Queries drop-down list.
10 Click the field Supplier Name from the list of available fields, then click the $>$ button. This action will place the field SupplierName into the list of selected fields.
11 Click Next in the Simple Query Wizard window.
12 Make sure the Detail button is selected in the window presented, and then click Next.
13 Type Products Query as the title, click the Open the query to view information button, and then click Finish.
14 The resulting query lists all products, as shown in Figure 9.10.

| 雷 |  | Products Query |  | $-\square \times$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Category Name | * | Product Name | Unit Cost | Supplier Name | - |
| Flatwater |  | Veneer Raven | \$700.00 | Boardworks |  |
| Flatwater |  | Nalu | \$800.00 | Naish |  |
| Inflatable |  | Shubu X | \$500.00 | Boardworks |  |
| Inflatable |  | Nalu Air | \$625.00 | Naish |  |
| Race |  | Candice Appleby | \$1,150.00 | Bark |  |
| Race |  | Glide GS | \$810.00 | Naish |  |
| Surf |  | Slater Trout | \$690.00 | Infinity |  |
| Race |  | Hollow Carbon | \$1,700.00 | Ron House |  |
| River |  | Joy Ride | \$626.00 | Boardworks |  |
| Surf |  | Badfish | \$410.00 | Bark |  |
| River |  | Badfish 2 | \$685.00 | Bark |  |
| Race |  | Clear Wood | \$975.00 | Infinity |  |
| Paddles |  | Makani | \$135.00 | Naish |  |
| Paddles |  | BW Hybrid | \$110.00 | Boardworks | $\checkmark$ |
| Record: is 4 of 14 | - | $\cdots$ * $\Gamma_{X}$ No Filter | Search 4 |  | - |

## Printing a Query

Occasionally you may want to print the query to make sure information has been properly selected. Later you will use the report feature of Access to print specific information available from a query in a format that more effectively provides the needed information.

Figure 9.10
Products Query

## To print a query:

1 Double-click Products Query.
2 Click the File tab and then click Print and then click Print Preview to view a reduced-size version of the query to be printed.
3 Click the Print button on the Print Preview tab to print a copy of the table, and then click $\mathbf{O K}$ to print.

4 Click the Close Print Preview button, and then close the Products Query window.

Access has another helpful feature, called forms, for capturing or viewing information in a database.

## Forms

Forms have a variety of purposes. One purpose is to provide a dialog box for access to predesigned queries, other forms, or reports. Another purpose is to provide a dialog box to capture new information and use it to carry out an action.

## Creating a Form

Kyle suggests that you use a form to capture information about additional What SUP's products. He reminds you that entering information into a form automatically updates the table containing such information. The form itself is just a means to update the table either by editing existing information or by adding new information like a new record.

## To create a form to capture additional products:

1 Click the Create tab on the Ribbon.

## 2 Click Form Wizard

3 Select Table: Product Table from the Table/Queries drop-down list.
4 Click the $\gg$ button to select all the fields available, and then click Next.

5 Select the Columnar layout, and then click Next.
6 Type Product Form as the new form title, and then click Finish. The resulting form should look like Figure 9.11.
7 Do not close this form.
Figure 9.11
Products Form


## Using a Form to View, Edit, or Add Information

This newly created form can be used to enter new information, edit existing information, and view existing information for each product. Nathan offers to try out the new form by viewing each record. He also volunteers to enter a new product and edit a reorder level for one product.

## To use a form to view and edit existing products and add an additional product:

1 Click the Next record button (the right arrow) at the bottom of the Products form and view each product. Continue to view each record until you reach record 5, Product ID 105.
2 Click in the Reorder Level edit box and change the reorder level from 2 to 3 .
3 Click the New record button (the right arrow with the asterisk).
4 Click in the Product Name field.
5 Type $\mathbf{1 1 5}$ as the Product ID and then type Blaster as the Product Name.
6 Complete the form as shown in Figure 9.12.


Figure 9.12
Product Form with New Record

7 Do not close this form.

Nathan has completed the form and, in so doing, has edited an existing record and added a new one. This new product is now a part of the product table and will be present for future queries or reports. Most of the information in a form comes from an underlying record source. For What SUP this includes some of the product information derived from the product table. Using graphical objects called controls, Nathan created a link between the form and its record source, the product table. He used the most common type of control used to display and enter data: a text box.

Other information in the form is stored in the form's design. In the What SUP form just created, this includes the descriptive text (such as headers and footers) as well as graphic elements (such as the horizontal rule). In other forms this might include a calculation that comes from an expression stored in the form's design.

## Printing a Form

Occasionally you may want to print a single form.

## To print a single form:

1 Click the Previous record button until you reach Record 2.
2 Click the File tab, click Print, and then click Print again.
3 Click Selected Record(s) to print the form of record 2. Note that only record 2 will be printed, because you were in record 2 when you activated the Print window.
4 Click $\mathbf{O K}$ to print the selected record.
5 Close the Products form.
"How do I get a report of the information in my new database?" asks Nathan. "Good question," Kyle answers. "Let's generate a report for you now."

## Reports

Reports are a way for a user to get information out of a database in a format that helps the analytical process. To be useful, reported information needs to be properly formatted, sorted, and/or grouped. Reports are more than listings of information. For instance, a user may want to create mailing labels, which would require a different level of formatting than a report of items grouped in particular categories. Your report may need a chart, a logo, subtotals, or grand totals. It may need a date, a special title, headers and footers by item or category, et cetera. Finally, your requirements may necessitate the reporting of only certain items in your database that meet specific criteria, such as those items that cost more than a certain dollar amount or those items from a particular category only.

## Creating a Report

Kyle suggests that your first report utilize Access's Reports Wizard and simply list, by product number, all the products together with their product ID, product name, and unit price. There are five steps to creating a report:

- Identify which fields you want in your report and in what tables those fields are present.
- Specify grouping levels, if any.
- Specify sort order, if any.
- Specify a report layout.
- Specify a report style.


## To create a report of all products listed by product number:

1 Click the Create tab on the Ribbon.
2 Click Report Wizard from the Reports group. Click Open if a Microsoft Access Security Notice appears.
3 Click Table: Product Table from the list of Tables/Queries.
4 Click Product ID from the list of Available Fields; then click the $>$ button to move ProductID from the list of Available Fields to the list of Selected Fields. Your screen should look like Figure 9.13.


Figure 9.13
Report Wizard

5 Click Product Name from the list of Available Fields, then click the $>$ button to move ProductName from the list of Available Fields to the list of Selected Fields.
6 Click Unit Cost from the list of Available Fields, then click the > button to move UnitCost from the list of Available Fields to the list of Selected Fields.
7 Click the Next button.
8 Click the Next button again, since no grouping is required for this report.
9 Select Product ID in the first sort order list box. Make sure the sort order is Ascending, as shown in Figure 9.14, and then click Next.

10 Click Tabular Layout, Portrait Orientation, and make sure the Adjust the field width so that all fields fit on a page check box is checked; then click Next.
11 Type Products by Product ID as the name of the report. Select the Preview the Report option button, and then click Finish. Your window should look like the one shown in Figure 9.15.
12 Click Close Print Preview to reveal the report's design view, as shown in Figure 9.16.
13 Leave the resulting report design view window open.


Figure 9.14
Selecting the Sort Order for a New Report

Figure 9.15
Product Report

Figure 9.16
Design View


Den


## Editing a Report

You can edit this report at any point and change its characteristics. When you closed the Report window, a Design View window appeared. You can switch between Report, Layout, and Design view by clicking on the View tool.

The Design view gives you a more detailed view of the structure of your report. You can see the header and footer bands for the report, page, and groups. The report is not actually running in Design view, so you cannot see the underlying data while working; however, there are certain tasks you can perform more easily in Design view than in Layout view. You can add a wider variety of controls to your report, such as labels, images, lines, and rectangles. You can also edit text-box control sources in the text boxes themselves (without using the property sheet) and change certain properties that are not available in Layout view.

The Layout view is the most intuitive view to use for report modification, and it can be used for nearly all the changes you would want to make to a report in Office Access 2013. In Layout view the report is actually running, so you can see your data much as it will appear when printed. Nonetheless, you can still make changes to the report design in this view. Because you can see the data while you are modifying the report, it's a useful view for setting column widths, adding grouping levels, or performing almost any other task that affects the appearance and readability of the report.

Meagan suggests that the report just generated could be improved be centering the product ID title and data, narrowing the width of the unit price field, and narrowing the horizontal rule. You offer to make the changes she has suggested by using the Design view.

## To edit the "Products by Product ID" report:

1 Change to the Layout view by clicking the View button tool and clicking Layout View. Note the differences between the Layout view shown here in Figure 9.17 below and the Design view shown previously in Figure 9.16. (More on this later.)

Figure 9.17
Layout View


2 Change back to the Design view by clicking the View button tool and clicking Design View.
3 Click Product ID (located in the Page Header section), then click the Center tool in the Text Formatting group in the Home tab of the Ribbon.
4 Click Product ID (in the Detail section) and then click the Center tool.
5 Click ProductName (in the Page Header section). Hold the Shift key down and click ProductName in the Detail section as well. (Note: Holding the Shift key down allows you to select both the header and the detail field at the same time.)
6 Click the right side on the ProductName field and drag to the left until the rightmost edge of both the ProductName field and header are lined up with the 3-inch marker on the ruler. Repeat the same process for the UnitCost field and header so that they are lined up as shown in Figure 9.18.


7 Click anywhere in the Report window to unselect the Unit Cost fields.
8 Scroll to the far lower right-hand side of the report and then click the Pages text box located in the Page Footer.
9 Click the right side of the Pages text box and drag to the left until the rightmost edge of text box is lined up with the $51 / 2$-inch marker on the ruler.
10 Click the right side of the report and drag to the left until the rightmost edge of the report is lined up with the 6 -inch marker on the ruler.
11 Click the View tool and then click Report View to see the effects of these changes on the final report. Your report should now look like Figure 9.19.

Figure 9.18
Resizing Fields in a Report

Figure 9.19
Resized Report in Print Preview


12 Close the Products by ProductID report.
13 When prompted, click Yes to save the changes in the Products by ProductID report.

## Printing a Report

Often you will want to print the reports created.

## To print the "Products by Product ID" report:

1 Double-click the Products by Product ID report.
2 Click the File tab, click Print, and then click Print Preview.
3 Click the Print button and then click OK to print the report. Your report should look like Figure 9.20.

| Products by ProductID |  |  |
| :---: | :---: | :---: |
| Productio | Product Name | Unit Cost |
| 101 | Veneer Raven | \$700.00 |
| 102 | Nalu | \$800.00 |
| 103 | Shubu X | \$500.00 |
| 104 | Nalu Air | \$625.00 |
| 105 | Candice Appleby | \$1,150.00 |
| 106 | Glide os | \$810.00 |
| 107 | Slater Trout | \$690.00 |
| 108 | Hollow Carbon | \$1,700.00 |
| 109 | Joy Ride | \$626.00 |
| 110 | Badish | \$410.00 |
| 111 | Badifish | \$685.00 |
| 112 | Clear Wood | \$975.00 |
| 113 | Makani | \$135.00 |
| 114 | ${ }^{\text {ew }}$ Hybrid | \$110.00 |
| 115 | Blaster | \$550.00 |

Figure 9.20
Printed Products by Product ID Report

4 Close the Products by ProductID report window.

Nathan and Meagan are both pleased with your changes and impressed with your skills. They recognize that they have just scratched the surface of what Access can do for their business and are anxious to learn more.

## End Note

In this chapter you have learned about some basics of the Access program, some features of the help system, and how to work with tables, queries, forms, and reports. There is much more to the Access program and much more to know about tables, queries, forms, and reports. The following four chapters will elaborate on each of these, bringing you a keener understanding of how Access is used in accounting.


## Chapter 9 Questions

1 Why isn't all information entered into a single table?
2 Identify and describe the first three steps followed in the creation of a database.

3 Which tool is used to establish relationships between tables?
4 What are queries?
5 What facts must be identified for each query?
6 What questions are asked by the Simple Query Wizard?
7 What are the purposes of forms?
8 From where does most of the information in a form come?
9 How are controls used to create forms?
10 Are headers and footers also a part of the record source?
11 What questions does the Simple Form Wizard ask?
12 What are reports?
13 To be useful, how should reports be organized?
14 What questions does the Report Wizard ask?
15 What are the five steps necessary to create a report?
16 How do you switch between the Design view and the Layout view when creating reports?

## Chapter 9 Assignments

1 Create new queries for What SUP (use the Ch9-02 file)
a. Create and print a query for What SUP that lists the supplier name, contact name, and phone number of every supplier. (Note: Be sure to use the supplier table to locate field names.) Save the query as Supplier Query 1.
b. Create and print another query for What SUP that lists the supplier name, address, city, and state of every supplier. (Note: Be sure to use the supplier table to locate field names.) Save the query as Supplier Query 2.

2 Create new forms for What SUP (use the Ch9-02 file)
a. Create and print a form for What SUP that lists all fields from the supplier table in a columnar format. (Note: Once again, use the supplier table to locate field names.) Save the form as Supplier Form, and print the first record only.
b. Create and print a form for What SUP that lists all fields from the category table in a columnar format. (Note: Use the category table to locate field names.) Save the form as Category Form, and print the first record only.

3 Create new reports for What SUP (use the Ch9-02 file)
a. Create and print a report for What SUP that lists the supplier ID, supplier name, and city from the supplier table. (Use the supplier table to locate field names.) The report should have no grouping, be sorted by supplier ID in ascending order, and be formatted in a tabular layout with portrait orientation. Save the report as Suppliers by Supplier ID. Make sure all field information is visible.
b. Create and print a report for What SUP that lists the supplier name, contact name, contact title, and phone number from the supplier table. (Use the supplier table to locate field names.) The report should have no grouping, be sorted by supplier name in ascending order, and be formatted in a tabular layout with portrait orientation. Save the report as Suppliers by Supplier Name. Make sure all field information is visible.

4 Create and edit tables for What SUP (use the Ch9-02 file)
a. Create a new table for What SUP that includes fields BuyerID, BuyerName, and BuyerPhone. The first field (BuyerID) is a Number data type; the rest are Short Text data types. All should have captions that separate each word (e.g., Buyer ID). Set the Buyer ID field as the Primary Key and save the new table as Buyers Table. Enter the following buyer information into the Buyers table, and then print the new table.

| Buyer ID | Buyer Name | Buyer Phone |
| :--- | :--- | :--- |
| 601 | Lopez | $555-7894$ |
| 602 | Ng | $555-1324$ |
| 603 | Fortier | $555-9137$ |

b. Add a field to the Product table called BuyerID, a Number data type. Add the specific BuyerID information to the following products in the Products table and then print the new table.

| Product ID | Buyer ID |
| :---: | :---: |
| 101 | 603 |
| 102 | 603 |
| 103 | 602 |
| 104 | 601 |
| 105 | 602 |
| 106 | 603 |
| 107 | 601 |
| 108 | 602 |
| 109 | 603 |
| 110 | 602 |
| 111 | 602 |
| 112 | 601 |
| 113 | 601 |
| 114 | 603 |
| 115 | 601 |

c. Establish a one-to-many relationship between the Buyers table and the Product table using BuyerID as the related field. Print the relationships report.
d. Create and print a query for What SUP that lists the product name, buyer name, and buyer phone number for every product. (Note: Be sure to use both the product and buyer tables to locate field names.) Save the query as Product Buyer Query.

## Chapter 9 Case Problem 1: KELLY'S BOUTIQUE

Recall from Chapter 2 that Kelly's Boutique sells books as well as women's shoes. Kelly's son Casey, a college accounting student who is home for the holidays, is eager to help his mom incorporate computers in her business. In this chapter (and in those that follow), Casey will try teaching Kelly the use of Access as it applies to her accounting and business needs.

Casey suggests that Kelly use a database to keep a record of her book inventory. Kelly has a partial list of books she has purchased that she thinks should be part of the database. This list includes each book's ISBN, department name, related supervisor and phone number of the supervisor, book title, publisher, publisher contact, publisher phone number, author, and list price.

Create a new database file using the following information and name the file ch9-03_student_name (replacing student_name with your name).
a. Use the information below to create a book table, department table, and publisher table in Access. Then print each table.

## Book Table

| ISBN | Dept | Book Title | PubNum | Author | ListPrice |
| ---: | :--- | :--- | :---: | :--- | :--- |
| 684872153 | Adult | Angela's Ashes | 7 | McCourt | $\$ 7.99$ |
| 60244151 | Children | Betsy-Tacy | 2 | Lovelace | $\$ 12.95$ |
| 670175919 | Children | Blueberries for Sal | 5 | McCloskey | $\$ 16.99$ |
| 27136701 | Children | Caddie Woodlawn | 4 | Brink | $\$ 17.00$ |
| 140286276 | Adult | Deep End of the Ocean <br> 60173289 | Adult | Divine Secrets of the YaYa <br> Sisterhood | 2 |
| Mitchard | $\$ 12.95$ |  |  |  |  |
| 394800168 | Children | Green Eggs and Ham | 6 | Seuss | $\$ 7.99$ |
| 439064864 | Children | Harry Potter and the <br> Chamber of Secrets | 9 | Rowling | $\$ 17.95$ |
| 439136350 | Children | Harry Potter and the <br> Prisoner of Azkaban | 9 | Rowling | $\$ 17.95$ |
| 590353403 | Children | Harry Potter and the <br> Sorcerer's Stone | 9 | Rowling | $\$ 17.95$ |

## Dept Table

| Dept | Supervisor | Phone |
| :--- | :--- | :--- |
| Adult | Nancy Wine | $555-9754$ |
| Children | Barbara Manchester | $555-1974$ |

## Publisher Table

| Pub Num | Publisher | Contact | Phone |
| :---: | :--- | :--- | :--- |
| 1 | Mass Market Paperback | Smith | $555-9745$ |
| 2 | Harper Collins | Potter | $555-7481$ |
| 3 | Penguin | Frued | $555-8974$ |
| 4 | Simon \& Schuster | Gonzalez | $555-9874$ |
| 5 | Viking Press | Hu | $555-1654$ |
| 6 | Random House | Ouimet | $555-9144$ |
| 7 | Scholastic Press | Salazar | $555-9888$ |
| 8 | Touchstone Books | Chi | $555-1112$ |
| 9 | Arthur A. Levine Books | Robinson | $555-5118$ |

b. Establish the appropriate relationship between each table. Print the relationships report.
c. Create and print a query that lists department, book title, author, supervisor, publisher, and contact. Save this query as Books by Department.
d. Create a form that shows all fields from the book table in a columnar format with. Save it as Book Form, and print the first record.
e. Create and print a report that contains the book title, ISBN, publisher, and phone number. The report should have no grouping, be sorted by book title in ascending order, and be formatted in a tabular portrait
layout and the title Book Report. All field information should be visible.
f. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 9 Case Problem 2: WINE DEPOT

The Wine Depot is interested in more effectively managing their inventory. Barbara would like you to put together a database of their current wine inventory. Create a new database file using the following information and name the file ch9-04_student_name (replacing student_name with your name).
a. Use the following information to create and print a wine products table, a buyer table, and a winery table. Use the field Name in the Buyer and Winery tables even when you are warned against using a reserved name.

| SKU | Type | Winery | Price | Cost | Size | Vintage | Quantity |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| 13883 | Chardonnay | 7 | 41.00 | 24.60 | 750 | 1998 | 12 |
| 14539 | Merlot | 8 | 36.00 | 21.60 | 750 | 1999 | 5 |
| 15347 | Cabernet Sauvignon | 3 | 120.00 | 72.00 | 750 | 1989 | 7 |
| 15966 | Pinot Noir | 2 | 65.00 | 39.00 | 750 | 1999 | 24 |
| 16528 | Chardonnay | 15 | 30.00 | 18.00 | 750 | 2001 | 12 |
| 16554 | Sauvignon Blanc | 18 | 21.00 | 12.60 | 750 | 2001 | 8 |
| 16716 | Chardonnay | 11 | 20.00 | 12.00 | 750 | 2001 | 10 |
| 16739 | Chardonnay | 17 | 61.00 | 36.60 | 750 | 1999 | 5 |
| 16769 | Syrah | 6 | 34.00 | 20.40 | 750 | 2000 | 10 |
| 16874 | Syrah | 5 | 35.00 | 21.00 | 750 | 2000 | 15 |
| 17024 | Sauvignon Blanc | 4 | 22.00 | 13.20 | 750 | 2001 | 10 |
| 17275 | Sauvignon Blanc | 14 | 16.00 | 9.60 | 750 | 2002 | 1 |
| 17425 | Zinfandel | 10 | 28.00 | 16.80 | 750 | 2001 | 7 |
| 17454 | Sauvignon Blanc | 13 | 15.00 | 9.00 | 750 | 2002 | 24 |
| 17521 | Chardonnay | 1 | 24.00 | 14.40 | 750 | 2001 | 4 |
| 17539 | Cabernet Sauvignon | 19 | 75.00 | 45.00 | 750 | 2000 | 3 |
| 17549 | Zinfandel | 9 | 22.00 | 13.20 | 750 | 2000 | 3 |
| 17578 | Cabernet Sauvignon | 12 | 11.00 | 6.60 | 750 | 2001 | 2 |
| 17840 | Red Chianti | 16 | 32.00 | 19.20 | 750 | 1999 | 12 |


| Buyer | Name | Phone |
| :--- | :--- | :--- |
| 101 | James Taylor | $555-1245$ |
| 102 | Johnny Rivers | $555-8794$ |
| 103 | Michael Jackson | $555-9743$ |
| 104 | Aaden Mikowicz | $555-2914$ |


| Winery | Name | Location | Buyer |
| :--- | :--- | :---: | :---: |
| 1 | Babcock | America | 101 |
| 2 | Bass Phillip | Australia | 104 |
| 3 | Beringer | America | 101 |
| 4 | Brander | America | 101 |
| 5 | Cafaro | America | 101 |
| 6 | Carhartt | America | 101 |
| 7 | Clarendon | Australia | 104 |
| 8 | Gainey | America | 102 |
| 9 | Gary Farrell | America | 102 |
| 10 | Joel Gott | America | 102 |
| 11 | Melville | America | 102 |
| 12 | Miguel Torres | Chile | 104 |
| 13 | MudHouse | New Zealand | 104 |
| 14 | Neil Ellis | South Africa | 103 |
| 15 | Neyers | America | 103 |
| 16 | San Vincenti | Italy | 104 |
| 17 | Talbot | America | 103 |
| 18 | Voss | America | 103 |
| 19 | Woodward | America | 103 |

b. Establish the appropriate relationship between each table and then print the relationships report.
c. Create and print a query that lists SKU, Type, Winery, Buyer, and Buyer Phone for all products. (Save as Wine Products Query 1.)
d. Create and print a form for entering new products; use whatever style you'd like. (Save the form as Wine Products Form 1, and print the first record only.)
e. Create and print a report with the fields Type, Name (Name of Winery), Vintage, and Price for all products. The report should be sorted by Type in ascending order and be formatted in a Tabular layout with Portrait orientation. (Save the report as Wine Products Report 1.) All field information should be visible.
f. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 9 Case Problem 3:

SNICK'S BOARD SHOP
Snick's Board Shop is interested in more effectively managing their inventory. Casey and Caitlin would like you to put together a database of their current inventory. Create a new database file using the information below. Name the file ch9-05_student_name (replacing student_name with your name).
a. Use the information below to create and print a products table, a manufacturer table, and a category table as you did earlier in this chapter.

## Table Structure:

| Table | Field Name | Data Type |
| :--- | :--- | :--- |
| Category | CategoryID | Number |
|  | CategoryName | Short Text |
| Manufacturer | ManufacturerID | Short Text |
|  | ManufacturerName | Short Text |
| Product | ProductID | Short Text |
|  | ProductName | Short Text |
|  | CategoryID | Number |
|  | ManufacturerID | Short Text |
|  | Price | Currency |
|  | Style | Short Text |
|  | Quantity | Number |

## Category Table

| CategoryID | CategoryName |
| :---: | :--- |
| 1 | Complete |
| 2 | Ramp |
| 3 | Longboards |
| 4 | Protective Gear |
| 5 | Rails |

## Manufacturer Table

| ManufacturerID | ManufacturerName |
| :--- | :--- |
| ALM | Almost |
| EMT | Element |
| GC | Goldcoast |
| MOJ | Mojo |
| KRO | Krooked |
| SC | Santa Cruz |
| S9 | Sector 9 |
| 888 | Triple 8 |
| 0 | Zero |

## Product Table

| ProductID | ProductName | CategoryID | ManufacturerID | Price | Style | Quantity |
| :--- | :--- | :---: | :--- | ---: | :--- | ---: |
| $61-16758$ | Element Flat Bar Grind Rail | 5 | EMT | 109.99 | Black | 10 |
| $61-23116$ | Zero Switchblade Rail | 5 | 0 | 119.99 | Silver | 10 |
| $61-36447$ | Zero 6 Foot Flat Bar Grind Rail | 5 | 0 | 99.99 | Red | 10 |
| $65-00011$ | Mojo Wedge Ramp | 2 | MOJ | 179.99 | Black/Blue | 8 |
| $65-00335$ | Almost Mullen OC Impact V4 | 1 | ALM | 119.99 | Orange/Teal | 10 |
| $65-00358$ | Element Section | 1 | EMT | 89.99 | Black/Red | 10 |
| $65-00981$ | Almost Mullen Day Glow | 1 | ALM | 119.99 | Black/Yellow | 10 |
| $65-01135$ | Macon Helmet | 4 | 888 | 59.99 | White | 10 |
| $65-01400$ | Krooked Eyes | 1 | KRO | 89.99 | Pink/Blue | 10 |
| $65-01783$ | Santa Cruz Landshark | 3 | SC | 99.99 | Blue/White | 10 |
| $65-01786$ | Santa Cruz Tiger Shark | 3 | SC | 129.99 | Orange/Black | 10 |
| $65-01837$ | Element Launch Ramp | 2 | EMT | 179.99 | Black/Red | 5 |
| $65-01967$ | Sector 9 Sand Wedge | 3 | S9 | 189.99 | Black/White | 10 |
| $65-01970$ | Goldcoast Venice | 3 | GC | 149.99 | Green/Yellow | 10 |
| $65-23174$ | Little Tricky Helmet | 4 | 888 | 34.99 | Black | 10 |

b. Establish the appropriate relationship between each table and then print the relationships report.
c. Create and print a query using the Simple Query Wizard that lists ProductName, CategoryName, and ManufacturerName for all product. (Save Query 1.)
d. Create and print a form using the Form Wizard for entering new products that lists all the available fields in the product table; use whatever style you'd like. (Save the form as Form 1, and print the first record only.)
e. Create and print a report using the Report Wizard with the fields ProductID, Style, Quantity, and ManufacturerName for all products. The report should be viewed by Manufacturer sorted by ProductID in ascending order and be formatted in a Tabular layout with Portrait orientation and no grouping. (Save the report as Report 1.) All field information should be visible.
f. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 9 Case Problem 4:

## ROSEY'S ROSES

Rosey's Roses is interested in more effectively managing their inventory. They would like you to put together a database of their current inventory. Create a new database file using the information below. Name the file ch9-06_student_ name (replacing student_name with your name).
a. Use the information below to create and print three tables-Products, Type, and Grower-as you did earlier in this chapter.

## Table Structure:

| Table | Field Name | Data Type | Primary Key? |
| :--- | :--- | :--- | :--- |
| Product | ID | Number | Yes |
|  | Type | Short Text |  |
|  | Description | Short Text |  |
|  | Quantity | Number |  |
|  | Cost/Unit | Currency |  |
| Type | Grower ID | Number | Yes |
|  | Type | Short Text |  |
|  | Description | Long Text | Yes |
|  | Grower ID | Number |  |

## Products:

| ID | Type | Description | Quantity | Cost/Unit | Grower ID |
| :--- | :--- | :--- | :---: | :---: | :---: |
| 1 | Shrub | Abraham Darby \#5 | 25 | $\$ 39.99$ | 100 |
| 2 | Shrub | Be My Baby \#5 | 30 | $\$ 18.99$ | 100 |
| 3 | Shrub | Deja Blu \#5 | 18 | $\$ 25.99$ | 200 |
| 4 | Shrub | Koko Loko \#7 | 17 | $\$ 17.99$ | 300 |
| 5 | Shrub | Peach Drift \#10 | 33 | $\$ 12.99$ | 200 |
| 6 | Shrub | Red Drift \#10 | 15 | $\$ 6.99$ | 100 |
| 7 | Shrub | Sedona \#5 | 3 | $\$ 14.99$ | 200 |
| 8 | Shrub | Sweet Intoxication \#5 | 17 | $\$ 9.99$ | 300 |
| 9 | Shrub | Wing Ding \#5 | 30 | $\$ 11.99$ | 300 |
| 10 | Climber | Climbing Orange Crush \#7 | 16 | $\$ 32.99$ | 100 |
| 11 | Climber | Don Juan Climber \#5 | 25 | $\$ 37.99$ | 200 |
| 12 | Tree | Barbara Streisand 36in Tree | 50 | $\$ 52.99$ | 300 |
| 13 | Tree | Firefighter 36in Tree | 14 | $\$ 55.99$ | 200 |
| 14 | Tree | Trumpeter 36in Tree | 4 | $\$ 65.99$ | 100 |

## Type:

## Type Description

Climber Climbing roses that are trained upright will tend to bloom only at the tips, and will not generate laterals. Other terms that are commonly used are climbers, ramblers, pillar roses, etc. There is no "official" definition of these terms. Generally, climbing roses are repeat blooming roses with large, stiff canes.
Shrub Rose shrubs that are not classified under the common varieties are known as shrub roses. Shrub roses are available in many different varieties, colors, and sizes.
Tree A rose tree is a rose bush that is pruned and grafted to grow as a tree. It has a long trunk with foliage and flower growth in a rounded mass at the top of the trunk.

## Grower:

| Grower ID | Grower Name | Contact |
| :---: | :--- | :--- |
| 100 | Jackson \& Perkins | Nate Rexford |
| 200 | Passion Growers | Kyle Said |
| 300 | Garden Valley | Casey Crawford |

b. Establish the appropriate relationship between each table and then print the relationships report.
c. Create and print a query using the Simple Query Wizard that lists the product description, type, and grower name for all products. (Save as Query 1.)
d. Create and print a form using the Form Wizard for entering new products that lists all the available fields in the product table; use whatever style you'd like. (Save the form as Form 1, and print the first record only.)
e. Create and print a report using the Report Wizard with the fields ID, type, description, and grower name for all products. The report should be viewed by grower sorted by ID in ascending order and be formatted in a Stepped layout with Portrait orientation. (Save the report as Report 1.) All field information should be visible.
f. Make sure you keep a copy of this file for use in the next chapter.


## Case: What SUP, Inc.

Nathan and Meagan are impressed with the features of Access as a database program. Kyle cautions them that there is a lot more to Access than what they have seen so far. He explains that the tables they have created can be structured in different ways and that each field can be set up with specific formats, default values, validation rules, and so on.
"Wait just a minute," exclaims Nathan. "This sounds more complicated than what we might need!"
"On the contrary," responds Kyle. "These table features-and the ones I'll explain later for queries, forms, and reports-are important to the validity of the data included in your database and helpful in making your database useful."
"Let's just take it one step at a time," says Meagan.
Kyle then enlightens them both on the importance of data validity and integrity. He explains that information in your database is of little use if it is incorrect, incomplete, or in an inconsistent format. Over the next few days he plans on explaining tables in more detail. Let's begin by reviewing the basic procedures for adding, changing, or deleting records from a table.

## Add, Change, and Delete Records

In this section, you will learn how to add, change, and delete records from tables. This process can also be done via forms, which will be discussed in Chapter 12.

## Add Records

You have already added records to the inventory database in Chapter 8 but decide to practice it again. Kyle observes your input of adding one more record to the Product table.

## To add a new record to a table:

1 Start Access.
2 Click the File tab button and then click Open.
3 Navigate the Open window to the location of this text's student files. (The location would be the CD provided with the text or from your computer lab's server.)
4 Double-click ch10-01, which should be located in a Ch 10 folder. (This is the completed What SUP Inventory file from Chapter 9 with a few modifications.)
5 Click the Enable Content button.
6 Click the File tab and then click Save Database As.
7 Navigate the Save As window to the location you wish to save this file and type Ch10-01_student_name in the File Name: text box (replacing "student_name" with your name).
8 Click Save.
9 Double-click Product Table.
10 Type 116 as the new product's Product ID and Zoomer as the new product's Product Name.
11 Press the [Tab] key and type 9.5 as the Length.
12 Press the [Tab] key and type $\mathbf{4}$ as the Supplier ID.
13 Press the [Tab] key and type $\mathbf{E}$ as the Category ID.
14 Press the [Tab] key and type Z23111 as the Product Number.
15 Press the [Tab] key and type 2000 as the Unit Cost.
16 Press the [Tab] key and type $\mathbf{3}$ as the Reorder Level.
17 Press the [Tab] key and type $\mathbf{1 0}$ as the Lead Time.
18 Press the [Tab] key and type $\mathbf{6 0 5}$ as the Buyer ID.
19 Press the [Tab] key again and note that a new record (product) has been added to the table, as shown in Figure 10.1.
20 Do not close this file.

| 囲 |  | Product Table |  |  |  |  |  |  |  |  |  |  |  | $-\square \times$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Product ID - | - | Product Name - | Length - | Supplier | ID |  | Category ID - | Product Number | - | Unit Cost - | Reorder Level | - Lead Time - | BuyerID - | Clic |
|  |  | 101 | Veneer Raven | 11.5 |  |  | 1 | A | 136305 |  | \$700.00 |  | 510 | 603 |  |
|  |  | 102 N | Nalu | 12.5 |  |  | 2 | A | NA321 |  | \$800.00 |  | 211 | 603 |  |
|  |  | 103 S | Shubu X | 10 |  |  | 1 | B | 137814 |  | \$500.00 |  | 214 | 602 |  |
|  |  | 104 | Nalu Air | 10 |  |  | 2 | B | NA841 |  | \$625.00 |  | 210 | 601 |  |
|  |  | 105 | Candice Appleby | 12.5 |  |  | 3 | C | CA392 |  | \$1,150.00 |  | 315 | 602 |  |
|  |  | 106 | Glide GS | 12.5 |  |  | 2 | C | GS233 |  | \$810.00 |  | 130 | 603 |  |
|  |  | 107 S | Slater Trout | 10 |  |  | 4 | D | ST23141 |  | \$690.00 |  | 230 | 601 |  |
|  |  | 108 | Sleeping One | 12 |  |  | 5 | C | 234 |  | \$1,500.00 |  | 210 | 605 |  |
|  |  |  | Joy Ride | 11 |  |  | 1 | E | 514102 |  | \$626.00 |  | 218 | 603 |  |
|  |  | 110 | Badfish | 7 |  |  | 3 | D | BD741 |  | \$410.00 |  | 210 | 602 |  |
|  |  | 111 B | Badfish 2 | 9 |  |  | 3 | E | BD241 |  | \$685.00 |  | 37 | 602 |  |
|  |  | 112 | Clear Wood | 12.5 |  |  | 4 | C | CW94355 |  | \$975.00 |  | 112 | 601 |  |
|  |  | 113 | Makani | 8 |  |  | 2 | F | NA112 |  | \$135.00 |  | 103 | 601 |  |
|  |  |  | BW Hybrid | 9 |  |  | 1 | F | 415333 |  | \$110.00 |  | 202 | 603 |  |
|  |  | 115 | Blaster | 10 |  |  | 5 | A | 254 |  | \$550.00 |  | 214 | 601 |  |
|  |  | 116 | Zoomer | 9.5 |  |  | 4 | E | Z23111 |  | \$2,000.00 |  | 310 | 605 |  |
| * |  | 0 |  | 0 |  |  |  |  |  |  |  |  |  |  | 0 |
|  | cord: 14 4 17 of | of 17 |  | ${ }^{\text {N }}$ No Filter | Search | 1 |  |  |  |  |  |  |  |  | - |

Figure 10.1
Partial View of Updated Product Table

## Change Records

Changing records in the table is equally as easy. Kyle suggests you change the supplier for the product you just entered from $\mathbf{3}$ to 2 and change the buyer from 1 to 3 .

## To change a record in a table:

1 Double-click the Supplier ID field for the Product ID 116 you just entered. Type 2 to replace the 4 currently listed in this field.

2 Double-click the Buyer ID field for the Diamond Pendant you just entered. Type 603 to replace the 605 currently listed in this field. You may have to use the horizontal scroll bars at the bottom of the table to view this field.

3 Press the [Tab] key to move to a new record.

Changing fields for a particular record in a table is easy. So is the procedure for deleting a record.

## Delete Records

Kyle warns you that deleting records in a table is a permanent act. It is important to be sure you want to delete a record before proceeding. Access will warn you of this and give you an opportunity to undo your deletion.

## To delete a record from a table:

1 Click on the far left side of the table next to the row containing information on Product ID 107.
2 With the Product ID 107 record selected, right-click anywhere in that record to bring up a shortcut menu.
3 Point your mouse to the text Delete Record as shown in Figure 10.2.


Figure 10.2
Deleting a Record from a Table
4 Click Delete Record.
5 An Access dialog warning box appears asking if you are sure you want to delete this record. See Figure 10.3.

Microsoft Access


Figure 10.3
Delete Warning

6 Click Yes, and the record is deleted.
"That was easy," you comment. "Let's continue."

## Add a Picture with an OLE Field

In this section, you will add a special field to the table and insert pictures to enhance the database. The process requires two steps. Step 1 is adding a new field to the table; step 2 is adding a picture to each record.

## Add an OLE Field to a Table

Kyle decides to add a picture field to the Product table. The picture-in this case, pictures of the stand-up paddle boards and products that What SUP sells-is created either by taking a digital picture of each product or by scanning a picture of each product. Nathan has taken digital pictures of each product and saved them as bitmaps (.bmp) files. Because these objects were created with another application, they need to be inserted as objects into the database. OLE (Object Linking/Embedding) is the integration of objects from other applications.

## To add an OLE field to the Product table:

## 1 Click View and then click Design View.

2 Scroll down the Design view and click in the blank field name under Buyer ID.

3 Type Picture as the new field name.
4 Press [Tab] to move the cursor to the Data Type column.
5 Select OLE Object from the drop-down list of data types as shown in Figure 10.4.

Figure 10.4
Adding a New OLE Field


6 Save the modified table by clicking the Save tool on the Quick Access toolbar.

The table is now ready for additional data. You will need to switch from the design view of the table back to the datasheet view in order to add pictures of each product.

## Add Pictures to the Table

To add pictures to the table you will need your student disk, which contains all the bitmap files that you'll need to insert into the Product table.

## To add a picture to the Product table:

1 Click View and then click Datasheet View.
2 Scroll to the right of the table to view the Picture field.
3 Right-click the Picture field on the first record to reveal the Shortcut menu; then click Insert Object, as shown in Figure 10.5.


4 Click the Create from File option.

## 5 Click Browse.

6 Navigate the Browse window to the location of this text's Images folder. (The location would be the CD provided with the text or from your computer lab's server.)
7 Several images should be available, as shown in Figure 10.6.
8 Double-click on $\mathbf{1 0 1}$ to insert that picture into the Product ID 101 record.
9 Click OK in the Insert Object window. This window should then close, and the table should now contain the words Paintbrush Picture in the Picture field of the Product ID 101 record. (Note: Instead, the words Bitmap Image, Package, or some other words may appear here. It all depends on what program your computer uses to manage images.)
10 Follow the same procedures to add pictures to the next three products.
11 Close the Product table. If asked click Yes to save the layout of the Product Table.

Figure 10.5
Inserting an Object


Figure 10.6
Images Available

You have now added both a placeholder and some data for the picture field. You will enter more pictures later.
"Why don't I see the pictures in the table?" Meagan asks.
"The pictures are there, they are just not shown." Kyle responds. "Instead, all you'll see in the table under the Picture field are the words Bitmap Image."
"You'll need to add the picture field to a form to view each picture. We can do that next week when we spend time modifying and creating new forms."

## Change the Structure of a Database

When you initially created the Inventory database, you defined its structure by specifying the names, data type, and sizes of all the fields in each table. Often, as when you added a picture field, you will need to change the structure of the database. In addition to adding fields, you may also need to change the field size, resize the field rows or columns, or change the data type. Additional changes that affect the validity of the data entered include the creation or modification of field validation rules, default values, and field formats.
"That is an important issue for us," says Nathan. "We can't use this database if the information isn't accurate and reliable. We also need to make it easier for our employees to enter data into the database."
"Exactly the reason for validation rules, default value, and field formats!" Kyle replies.

## Change a Field Size, Row Height, Column Width, and Data Type

Recall that, when you first created the Inventory tables, every field you created with a Data Type $=$ Text set the initial field size to 50 . That means that a maximum of 50 characters could be entered into that field. In some cases, limiting the field size helps prevent errors. For instance, the supplier table has a field for State or Province. If you wanted only a two-character designation for each State or Province, you could set the field size to 2 .

## To change a field size:

1 Double-click the Supplier Table.
2 Click View and then click Design View.
3 Click the State Or Province field name.
4 Under Field Size for the StateOrProvince field, type 2 (replacing 50). See Figure 10.7.


5 Click the Save.
6 A warning should appear. Click Yes to continue.

Figure 10.7
Changing a Fields Field Size Property
$\mathbf{7}$
$\mathbf{8}$
Click View and then click Datasheet View.
New Jersey. Note that you are restricted to two characters.
$\mathbf{9}$
Type NJ into the StateOrProvince field for Supplier ID 5.
$\mathbf{1 0}$ Close the Supplier table.

Viewing data in table format is a quick way to look at all the information available in the table without generating a query or report. Sometimes, however, the information in a table is not very readable. Take, for instance, the Supplier table. Only part of the address is viewable. That is easily fixed by modifying the column width of each record.
"There is also a lot of wasted space in those tables where the columns are too wide as well," remarks Meagan.
"Sometimes the problem is the number of characters in the field and sometimes it's the column title," says Kyle. "I'll show you how to fix both."

Kyle then explains that it's very important to keep field names the same in tables as you may have referred to this field name in a relationship or in a query, form, or report. Thus to resize a column that is too large due to its title, you'll first need to change the field's caption.

## To modify the Supplier table's row height and column width:

## 1 Double-click Supplier table.

2 Place the cursor between the Address field and City columns. Doubleclick the vertical line separating the Address and City column titles. The Address column should expand so that each supplier's address is visible in the column.
3 Now place the cursor between the Supplier Name column title and the Contact Name column title. Once again, double-click the vertical line separating the two columns. The Supplier Name column should contract so that the extra space in the column is eliminated, as shown in Figure 10.8. Notice how the cursor changed its appearance once it was over the line separating each column.

Figure 10.8
Partial View of Supplier Table after Resizing a Field's Column Width

4 Note in Figure 10.8 the first column (Supplier ID) only has one character in the date but is rather wide due to the number of characters in the column title (otherwise known as the field caption). In the design view, type ID in the Caption field property, which will change the column title of the SupplierID field to ID.
5 Repeat the same process to change the caption of the SupplierName field to Supplier, the ContactName field to Contact, the ContactTitle field to Title, the PostalCode field to Zip, the StateOrProvince field to ST, the PhoneNumber field to Phone, and finally the FaxNumber field to FAX.
6 Return to the Datasheet View and be sure to save the table.
7 Resize all columns using the double-click process described above. The newly resized and titled Supplier Table is shown in its entirety in Figure 10.9.


Figure 10.9
Supplier Table after Changing the Caption of Some Fields
8 Close and save the Supplier Table.

Kyle notes that while you have changed the caption of many fields, you did not change the field names, which is very important.
"I have a question," says Meagan. "When I was watching you create the Product table, I noticed you set up the LeadTime field as a data-type text. Why isn't it considered a number?"
"Good question," Kyle responds. "If we plan to use the lead time information as just information for each product, then it doesn't matter whether we set it up as a Number data type or as a Text data type. However, if we later on want to use this field in a calculation, the Text data type wouldn't work. I'll show you how easy it is to change a field's data type."

## To change a field's data type:

1 Open the Product Table in Design View.
2 Scroll down the fields listed and click in the Data Type column next to the field name LeadTime.

3 Select Number from the drop-down arrow as the new data type for this field, as shown in Figure 10.10.

Figure 10.10
Changing a Field's Data Type


4 Close and save the changed Product table. Click Yes in the warning window presented.

By changing a table's row height and column width or by editing a field's data type and field size, you change the basic structure of a database. We next address additional changes that can be made to a table: establishing validation rules, default values, and formats.

## Create Validation Rules

Kyle explains that validation rules improve data integrity and validity. Validation rules check information entered into the database (e.g., into a field) and test the entry to see if it meets certain criteria. If the information entered passes the test, the entry is allowed. If the entry fails the test, a warning appears and the entry is rejected.
"For example, in the Product table, every product should have a unit price entered and every price should be reasonable. You wouldn't want to have a unit price of $\$ 0.00$ or something greater than $\$ 5,000.00$," says Kyle.
"This would then prevent someone from entering an unreasonable price but it wouldn't prevent entering an incorrect price, right?" asks Nathan.
"Right," Kyle responds. "Validation rules can test for limits like greater than 0 and less than 1,000 , or just greater than 100 ." Kyle explains that, in addition to validating a user's entry into a database, the validation rule can also provide specific feedback to a user concerning why the validation test failed. He suggests that you help Meagan and Nathan establish the unit cost restriction for the Product table and ensure that a price is entered for every product.

## To create a validation rule:

1 Double-click Product table.
2 Click View and then click Design View.
3 Select the UnitCost field.
4 With the UnitCost field selected, click in the Validation Rule text box and type $>0$ and $<\mathbf{5 0 0 0}$.
5 With the UnitCost field still selected, click in the Validation Text text box and type Unit Cost must be $>\mathbf{\$ 0}$ and $<\mathbf{\$ 5 , 0 0 0}$, as shown in Figure 10.11.

|  | 目 |  | Product Table |  | - | $\square$ | $\times$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Field Name |  | Data Type |  | Description (Optional) |  | $\wedge$ |
| 8 | ProductiD |  | Number |  |  |  |  |
|  | ProductName |  | Short Text |  |  |  |  |
|  | Length |  | Number |  |  |  |  |
|  | SupplierID |  | Number |  |  |  |  |
|  | CategoryID |  | Short Text |  |  |  |  |
|  | ProductNumber |  | Short Text |  |  |  |  |
|  | UnitCost |  | Currency |  |  |  |  |
|  | ReorderLevel |  | Number |  |  |  |  |
|  | LeadTime |  | Number |  |  |  |  |
|  | BuyerID |  | Number |  |  |  |  |
|  | Picture |  | OLE Object |  |  |  |  |
| Field Properties |  |  |  |  |  |  |  |
| General Lookup |  |  |  |  |  |  |  |
| Format |  | Currency |  | The error message that appears when you enter a value prohibited by the validation rule. Press F1 for help on validation text. |  |  |  |
| Decimal Places |  | Auto |  |  |  |  |  |
| Input Mask |  |  |  |  |  |  |  |
|  | Caption | Unit Cost |  |  |  |  |  |
| Default Value |  |  |  |  |  |  |  |
|  | Validation Rule | $>0$ And $<5000$ |  |  |  |  |  |
|  | Validation Text | Unit Cost must be > \$0 and < \$5,000 |  |  |  |  |  |
|  | Required | No |  |  |  |  |  |
|  | Indexed | No |  |  |  |  |  |
| Text Align |  | General |  |  |  |  |  |

Figure 10.11
Validation Rules and Text

6 Save your changes to the table by clicking on the Save tool on the Quick Access toolbar.
7 Before Access will allow you to save the changes in validation rules, it will first ask if you want to test the existing data in the table (specifically, the UnitCost field) to see if it meets the new rule. See Figure 10.12.

Figure 10.12
Warning Window

Figure 10.13
Validation Rule Dialog Box


8 Click Yes to check the validity of existing information.
9 With the UnitCost field still selected, select Yes from the drop-down list in the Required text box. (This will require that all new records in the Product table have a unit cost entered.)

10 Click View and then click Datasheet View.
11 Click Yes in the dialog box provided to save the revised table design.
12 Click Yes in the next dialog box provided to once again test whether existing data meets the new rules.
13 Type $\mathbf{5 5 0 0}$ as the new unit cost of Product ID 101 and then press [Tab].
14 The dialog box shown in Figure 10.13 should appear.


## 15 Click OK.

16 Type 700 as the unit cost of Product ID 101 and then press [Tab].
17 Select the unit cost of Product ID 102; then press [Backspace] and to remove the existing $\$ 800$ unit cost then [Tab]. The dialog box shown in Figure 10.14 should appear, stating that an entry is required in this field.

Figure 10.14
Required Value Dialog Box


## 18 Click OK.

19 Type $\mathbf{8 0 0}$ as the unit cost of Product ID 102 and then press [Tab].
20 Close the Product Table.

You've now established validation rules, text, and field requirement rules, which will help you maintain data integrity. Another way to ensure that valid information is entered into the database is to create default values.

## Create Default Values

Default values, as the name implies, provides the person entering data into a database with pre-existing information for certain fields. This helps ensure the validity of entered data and also speeds up the process of entering information into a database.
"Repetitive information or information that is present in many or most records is ideal for Access's Default Value option," Kyle explains.
"For example, if most of your suppliers are located in New York, then you could set the default value for the state field of the supplier table to ' NY '."
"But what if a supplier is not actually located in New York?" you ask.
"Then you simply type over the default value," Kyle answers. "However, since most of your suppliers are in the state of New York, that won't happen very often."
"Could we also set the default value for country, given that most of our suppliers are also located in the United States?"
"Now you're catching on!" Kyle responds.
Kyle instructs you to add a new supplier after you establish NY as the default value for the state field and USA as the default value for the country field of the Supplier table.

## To create default values:

1 Double-click Supplier Table.

## 2 Click View and then click Design View.

3 Click the State Or Province field.
4 Click in the Default Value text box, type NY, and then press [Tab]. Note that Access automatically adds the quotes around NY. The Field Properties section of your screen should look like Figure 10.15.

| General | Lookup |
| :--- | :--- |

5 Select the Country field.
6 With the Country field selected, click the Default Value text box and type USA.
7 Close the Supplier table and click Yes to save your changes.

Figure 10.15
Entering a Default Value for a Field
"Now that should save us some time as we enter more suppliers," you comment.
Kyle remarks that formats and input masks also help ensure valid data entry while making information more meaningful.

## Create Formats and Input Masks

Kyle explains that format properties in tables vary depending on the data type assigned to each field. For example, a Number data type can be pre-formatted as currency ( $\$ 1,234.56$ ), fixed decimal (1234.56), standard decimal $(1,234.56)$, percent ( $123 \%$ ), or other formats. A Date/Time data type can be pre-formatted as a short date ( $1 / 23 / 15$ ), a long date (Sunday, January 25, 2015), et cetera. On the other hand, a Text data type is not usually subject to a particular format.
"I'd like to add a date to our supplier table so that I know how long I've been doing business with each supplier," Nathan comments. "Can that date be formatted like you mentioned?"
"Certainly," Kyle responds.
"How about formatting phone numbers?" Meagan asks. "Can we format phone numbers so that the area code, prefix, and number are always displayed the same?"
"The best way to solve that issue is by using another Access feature called input masks," Kyle answers.

He explains that input masks are used to control how data is entered. This is quite different from the format property referred to previously, which affects only how a value is displayed, not how it is stored in the table. A display format is not applied until the data entered is saved-nothing is displayed in the field to suggest or control the format in which data is entered. If you need to control how data is entered, Kyle suggests you use an input mask in addition to (or instead of) a data display format in those cases.

An input mask ensures that the data will fit in the format you define, and only the kind of values specified can be entered in each blank. In Meagan's example, an input mask would require that all entries contain exactly enough digits to make up a U.S. area code and telephone number and also that only digits (not alphabetic characters) be entered in each blank.

Kyle instructs you to work with Nathan and Meagan by adding a "first purchase date" field to the Supplier table and have it displayed in a short date format. In addition, he suggests you modify the Supplier table: phone number field using a phone number mask.

## To utilize the format and input mask capabilities of Access:

1 Double-click Supplier table.
2 Click View and then click Design View.
3 Create a new field by clicking in the field name text box located under the last field titled FaxNumber.
4 Type Firstpurchasedate as the new field name and then press [Tab].
5 Select Date/Time as the data type for the new field.
6 Select Short Date as the format for the new field.

7 Type First Purchase as the caption for the new field. Your screen should look like Figure 10.16.


8 Click Save from the Quick Access toolbar.
9 Click the PhoneNumber field.
10 With the PhoneNumber field selected, click in the Input Mask text box and select the button on the far right to activate the Input Mask Wizard. If a security warning appears, click Open.
Trouble? The input mask feature may not be installed on your version of Access. If not installed, a message may pop up asking if you want to install it now. If you are in a lab environment, please check with your lab administrator before proceeding. If you are at your own computer, have your installation disk handy and follow the instructions to install this feature.

Figure 10.16
Modified Supplier Table

Figure 10.17 Input Mask Wizard


12 Click Next two times to accept the default input mask for a phone number; then click Finish.
13 The Field Properties section of the PhoneNumber field should look The Field Propertic
like Figure 10.18.

Figure 10.18
Input Mask for the PhoneNumber Field

11 Click Phone Number input mask, as shown in Figure 10.17, and then click Next.

| General Lookup |  |
| :---: | :---: |
| Field Size | 50 |
| Format |  |
| Input Mask | ! |
| (999") "000\-0000; \%- ... |  |
| Caption | Phone |
| Default Value |  |
| Validation Rule |  |
| Validation Text |  |
| Required | No |
| Allow Zero Lenqth | No |
| Indexed | No |
| Unicode Compression | Yes |
| IME Mode | No Control |
| IME Sentence Mode | None |
| Text Aliqn | General |

14 Click Save from the Quick Access toolbar.
15 Click View and then click Datasheet View.
16 Type $\mathbf{1} / 1 / 15$ in the First Purchase field of Supplier ID 1.
17 Click in the First Purchase field of Supplier ID 2. Note that the date displayed for Supplier ID 1 has changed to $1 / 1 / 2015$.

18 Type February 12, 2015 in the First Purchase field of Supplier ID 2.
19 Click in the First Purchase field of Supplier ID 3. Note that the date displayed for Supplier ID 2 has changed to 2/12/2015.
20 Type Mar 20, 2015 in the First Purchase field of Supplier ID 3.
21 Click in the First Purchase field of Supplier ID 4. Note that the date displayed for Supplier ID 3 has changed to 3/20/2015.

22 Type 4/30/15 in the First Purchase field of Supplier ID 4 and 5. Part of your screen should look like Figure 10.19.


23 Add a new supplier to the Supplier table by typing 6 in the ID column and Fanatic in the Supplier column and then pressing [Tab].
24 Type Paula Lyon as the Contact, then press [Tab].
25 Type Sales associate as the Title, then press [Tab].
26 Type 10332 5th Avenue as the Address, then press [Tab].
27 Type New York as the City, then press [Tab].
28 Type 10003 as the Postal Code, then press [Tab].
29 Press [Tab] twice to accept the default State and Country values of NY and USA.
30 Type 2125551345 as the Phone Number, then press [Tab]. Note the input mask will place the parentheses and dashes accordingly. (Although the input mask will affect future entries into this field, it will not affect the form of existing entries-e.g., by placing the area code in parentheses.)
31 Type 2125551346 as the Fax Number, then press [Tab]. Observe that, in the absence of an input mask, the data is accepted as is.
32 Go back to the Fax Number field and reenter the fax number as 212-555-1346 (to be consistent with previous entries); then press [Tab].
33 Type 6/1/15 as the First Purchase field.
34 Click Save from the Quick Access toolbar.
35 Close the Supplier table.

Figure 10.19
Partial View of Modified Supplier Table

You have witnessed the affects and benefits of default values, display formatting, and input masks. Perhaps now is a good time to see how Access can enforce additional constraints on data entry to ensure that only valid data from database tables are entered as a part of a record.

## Referential Integrity

In the previous chapter you established relationships between the product, supplier, category, and buyer tables. This action identified the common fields between each table. You can further define that relationship by using referential integrity.

Kyle explains that referential integrity is a system of rules that Microsoft Access uses to ensure not only that relationships between records in related tables are valid but also that you don't accidentally delete or change related data. When referential integrity is enforced, you must observe the following rules.

- You cannot enter a value in the Foreign Key field of the related table that does not exist in the Primary Key of the primary table. A Foreign Key is a field that refers to the Primary Key field in another table and indicates how the tables are related: the data in the Foreign Key and Primary Key fields must match, although the field names need not be the same.
- You cannot delete a record from a primary table if matching records exist in a related table.
- You cannot change a Primary Key value in the primary table if that record has related records. If you want Microsoft Access to enforce these rules for a relationship, you should select the Enforce Referential Integrity check box when you create or edit the relationship. If referential integrity is in force and you break one of the rules while changing related tables, Microsoft Access displays an error message and does not allow the change.
"Wait just a minute!" Nathan exclaims. "Primary key, foreign key, referential integrity, I'm confused!"
"I know," responds Kyle. "Let me give you an example. Once I show you how this affects our product, supplier, category, and buyer tables, I think you will have a better understanding."

Kyle explains that one of the foreign keys he was referring to included the SupplierID field located in the Product table. It is considered a Foreign Key field because it refers to a Primary Key field in another table. In this case, the Primary Key to which it refers is the SupplierID field located in the Supplier table. Kyle also notes that this field, SupplierID, is the Primary Key field in the Supplier table as can be seen in Figure 10.20.
"Further," Kyle explains, "to ensure validity in the Product table we should enforce referential integrity. In doing so, every entry in the SupplierID field of the Product table will have to match one of the records in the SupplierID field of the Supplier table."
"This is still a bit baffling," says Meagan.
"Just watch as I establish referential integrity for the SupplierID field and test it by adding another record," responds Kyle.

## To establish referential integrity:

1 Click the Database Tools tab on the Ribbon.
2 Click the Relationships tool in the Relationships group.

3 Move the tables around the screen, so they match Figure 10.20, by clicking the title bar of each window and then dragging it to a new location.


4 Double-click the line that connects the SupplierID field of the Product table with the SupplierID field of the Supplier table.
5 Click the Enforce Referential Integrity check box in the Edit Relationships window as shown in Figure 10.21; then click OK.


6 Note the changed line connecting the two tables. In particular, note the one-to-many reference shown by the dark line, the 1 , and the infinity symbol.
7 Click Relationship Report from the Tools group of the Design tab on the Ribbon. If a security notice appears, click Open.
8 Click Print and then click OK to print the Relationships Report as shown in Figure 10.22.

Figure 10.20
Relationships Window

Figure 10.21
Edit Relationships Window

Figure 10.22
Printed Relationships Report

Relationships for Ch10-01_student_name
Sunday, August 18, 2013


9 Close the Relationships Report window and click No when asked if you want to save changes to the design of Report1.
10 Close the Relationships window and then click Yes if asked to save changes to relationships.
11 Double-click the Product Table.
12 Enter a new record by typing 117 as the ProductID in the last line of the Product Table, press [Tab], type Allwave as the ProductName in the Product Name field, and then press [Tab].
13 Type 8.6. in the Length field; then press [Tab].
14 Type 7 in the Supplier ID field, then press [Tab].
15 Type $\mathbf{G}$ in the Category ID field, then press [Tab].
16 Type $\mathbf{F 9 8}$ in the Product Number field, then press [Tab].
17 Type $\mathbf{7 5 0}$ in the Unit Cost field, then press [Tab].
18 Type $\mathbf{1}$ in the Reorder Level field, then press [Tab].
19 Type 14 in the Lead Time field, then press [Tab].
20 Type 604 in the Buyer ID field, then press [Tab].
21 Insert image 117.bmp for this product like you've done before, and then press [Tab].
22 Note that the last Tab completes the entry for this new product. However, since you established referential integrity, an error message (see Figure 10.23) appears. This occurred because there is no Supplier ID 7 in the Supplier table and so Access rejected your entry. Click OK in the error message to return to the Product table.


23 Type 6 in the Supplier ID field, and then close the Product table. This time Access accepts the entry in the Supplier ID field because it matches a record found in the Supplier ID field of the Supplier table.
"That makes more sense now," Meagan and Nathan agree.

## Documenting a Database

"Now that we've made all these changes to our database, how do we document them?" Nathan asks.
"Good question" responds Kyle. "Access has a feature called the Database Documenter that will provide a list of table, query, form, and report attributes."

Kyle suggests you document some of the changes you made to the product and supplier tables. In particular, he would like to see documentation of the unit price field in the Product table (where you added a validation rule) and documentation of the phone number field in the Supplier table (where you added an input mask).

## To document the information requested:

1 Click Database Documenter from the Analyze group of the Database Tools tab on the Ribbon.
2 Click the Tables tab in the Documenter window.
3 Click the Supplier Table check box as shown in Figure 10.24.


4 Click the Options button.
5 Check or uncheck boxes and select option buttons as per Figure 10.25.

Figure 10.23
Error Message

Figure 10.25
Print Table Definition


6 Click OK in the Print Table Definitions window, and then click OK in the Documenter window.

7 Click in the lower portion of the Zoom button in the Zoom group of the Print Preview tab of the Ribbon.

8 Click 150\%.
9 Navigate to page 4 of the report by clicking the arrows located in the lower left-hand corner of the Print Preview window, and locate information on the PhoneNumber field.
Trouble? Page 4 on your screen may not contain information on the PhoneNumber field. If not, look on pages 3 or 5 to find it and then change the page you print in step 10 accordingly.
10 Click Print, click Pages in the Print window, and then type 4 in the From and then type 5 in the To: text boxes and then click OK to print. Your resulting printout should contain the information shown in Figure 10.26.
11 Click Close Print Preview.
12 Click Database Documenter from the Analyze group of the Database Tools tab on the Ribbon.

13 Click the Tables tab in the Documenter window.
14 Click the Product Table check box and then click OK.
15 Click in the lower portion of the Zoom button in the Zoom group of the Print Preview tab of the Ribbon.

16 Click $\mathbf{1 5 0 \%}$.
17 Navigate to page 3 of the report by clicking the arrows located in the lower left-hand corner of the Print Preview window, and locate information on the UnitCost field.

Trouble? Page 3 on your screen may not contain information on the UnitCost field. If not, look on pages 2 or 4 to find it and then change the page you print in step 18 accordingly.

|  | PhoneNumber | Text | 50 |
| :---: | :---: | :---: | :---: |
|  | AggregateType: | -1 |  |
|  | AllowZeroLength: | False |  |
|  | AppendOnly: | False |  |
|  | Attributes: | Variable Length |  |
|  | Caption: | Phone Number |  |
|  | CollatingOrder: | General |  |
|  | ColumnHidden: | False |  |
|  | ColumnOrder: | Default |  |
|  | ColumnWidth: | 1830 |  |
|  | DataUpdatable: | False |  |
|  | DisplayControl: | Text Box |  |
|  | GUID: | \{guid \{D396690E-F676-11D3-B511-939E8A1E7E2A\}\} |  |
|  | IMEMode: | 0 |  |
|  | IMESentenceMode: | 3 |  |
| Note the InputMask specified here | $\longrightarrow$ InputMask: | ! |  |
|  |  |  |  |
|  | OrdinalPosition: | 9 |  |
|  | Required: | False |  |
|  | SourceField: | PhoneNumber |  |
|  | SourceTable: | Supplier Table |  |
|  | TextAlign: | General |  |
|  | UnicodeCompression: | True |  |

Figure 10.26
Database Documenter Information on the Phone Number Field of the Supplier Table
18 Click Print. click Pages in the Print window, and then type 3 in the From and To: text boxes. Your resulting printout should contain the information shown in Figure 10.27.

|  | UnitCost | Currency |
| :---: | :---: | :---: |
|  | AggregateType: | -1 |
|  | AllowZeroLength: | False |
|  | AppendOnly: | False |
|  | Attributes: | Fixed Size |
|  | Caption: | Unit Cost |
|  | CollatingOrder: | General |
|  | ColumnHidden: | False |
|  | ColumnOrder: | Default |
|  | ColumnWidth: | 1200 |
|  | CurrencyLCID: | 0 |
|  | DataUpdatable: | False |
|  | DecimalPlaces: | Auto |
|  | Format: | \$\#,\#\#0.00;(\$\#,\#\#0.00) |
|  | GUID: | \{guid \{FA1F2364-E5F1-11D3-B511-FAF49AA7C228\}\} |
|  | OrdinalPosition: | 6 |
|  | Required: | True |
|  | ResultType: | 0 |
|  | SourceField: | UnitCost |
|  | SourceTable: | Product Table |
| Note the ValidationR and ValidationText specified here | Rule TextAlign: | General |
|  | $\longrightarrow$ ValidationRule: | $>0$ And $<5000$ |
|  | ValidationText: | Unit Cost must be > \$0 and < \$5,000 |

Figure 10.27
Database Documenter Information on the Unit Cost Field of the Product Table

## 19 Click Close Print Preview.

Meagan notes that in the Supplier table documentation she can see the input mask created for the PhoneNumber field and that in the Product table documentation she can see the validation rule and validation text created for the UnitCost field.
"What about all the other information provided for the fields in question?" Meagan asks.
"Helpful," comments Kyle, "but not that important for us right now. It's time to practice!"

## End Note

In this chapter, you have learned more about the use of tables in the Access program. You have learned how to add, change, and delete records; how to add a picture with an OLE field; and how to change the structure of a database, which included changing field data types and column widths and changing record row heights. You have also learned how to create field validation rules, default values, and formats. Finally, you learned about the advantages and functionality of specifying referential integrity. In the next chapter you will experience more of the query process.

## Chapter 10 Questions

1 Describe the process for deleting a record from a table.
2 Define OLE.
3 What can you do in Access to change the structure of a database?
4 Why would you want to change the column width and/or row height of a table?

5 What do validation rules do?
6 What is the process for adding a validation rule to a field?
7 Why would you establish default values for a field?
8 What are input masks?
9 What is referential integrity?
10 What rules must be followed if referential integrity is enforced?

## Chapter 10 Assignments

1 Add, change, and delete records to the What SUP database (use the Ch10-02 file)
a. Add the following record to the Buyers table: BuyerID 605, Farley, 555-7187.
b. Add G as a CategoryID with a CategoryName of Women's as a category to the Category table.
c. Delete the following record from the Buyers table: BuyerID 601.
d. Change the buyer for the following Product IDs from buyer 601 to buyer 605: Product ID 104, 108, 113, and 115.
e. Print the first page of the product, buyers, and category tables as modified in a landscape orientation.
f. Save your file as Ch10-02_01_student_name (replacing student_ name with your name).

2 Add pictures to the What SUP database (use the Ch10-02 file; do not use the file you just updated in Assignment 1)
a. Add pictures for the remaining products in the Product table using the picture files provided. Each product has a picture associated with it and is labeled with the product ID number.
b. Print the second page of the Product table as modified in landscape orientation.
c. Save your file as Ch10-02_02_student_name (replacing student_name with your name).

3 Change the structure of the What SUP database (Use the Ch10-02 file; do not use the file you just updated in Assignment 1 or 2.)
a. Add the following product to the Product table. ProductID: 117; ProductName: LadyG; Length: 8.5; SupplierID: 6; CategoryID: F; ProductNumber: 3983AE; UnitCost: 620; Reorder Level: 1; Lead Time: 3; Buyer ID: 604; Picture: 117.bmp.
b. Modify the caption and re-size the column width of each field of the Product table so that the table will fit on one page when printed in landscape orientation.
c. Print the Product table in landscape orientation.
d. Create a validation rule for the Reorder Level field of the Product table, making the field a required one and making sure the reorder level is greater than 0 but less than 25 units. Create your own feedback statement and insert it as the validation text.
e. Establish 7 as the default value for the Lead Time field of the Product table.
f. Establish a phone number input mask for the BuyerPhone field of the Buyers table.
g. Enforce referential integrity between the Product table and the Buyer and Category tables.
h. Print a Relationships report.
i. Print documentation on the properties of the Reorder Level and Lead Time fields of the Product table and the BuyerPhone field of the Buyers table.
j. Save your file as Ch10-02_03_student_name (replacing student_name with your name).

## Chapter 10 Case Problem 1: KELLY'S BOUTIQUE

Note: You must have completed Case 1 in the previous chapter in order to continue working on this case.

In Chapter 9 you created a database for Kelly's Boutique consisting of a Book table, a Department table, and a Publisher table. You also created an initial form, query, and report. Kelly would now like you to make some adjustments to the tables previously created by adding and deleting some records, adding some OLE fields and pictures, and changing the structure of the database. Make the following changes for Kelly using the ch9-03_student_name file
you created in Chapter 9. (Note: Open your ch9-03_student_name file first, save it as ch10-03_student_name, and then make the listed changes.)
a. Add Warner as the tenth publisher to the Publisher table with a contact Yee and phone 555-7894.
b. Add the following records to the Book table:

| ISBN | Dept | Book Title | Num | Author | Price |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 039480029 | Children | Hop on Pop | 6 | Seuss | 7.99 |
| 039480001 | Children | The Cat in the Hat | 6 | Seuss | 7.99 |
| 446676098 | Adult | The Notebook | 10 | Sparks | 16.95 |

c. Add a Picture field for OLE objects to the Book table.
d. Add pictures to the Book table for Green Eggs and Ham, Hop on Pop, Harry Potter and the Prisoner of Azkaban, Divine Secrets, and Deep End of the Ocean. Picture files are labeled by book name and are located on your student disk in an Images folder.
e. Resize the column width of each field and the record's row height of each table so that they fit on one page when printed.
f. Establish a phone number input mask for the Phone field of the Publisher and Department tables.
g. Enforce referential integrity between the Book table and the Department and Publisher tables.
h. Create a validation rule for the List price field of the Book table, making the field a required one and making sure the price is no less than $\$ 1$ but no more than $\$ 100$. Create your own feedback statement and insert it as the validation text.
i. Establish Children as the default value for the Department field of the Book table.
j. Print the Book, Department, and Publisher tables.
k. Print the Relationships report.

1. Print documentation on the properties of the List Price field of the Book table and the Phone field of the Publisher table.
m. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 10 Case Problem 2:

## WINE DEPOT

Note: You must have completed Case 2 in the previous chapter in order to continue working on this case.

In Chapter 9 you created a database for the Wine Depot consisting of a Wine Products table, a Winery table, and a Buyer table. You also created an initial query, form, and report. Barbara has now asked you to make some changes to those files. Make the following changes for Barbara using the ch9-04_student_name file you
created in Chapter 9. (Note: Open your ch9-04_student_name file first, save it as ch10-04_student_name, and then make the listed changes.)
a. Add buyer 105, Carly Simon, 555-6874 to the Buyer table.
b. Add winery 20 (Robert Mondovi, American, 105) and winery 21 (Wente, American, 104) to the Winery table.
c. Delete wines with SKU 15966 and 16769.
d. Delete winery 2 .
e. Add the following records to the Wine Products table:

| SKU | Type | Winery | Price | Cost | Size | Vintage | Quantity |
| :--- | :--- | :--- | :--- | :--- | :--- | :---: | :---: |
| 12564 | Merlot | 21 | 12.99 | 8.00 | 750 | 2000 | 24 |
| 12895 | Sauvignon Blanc | 4 | 15.49 | 9.00 | 750 | 2002 | 12 |
| 16900 | Syrah | 11 | 30.00 | 24.00 | 750 | 2001 | 12 |
| 11350 | Pinot Noir | 11 | 30.00 | 24.00 | 750 | 2001 | 12 |
| 11475 | Pinot Noir | 1 | 22.00 | 17.50 | 750 | 2001 | 48 |
| 12380 | Pinot Noir | 20 | 21.00 | 18.00 | 750 | 2000 | 24 |
| 12383 | Chardonnay | 20 | 18.00 | 12.00 | 750 | 2000 | 36 |
| 12384 | Fume Blanc | 20 | 17.49 | 11.00 | 750 | 2001 | 36 |

f. Enforce referential integrity between the tables.
g. Print the Relationships report.
h. Add a Picture field for OLE objects to the Wine Products table.
i. Add pictures to the Wine Products table for products 11475,12384 , 12895, 14539, and 15347. (Note: Pictures for these products are provided in an Images folder on your student disk and are labeled with the SKU number.)
j. Establish a phone number input mask for the Phone field of the Buyer table, and then change all the phone numbers in the table to include an area code of 805.
k. Create a validation rule for the Price field of the Wine Products table, making the price field required and making sure the price is no less than $\$ 1$ but no more than $\$ 100$. Create your own feedback statement and enter it as the validation text. Save the changes you made.

1. When creating your validation rule, you might well have checked to see if the data already stored actually met that rule. If you did check, you found that the validation rule was in conflict with some of the existing data. Change the rule so that the price must be no less than $\$ 1$ but now no more than $\$ 200$. Create your own feedback statement and enter it as the validation text. Save the changes you made.
m . Establish a default value of 750 for the Size field of the Wine Products table.
n. Resize the column width of the Wine Products table so that it can fit on one page when printed in landscape orientation.
o. Print each table.
p. Print documentation on the properties of the Phone field of the Buyer table and the Price field of the Wine Products table.
q. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 10 Case Problem 3: SNICK'S BOARD SHOP

Note: You must have completed Case 3 in the previous chapter in order to continue working on this case.

In Chapter 9 you created a database for the Snick's Board Shop consisting of a Products table, a Category table, and a Manufacturer table. You also created an initial query, form, and report. Caitlin has now asked you to make some changes to those files.

Make the following changes for Caitlin, using the ch9-05_student_name file you created in Chapter 9. (Note: Open your ch9-05_student_name file first, save it as Ch10-05_student_name, and then make the listed changes.)
a. Add CategoryID 6, CategoryName T-shirts to the category table.
b. Add ManufacturerID AH, ManufacturerName Anti-Hero to the manufacturer table.
c. Add ProductID 62-01296, ProductName Anti-Hero Logo T-Shirt, CategoryID 6, ManufacturerID AH, Price \$14.99, Style Red, Quantity 30 to the product table.
d. Change ProductID 65-23174 to 61-23174
e. Delete ProductID 65-01837 from the product table.
f. Enforce referential integrity between the tables.
g. Print the Relationships report.
h. Add a Picture field for OLE objects to the Products table.
i. Add pictures to the products table. (Note: Pictures for these products are provided in the Images folder and are labeled with the ProductID.)
j. Add a PhoneNumber field to the manufacturer table with a standard phone number input mask and then add the following phone numbers to the manufacturer table.

| ManufacturerID | PhoneNumber |
| :--- | :--- |
| AH | $619-555-8521$ |
| EMT | $305-555-7861$ |
| S9 | $415-555-7142$ |

k. Create a validation rule for the Price field of the product table, making the price field required and making sure the price is greater than $\$ 1$ but less than $\$ 500$. Create your own feedback statement and enter it as the validation text. Save the changes you made.

1. Establish a default value of 20 for the Quantify field of the product table.
m . Resize the column width of the product table so that it can fit on one page when printed in landscape orientation.
n. Use Access's help feature to learn how to sort tables alphabetically by a certain field. Then sort and save each table by its primary key.
o. Print each table.
p. Print documentation on the properties of the PhoneNumber field of the manufacturer table and the quantity field of the product table.
q. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 10 Case Problem 4: ROSEY'S ROSES

Note: You must have completed Case 4 in the previous chapter in order to continue working on this case. In Chapter 9, you created a database for Rosey's Roses consisting of a Product table, a Type table, and a Grower table. You also created an initial query, form, and report. You have now been asked to make some changes to those files.

Make the following changes using the ch9-06_student_name file you created in Chapter 9. (Note: Open your ch9-06_student_name file first, save it as Ch10-06_student_name, and then make the listed changes.)
a. Add Type "Creeper", and Description "Low-growing roses used as ground cover." to the Type table.
b. Add Grower ID " 400 ", Grower Name "Owen Farms", and Contact "Maria Lopez" to the Grower table.
c. Add ID "15", Type "Creeper", Description "Sunlight \#3", Quantity " 35 ", Cost/Unit " 30.00 ", and Grower ID " 400 " to the Product table.
d. Delete ID " 7 " from the Product table.
e. Delete the existing relationships between tables.
f. Change the Field Size of the following fields in the Product table: Type - 10 and Description - 30 .
g. Add a Picture field for OLE objects to the Product table.
h. Add pictures to the Product table. (Note: Pictures for these products are provided in the Images folder and are labeled with the product ID.)
i. Add a Phone Number field to the Grower table with a standard phone number input mask and a field size of 10 , and then add the following phone numbers: ID 100 - 503-555-1957, ID 200 - 408-555-8741, ID 300 - 212-555-1154, and ID 400-805-555-6974.
j. Create a validation rule for the Cost/Unit field of the Product table, making the Cost/Unit field required and making sure the Cost/Unit is
greater than $\$ 1$ but less than $\$ 100$. Create your own feedback statement and enter it as the validation text.
k. Establish a default value of 10 for the Quantify field of the Product table.

1. Recreate relationships between tables and enforce referential integrity.
m. Print the relationships report.
n. Print each table.
o. Print documentation on the properties of the Phone Number field of the Grower table, the Quantity field of the Product table, and the Cost/Unit field of the Product table.
p. Make sure you keep a copy of this file for use in the next chapter.


## Case: What SUP, Inc.

Kyle decides to take Meagan and Nathan to the next level of database use by explaining the query process.
"What good is all this information if you can't use it?" Kyle asks. "Access provides you tables as a holder of information, but queries are used to ask questions of the data and to retrieve a subset of the total information available."
"Do we have to learn a special language in order to ask questions of the database?" asks Meagan.
"No, but you do need to know some characteristics of the data so that you can use Access's Query By Example (QBE) method of inquiry," he responds.

Kyle decides that he'll begin by explaining how to go about querying the database for specific information, such as what necklaces Coast has in inventory, and then continue with more complicated queries, such as which necklaces Coast has in inventory that are above one price but below another.

## Querying Selected Records

Kyle explains that the querying you accomplished in your introduction to Access involved listing specific data from various tables. In these queries you
didn't establish any criteria to select specific records; you just specified what specific information you wanted from all records. The next level of inquiry requires that you establish specific criteria for certain fields to narrow down your search for particular records. These are referred to as select queries.
"We'll begin with character data, wildcards, and numbers to specify what records we're looking for," Kyle explains.

## Using Character Data in a Select Query

Queries can be generated either by using the Query Wizard (as was done in our introduction to Access) or by using the Design view, which is more sophisticated and flexible. Kyle suggests you use the Design view to create a simple query of your inventory file, which has been updated to include a total of 20 records. If a customer were looking for a specific item that she saw elsewhere, then she might ask if you have a particular watch in stock. You could look that item up in your database by generating a query asking for a specific match to a specific name.
"Why don't we ask the database if it has a specific Seiko watch with a product number of SMA113?" asks Meagan.
"Good idea," Nathan responds. "Let's create such a query that displays the product number, name, and supplier."

## To create a query using character data:

## 1 Start Access.

2 Click the File tab and then click Open.
3 Navigate the Open window to the location of this text's student files. (The location would be the CD provided with the text or from your computer lab's server.)
4 Double-click ch11-01, which should be located in a Ch 11 folder. (This is a modified version of the completed What SUP Inventory file from Chapter 10.) Click the Enable Content button.
5 Click the File tab and then click Save Database As.
6 Navigate the Save As window to the location where you want to save this file and type Ch11-01_student_name in the File Name: text box, replacing "student_name" with your name.
7 Click Save. Click the Enable Content button.
8 Click Query Wizard from the Queries group on the Create tab of the Ribbon.

9 Click Simple Query Wizard and then click OK. Click Open if a security notice appears.
10 Click Table: Product Table from the drop-down list of Tables/ Queries.

11 Double-click Product Number and Product Name from the list of available fields.

12 Click Table: Supplier Table from the drop-down list of Tables/ Queries.

13 Double-click Supplier Name from the list of available fields.
14 Click Next and then type Product Query 1 as the title for the query and then click Finish.

15 Double-click the space between each field name to resize the columns so that all information is visible. Your screen should look like Figure 11.1.

Figure 11.1
Product Query 1


16 Click the Home tab of the Ribbon; click View and then click Design View.

17 Type NA321 in the criteria section of the query in the ProductNumber column of the design grid, as shown in Figure 11.2.
18 Click Run from the Results group of the Design tab of the Ribbon.
19 Resize the column widths if necessary to view all of the information provided. The resulting Datasheet view of the query should look like the query solution in Figure 11.3.

20 Close the Query window and click Yes to save changes.


The character-based queries work well when you have a specific name or set of characters (like the product number) you are looking for. However, Access users are often in search of records that match some-but perhaps not all-of a specific criteria. Wildcards provide this capability.

## Using Wildcards in a Select Query

Queries using wildcards allow the user to find such things as field values, records, or filenames. The asterisk (*), which matches any number of characters, can be used as a wildcard in the first, last, or first and last position of the character string. For example, if Nathan wanted to list all the products he had in inventory that contained the text "Badfish" in the product name, he would type *Badfish* as the criteria under the ProductName column.

Kyle points out that there is a way to create a new query other than by using the Query Wizard. This method, which Kyle actually prefers, is called query by design and uses a different tool called the Query Design tool. He suggests you try this method out next to practice your use of wildcards.

## To search for a product using wildcards using the Query Design tool:

1 Click Query Design from the Queries group on the Create tab of the Ribbon.

2 Double-click Product Table from the list of tables in the Tables tab of the Show Table window to add the Product table to the query, and then click the Close button.

3 Resize the Product Table window so that all fields are visible by clicking and holding the lower right-hand corner of the window and dragging down and to the right.

4 Double-click the ProductName and UnitCost fields from the Product table shown in the query.

5 Type *Badfish* in the criteria section of the query in the ProductName column of the design grid, as shown in Figure 11.4.

Figure 11.4
Using Wildcards in a Query


6 Click Run from the Results group in the Design tab of the Ribbon. The resulting Datasheet view of the query should look like the query solution in Figure 11.5.


7 Click View and then Design View. Note that the Criteria has changed to Like "*Badfish*", which is the proper syntax to be used when searching in a query.
8 Click the Save icon on the Quick Access Toolbar.
9 Type Product Query 2 in the Save As text box and then click OK.
10 Click the Home tab and then close the query.
"That's all well and good," Meagan says. "But what if I wanted to add more fields to my query solution?"
"Good question," Kyle responds. "It's easy to change your existing query, but you'll notice that Access has saved your query in a slightly different form from how you created it."

## Editing a Select Query

Once you've saved a query, it can be re-run any number of times. For instance, Product Query 1-which looked up a particular product number from the data-base-could be run again for the same or a different product number. Product Query 2 could be run again using the same criteria but asking for different fields of information.

Kyle suggests you demonstrate the query editing features of Access by modifying Product Query 1 to look up a different product number (LGR29) and adding the buyer's name to the result. He also suggests you modify Product Query 2 to look up all product names containing the word "earrings" and adding the category name to the result.

Figure 11.5
Results of Wildcard Query

Trouble? You may have to resize the query window, tables, and so forth in order to view all the information. To do this, place the cursor over the edges you wish to resize.
2 Click Show Table from the Query Setup group on the Design tab of the Ribbon.
3 Double-click Buyers Table and then close the Show Table window.
4 Move the table windows around so that all fields and tables are viewable.
5 Double-click the BuyerName field from the Buyers table shown in the query to add that field to your query.
6 Type 234 in the criteria section of the query in the Product Number column replacing the previous value as shown in Figure 11.6.
Trouble? Before typing the new criteria specified for this query, note that the previous product number has automatically been placed in quotes. You don't need to type the quotes in before making this query, but Access knows that quotes are needed for future instances of the query.


Figure 11.6
Editing Product Query 1

7 Click Run from the Results group in the Design tab of the Ribbon. The resulting Datasheet view of the query should look like the query solution in Figure 11.7.

| 困 | Product Query 1 |  |  |  | - $\square$ | $\times$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Product Number |  | Product Name * |  | Supplier * | Buyer Name * |  |
| 234 |  | Sleeping One |  | Ron House | Lopez |  |
| * |  |  |  |  |  |  |
| Record: is 1 of 1 | - | $\cdots$ | $\Gamma_{x}$ No Filter | Search |  |  |

8 Click the File tab, then click Save As, then click Save Object As, and then click the Save As button.
9 Type Product Query 3 as the new name and then click OK.
10 Click the Home tab and then close the Query window.
11 Right-click Product Query 2 from the Query listing and then select Design View from the shortcut menu.
12 Click Show Table from the Query Setup group on the Design tab of the Ribbon.
13 Double-click Category Table and then close the Show Table window.
14 Move the table windows around so that all fields and tables are viewable.
15 Double-click the CategoryName field from the Category table shown in the query.
16 Select Like "*Badfish*" from the Criteria row of the ProductName column and press the [Backspace] key to delete this criteria. Then type Race in the Criteria row of the CategoryName column as shown in Figure 11.8.


## Figure 11.7

Results of the Newly Modified Product Query 1

Figure 11.8
Editing Product Query 2

Figure 11.9
Results of the Newly Edited Product Query 2

17 Click Run from the Results group in the Design tab of the Ribbon. The resulting Datasheet view of the query should look like the query solution in Figure 11.9.


18 Click the File tab, click Save As, then click Save Object As, and then click the Save As button.

19 Type Product Query 4 as the new name and then click OK.
20 Click the Home tab and then close the Query window.
"How do we delete fields from a query?" Meagan asks.
"Let me show you by removing the UnitCost field from the Product Query 4 we just created," Kyle answers.

## To delete a field from a query:

1 Double-click Product Query 4 to reopen the query you just worked on.
2 Click View and then click Design View.
3 Click the top of the UnitCost field column until it is selected (turns black).
4 Press the [Delete] key. Note that the UnitCost field column is removed.
5 Close Product Query 4 but do not save changes.
"I'm impressed!" exclaims Meagan. "This query stuff isn't so difficult; in fact, it's rather intuitive."

Kyle continues with his explanation of queries by showing additional examples of the query process. So far he has used characters in his queries. Now it is time to demonstrate the use of numbers in queries and show how comparison operators can be used in a select query.

## Using Comparison Operators and Sorting in a Select Query

Kyle asks if you would like to track items you're running short of or items that you need to place on sale. Prior to creating a query to do this, you'll need to add quantify as a field to the Product Table and then add values to that field for all products.

If so, he suggests you create a select query to find all inventory items for which quantity balances are running low (less than or equal to two items, for instance). To do so, Kyle explains that you simply modify your criteria to include comparison operators like the < symbol, which signifies "less than". He cautions you, however, that the less-than symbol, just like the greater-than symbol ( $>$ ), is not inclusive of the number specified. Thus, in order to generate a query that selects those records for which inventory quantities are less than or equal to a certain number, you must include both the $<$ and the $=$ symbols.

## To add a quantity field and values and select records for which inventory quantities are less than or equal to 2 :

1 Using what you learned in the previous chapter on tables, add a new field Quantity to the Product Table as a Date Type Number. Then enter quantity values as follows for each ProductID:

| Product ID | Quantity |
| :--- | :---: |
| 101 | 2 |
| 102 | 3 |
| 103 | 3 |
| 104 | 4 |
| 105 | 1 |
| 106 | 0 |
| 108 | 4 |
| 109 | 1 |
| 110 | 5 |
| 111 | 2 |
| 113 | 12 |
| 114 | 15 |
| 115 | 4 |
| 116 | 5 |

Then close the Product Table.
2 Click Query Design from the Queries group on the Create tab of the Ribbon.
3 Double-click Product Table from the list of tables in the Tables tab of the Show Table window to add the Product table to the query; then click the Close button.
4 Resize the Product Table window so that all fields are visible.
5 Double-click Product Name and Quantity fields for this query.
6 Type $<=\mathbf{2}$ in the criteria row of the Quantity field of the design grid.
7 Click Run. Your results should look like Figure 11.10.
8 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
9 Type Product Query 5 as the new name and then click OK.
10 Click the Home tab and then close the Query window.

Figure 11.10
Query Results for Products with a Quantity of 2 or Less

"Wouldn't you get the same results if you set the criteria as $<2$ ?" Nathan asks.
"No, you wouldn't," responds Kyle. "Let me demonstrate."

## To select records with criteria of $<\mathbf{2}$ :

1 Right-click Product Query 5 and then click Design View.
2 Type $<\mathbf{2}$ in the criteria row of the Quantity field of the design grid, replacing the $<=2$.
3 Click Run. Your results should look like Figure 11.11.
Figure 11.11
Query Results for Products with a Quantity of Less Than 2


4 Close the query but do not save changes.

Kyle compares the two query results to demonstrate to Nathan the differences. He explains that the equal sign was important so that all records with a quantity of two or fewer were selected.
"What other comparison operators are available in Access?" asks Meagan.
Kyle responds that, in addition to the $<$ and $=$ symbols, Access allows you to select records using any combination of $<,=$, or $>$. For instance, you could ask for records in which the price was between $\$ 500$ and $\$ 1,000$ by using the $<$ and $>$ symbols together. Or you could not use the symbols and simply ask for the records in which the unit cost was between 500 and 1000.
"Could we also sort the results from lowest to highest cost?" asks Meagan.
"Yes," Kyle answers. "Access queries allow for sorting the results in either ascending or descending order.

## To select records with a cost between $\$ 500$ and $\$ 1,000$ and sort the results:

1 Click Query Design from the Queries group on the Create tab of the Ribbon.

2 Double-click Product Table from the list of tables in the Tables tab of the Show Table window to add the Product table to the query, and then click the Close button.

3 Resize the Product Table window so that all fields are visible.
4 Double-click Product Name and UnitCost fields for this query.
5 Type $>500$ And $<\mathbf{1 0 0 0}$ in the criteria row of the UnitCost field of the design grid.
6 Click Ascending from the drop-down menu in the Sort cell of the UnitPrice field, as shown in Figure 11.12.


7 Click Run. Your results should look like Figure 11.13.
8 Return to the Design View and type Between 500 And 1000 in the criteria row of the UnitCost field.
9 Click Run. Your results will be slightly different since the concept of Between is inclusive of 500 and 1000 , whereas $>500$ AND $<1000$ is exclusive of 500 and 1000 .

Figure 11.13
Results of Unit Price Query


10 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
11 Type Product Query 6 as the new name and then click OK.
12 Close the Query window.

Kyle explains that so far you've specified criteria for only one field. Access allows you to specify criteria for more than one field using specific or comparison operators.

## Using Compound Criteria and Limiting Output in a Select Query

Compound criteria allow you to select records from a database using more than one field. These criteria can be applied to require that all criteria be met or they can be applied such that only one criterion need to be met before a record is selected. The field upon which the criteria are applied must be included in the query but need not be included in the output.
"Let's create a query that includes product name and unit cost for all products with a unit cost greater than $\$ 500$ and a buyer ID of 1 or 3 sorted by product name," suggests Kyle.
"Do we have to include the Buyers table in this query?" Meagan asks.
"No, since the buyer ID is a part of the Product table, it won't be necessary to include the Buyers table," answers Kyle.

## To create a query that includes product name and unit price for all products with a unit cost greater than $\$ 500$ and a buyer ID of 1 or 3:

1 Click Query Design from the Queries group on the Create tab of the Ribbon.
2 Double-click Product Table from the list of tables in the Tables tab of the Show Table window to add the Product table to the query, and then click the Close button.
3 Resize the Product Table window so that all fields are visible.

4 Double-click ProductName, UnitCost, and BuyerID fields for this query.
5 Type $>\mathbf{5 0 0}$ in the criteria row of the UnitCost field of the design grid. Make sure the Show check box in the Unit Price field of the design grid is selected.
6 Type 602 Or 603 in the criteria row of the Buyer ID field of the design grid.
7 Be certain that the Show check box under all fields is checked.
8 Click Ascending from the drop-down menu in the Sort cell of the Product Name field. Your screen should look like Figure 11.14.


9 Run the query. Your results should look like Figure 11.15.

| 7 | Query 1 |  | - $\square$ | $\times$ |
| :---: | :---: | :---: | :---: | :---: |
|  | Product Name - | Unit Cost * | BuyerID | . |
|  | Badfish 2 | \$685.00 |  | 602 |
|  | Candice Appleby | \$1,150.00 |  | 602 |
|  | Glide GS | \$810.00 |  | 603 |
|  | Joy Ride | \$626.00 |  | 603 |
|  | Nalu | \$800.00 |  | 603 |
|  | Veneer Raven | \$700.00 |  | 603 |
|  | Zoomer | \$2,000.00 |  | 603 |
| * |  |  |  | 0 |
|  | cord: 14 1 of 7 | $\cdots \cdots$ | ${ }^{\text {a }}$ No Filter | Se |

10 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
11 Type Product Query 7 as the new name and then click OK.

Figure 11.14
Query Design of Products with Unit Cost Greater than $\$ 500$ and Purchased by Buyer 602 or 603

## Figure 11.15

Query Results for Products with Unit Cost Greater than $\$ 500$ and Purchased by Buyer 602 or 603

As an alternative Kyle explains that the criteria specified on multiple fields can require that all records satisfy all criteria or that the criteria specified on multiple fields satisfy one or more criteria. For example, the previous query asked for all records in which the unit cost was greater than $\$ 500$ and for which the buyer was 602 or 603 . Another query might ask for all records in which the unit cost was greater than $\$ 500$ or for which the buyer was 602 or 603 . These variations, as you will see, yield different results.

## To create a query that includes product name, unit price, and

 buyer ID for all products with a unit price greater than $\$ 500$ or a buyer ID of 602 or 603:1 Using Product Query 7 that you just created, click View and then click Design View.
2 Click 602 Or 603 from the Criteria: row of the Buyer ID field and then press the [Delete] key.
3 Type $\mathbf{6 0 2}$ Or $\mathbf{6 0 3}$ in the or: row of the Buyer ID field, as shown in Figure 11.16 .

Figure 11.16
Query Design of Products with Unit Cost Greater than \$500 or Purchased by Buyer 602 or 603


4 Click Run. Your results should look like Figure 11.17. Note that in this query, the first product listed has a unit cost less than 500 but is listed since it had a BuyerID that matched the criteria in the query.
5 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.


6 Type Product Query 8 as the new name and then click OK.
7 Close this query.

Figure 11.17
Query Results for Products with Unit Cost Greater than \$500 or Purchased by Buyer 602 or 603 602 or 603

## Performing Calculations

Kyle remarks that there are many types of calculations you can perform in a query. For example, you can calculate the sum or average of the values in one field, multiply the values in two fields, or calculate the date three months from the current date. When you display the results of a calculation in a field, the results aren't actually stored in the underlying table. Instead, Microsoft Access reruns the calculation each time you run the query so that the results are always based on the most current information in the database.

## Displaying the Results of Calculations in a Field

To demonstrate the use of computations and the creation of a computed field, Kyle suggests that you and Nathan create a query that calculates the total cost of each item in inventory. He explains that to begin you'll need to create a query that includes the field's product name, quantity, and unit cost. Then you'll need to create a computed field to calculate the product of the quantity and the unit cost fields. In order to create a computed field, you'll need to type the name of the newly created field in a blank field row followed by the two fields used to compute total cost. Each field used must be surrounded by brackets, as with [Quantity]. After you've created the computed field, you'll often need to format the field to a number or currency depending on how you want it displayed.

## To create an inventory cost query:

1 Click Query Design from the Queries group on the Create tab of the Ribbon.

2 Double-click Product Table from the list of tables in the Tables tab of the Show Table window to add the Product table to the query, and then click the Close button.

3 Resize the Product Table window so that all fields are visible.
4 Double-click ProductName, Quantity, and UnitCost fields for this query.
5 In the fourth column on the Field row of the design grid, type TotalCost: [Quantity]*[UnitCost]. (In this case TotalCost is the name of the new field and [Quantity] and [UnitCost] are the two fields being used to calculate the value for the newly created TotalCost field.
6 Right-click the newly created TotalCost field and then click Zoom to enlarge the formula.
7 Click Font and then click 16 in the Size column; then click OK to make the Zoom window text increase in size. Your Zoom window should look like Figure 11.18.
Figure 11.18
Creating a Calculated Field


8 Click OK to close the Zoom window after you verify its contents.
9 Right-click the TotalCost field again and then click Properties, which takes you to the Property Sheet window.
10 Click in the text box next to Format and then select Currency from the drop-down list of formats; then type Total Cost as the Caption, and then close the Property Sheet window.
11 Click Run to run the query to yield the results shown in Figure 11.19.
12 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.

13 Type Product Query 9 as the name of the new query and then click OK.

14 Close the query.


Once again, the resulting value established in the Cost field is there only temporarily and cannot be used in a later report or form unless this query is run as well. In addition to creating a computed field, Access will allow you to perform statistics and summations from within a query.

## Computing Statistics

Access will allow you to calculate various statistical measures of your database, including (for example) sum, average, maximum, and minimum.
"What if I needed to know my total inventory cost?" asks Nathan.
"No problem," Kyle responds. "Access has a sum function that will work on the cost variable we just created. All we need to do is turn on the sum function and then create a sum query using the cost field we defined. To do so, we must select the query we just created instead of an existing table."

Figure 11.19
Query with a Calculated Field

## To create a sum query:

1 Click Query Design from the Queries group on the Create tab of the Ribbon.
2 Double-click Product Query 9 from the list of queries in the Queries tab of the Show Table window then click the Close button.

3 Resize the Product Query 9 window so that all fields are visible.
4 Double-click TotalCost.
5 Click Totals from the Show/Hide group of the Design tab on the Ribbon.

Figure 11.20
Creating a Sum Query
6 Click Sum from the drop-down list in the Total row, as shown in Figure 11.20.


7 Click Run to generate a summation of all inventory cost, as shown in Figure 11.21.
Figure 11.21
Sum Of Inventory Cost Query


8 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
9 Type Product Query 10 as the name of the new query and then click OK.

10 Close the query.
"Is there any way to find the total cost of inventory by category?" asks Nathan.
"Yes," Kyle answers. "Access uses the concept of grouping to provide statistical information on a database."

Kyle goes on to explain that, since the field he summed previously was a calculated field, it is imperative that the category field be a part of that query before a sum query is run. He suggests that you edit the inventory cost query to include the category field before modifying the inventory cost summary query you just created.

## To create a sum query by category:

1 Right-click Product Query 9 and then click Design view from the shortcut menu.
2 Click Show Table from the Query Setup group on the Design tab of the Ribbon.
3 Double-click Category Table and then close the Show Table window.
4 Double-click the Category Name field to add it to the query.
5 Close and save the revised query.
6 Right-click Product Query 10 and then click Design view from the shortcut menu.
7 Click and drag the Category Name field to the left of the Cost field, as shown in Figure 11.22.


8 Click Run to generate a summation of all inventory cost by category, as shown in Figure 11.23.

| Product Query 10 |  |  | $-\square \times$ |  |
| :---: | :---: | :---: | :---: | :---: |
| Category Name |  |  | OfTotalCost |  |
| Flatwater |  |  | \$6,000 |  |
| Inflatable |  |  | \$4,000 |  |
| Paddles |  |  | \$3,270 |  |
| Race |  |  | \$7,150 |  |
| River |  |  | \$11,996 |  |
| Surf |  |  | $\$ 2,050 .$ |  |
| Record: is 4 of 6 | - | M ${ }^{\text {a }}$ | $\bar{T}^{\times}$No Filter | Search |

Figure 11.23
Results of a Query to Group Totals by Category

9 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.

10 Type Product Query 11 as the name of the new query and then click $\mathbf{O K}$.
11 Close the query.
"That's great information," says Nathan. "Is there a way to find out how many Flatwater, Inflatable, et cetera, we have on hand or how many different products we have in each category?"
"Sure," responds Kyle. "We can use the sum feature again to sum up the quantity of each category and the count feature to count the number of products we have by category."

Kyle explains that the sum feature in this case can be used on the product and category tables because the information we want to display and sum is found in the tables and not in any particular query. Likewise, the count feature is used on the same two tables. He recommends that you and Meagan give it a try.

## To create a sum query of quantities by category:

1 Click Query Design from the Queries group on the Create tab of the Ribbon.

2 Double-click Category Table and Product Table from the list of tables in the Tables tab of the Show Table window then click the Close button.

3 Resize the window so that all fields are visible.
4 Double-click the Category Name and the Quantity fields to add them to the query.
5 Click Totals from the Show/Hide group of the Design tab on the Ribbon.
6 Click Sum from the drop-down list in the Total row of the Quantify field; then click Group By from the drop-down list in the Total row of the CategoryName field, as shown in Figure 11.24.

Figure 11.24
Design View of Query to Sum Quantities by Category


7 Click Run to generate a summation of all quantities by category, as shown in Figure 11.25.


Figure 11.25
Results of a Query to Group Quantities by Category

8 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
9 Type Product Query 13 as the name of the new query and then click OK.
10 Close the query.
"That was fairly easy," Meagan says. "Let's let Nathan see if he can create the count query."

## To create a query to count the number of products by category:

1 Click Query Design from the Queries group on the Create tab of the Ribbon.
2 Double-click Category Table and Product Table from the list of tables in the Tables tab of the Show Table window; then click the Close button.
3 Resize the window so that all fields are visible.
4 Double-click the CategoryName and the ProductName fields to add them to the query.
5 Click Totals from the Show/Hide group of the Design tab on the Ribbon.
6 Click Count from the drop-down list in the Total row of the ProductName field and then click Group By from the drop-down list in the Total row of the CategoryName field, as shown in Figure 11.26.
7 Click Run to generate a count of all products by category, as shown in Figure 11.27.
8 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
9 Type Product Query 12 as the name of the new query and then click OK.

10 Close the query.

Figure 11.26
Design View of Query to Count Products by Category


Figure 11.27
Results of a Query to Count Products by Category

| 䀯 | Query1 |  | - | $\square$ | $\times$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Category Name |  | CountOfProductName |  |  | - |
| Flatwater |  |  |  |  | 3 |
| Inflatable |  |  |  |  | 2 |
| Paddles |  |  |  |  | 2 |
| Race |  |  |  |  | 3 |
| River |  |  |  |  | 3 |
| Surf |  |  |  |  | 1 |
| Record: 14 < 1 of 6 |  | $7_{x}$ No Filter | Search |  |  |

Next Kyle will explain the process of using action queries to affect many records at one time.

## Action Queries (Update, Parameter, and Delete)

An action query is a query that makes changes to many records in just one operation. There are three types of action queries that Kyle would like to explain: update, parameter, and delete. An update query makes global changes to a group of records in one or more tables. For example, you can raise costs or
sales prices by 10 percent for all products, or you can raise salaries by 5 percent for the people within a certain job category. With an update query, you can change data in existing tables. A parameter query is a query that, when run, displays its own dialog box prompting you for information-such as criteria for retrieving records or a value you want to insert in a field. A delete query removes a group of records from one or more tables. With delete queries, you always delete entire records, not just selected fields within records.

## Update Queries

First, Nathan realizes that his database has a unit cost field for all products but it doesn't contain a unit price field. The unit cost field represents what he pays to his suppliers. A unit price would represent the unit price he charges each customer. Thus he needs to add a unit price field to the Product Table that is based on prices in effect at the beginning of the year. Later he decides to use an update query to increase the price of all products by 5 percent. To do so he'll need to use an update query that includes the Product Table and the newly created field UnitPrice. You should always back up your database before you run an update query, because you cannot undo the results of an update query. Making a backup ensures that you can always reverse your changes.

## To add a unit price field and related unit prices to the Product Table:

1 Right-click Product Table and select Design View.
2 Type UnitPrice as the name of a new field.
3 Select Data Type Number for the new field.
4 Select Currency as the Format and type Unit Price as the Caption.
5 Click View and then Datasheet View and then click Yes to save the table.
6 Add the following unit prices to each product:

| ProductID | UnitPrice |
| :--- | :---: |
| 101 | 1425 |
| 102 | 1625 |
| 103 | 1100 |
| 104 | 1250 |
| 105 | 2300 |
| 106 | 1700 |
| 108 | 3100 |
| 109 | 1200 |
| 110 | 850 |
| 111 | 1500 |
| 113 | 200 |
| 115 | 210 |
| 116 | 1000 |

## To back up a database and then create an update query to increase the price of all products by 5 percent:

1 Click the File tab.
2 Click Save As, then click Save Database As, then click Backup Database, and then click Save As.

3 Accept the file name provided, which should read Ch11-01_student_ name followed by today's date.
4 Navigate the window to the location where you want to save your backup file, and then click Save.
5 Click Query Design from the Queries group on the Create tab of the Ribbon.

6 Double-click Product Table from the list of tables in the Tables tab of the Show Table window; then click the Close button.

7 Resize the window so that all fields are visible.
8 Double-click UnitPrice to add it to the query.
9 Click Update from the Query Type group of the Design tab of the Ribbon.

10 Type [UnitPrice]*1.05 in the Update To: row of the design grid, as shown in Figure 11.28.

Figure 11.28
Update Query


11 Click Run and then click Yes to update 14 records.

Trouble? Do not run this query again. Since the query as written takes a current value and increases it 5 percent, if you were to run it again, it would take the new value and increase it 5 percent again. To verify your query ran correctly and only one time, check to see if ProductID 101 has a new unit price of $\$ 1,496.00$.
12 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
13 Type Product Query 14 as the name of the new query and then click $\mathbf{O K}$.
14 Close the query.
15 Create and run a new query that displays the Product Name, Unit Cost, and Unit Price for all Flatwater boards. Your query should look like Figure 11.29.


Figure 11.29
Listing of Flatwater Boards with Unit Costs and Unit Prices

16 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
17 Type Product Query 14A as the name of the new query, click OK, and then close the query.
"Very slick and efficient!" says Meagan. "This software will be very helpful for us in maintaining our inventory. But do we always have to update all records, or can we limit an update to just a few records?"
"You can limit your update by setting criteria for the update, just as with a select query," Kyle answers. "Let's have you update all records that have a reorder level of 2 to reflect a new reorder level of 4."

## To create an update query to update reorder levels:

1 Create a back up file and then click Query Design from the Queries group on the Create tab of the Ribbon.
2 Double-click Product Table from the list of tables in the Tables tab of the Show Table window; then click the Close button.
3 Resize the window so that all fields are visible.

Figure 11.30
Products and Reorder Level

4 Double-click Product Name and Reorder Level to add the fields to the query.
5 Click Run to view a listing of all products and their reorder level, as shown in Figure 11.30.

| 聑 | Query1 | - | $\square \times$ |
| :---: | :---: | :---: | :---: |
|  | Product Name * | Reorder | evel * |
|  | Veneer Raven |  | 5 |
|  | Nalu |  | 2 |
|  | Shubu X |  | 2 |
|  | Nalu Air |  | 2 |
|  | Candice Appleby |  | 3 |
|  | Glide GS |  | 1 |
|  | Sleeping One |  | 2 |
|  | Joy Ride |  | 2 |
|  | Badfish |  | 2 |
|  | Badfish 2 |  | 3 |
|  | Makani |  | 10 |
|  | BW Hybrid |  | 20 |
|  | Blaster |  | 2 |
|  | Zoomer |  | 3 |
| * |  |  |  |
|  | cord: 14 1 of 14 | - 1 * | ${ }^{\times} \times$No Fil |

6 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.

7 Type Product Query 15 as the name of the new query and then click OK.

8 Close the query.
9 Click Query Design from the Queries group on the Create tab of the Ribbon.

10 Double-click Product Table from the list of tables in the Tables tab of the Show Table window, and then click the Close button.

11 Resize the window so that all fields are visible.
12 Double-click the ReorderLevel to add it to the query.
13 Click Update from the Query Type group of the Design tab of the Ribbon.

14 Type $\mathbf{4}$ in the Update To: row and then type $=\mathbf{2}$ in the Criteria row of the design grid as shown in Figure 11.31.

15 Click Run and then click Yes to update 7 records.
16 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
17 Type Product Query 16 as the name of the new query and then

Figure 11.31
Update Query to Change ReorderLevel
click OK.
18 Close the query.
19 Double-click Product Query 15 to see the new reorder level for all affected products, as shown in Figure 11.32.
20 Compare Figure 11.32 with Figure 11.30 and note that all products
that previously had a recorder level of 2 now have a reorder level of 4 .
21 Close the query.
$\qquad$


Figure 11.32
New Reorder Levels for All Products


## Parameter Queries

Another type of action query is the parameter query, in which the query prompts the user with a dialog box asking for some criteria information to select records.
"When would I want to use this type of query?" Meagan asks.
"These queries," Kyle explains, "are used when you're not sure what criteria the user wants to specify for record selection. They provide flexibility in the query process and will be handy in the future when forms and reports are generated for users who aren't that familiar with Access."
"Let's create a parameter query to provide information on who is responsible for buying each product," suggests Nathan. "Can this query just give us information on one buyer?"
"Yes," responds Kyle. "I suggest you and Meagan create this query now."

## To create a parameter query for buyers:

1 Click Query Design from the Queries group on the Create tab of the Ribbon.

2 Double-click Product Table and Buyers Table from the list of tables in the Tables tab of the Show Table window, and then click the Close button.
3 Resize the window so that all fields are visible.
4 Double-click the BuyerName, ProductName, and Quantity fields to add them to the query.
5 Type [Enter Buyer's Name] in the Criteria: row of the Buyer Name field of the design grid, as shown in Figure 11.33.


6 Click Run.
7 Type Lopez in the Enter Parameter Value dialog box presented, as shown in Figure 11.34.


8 Click $\mathbf{O K}$ to produce the results, as shown in Figure 11.35.
9 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
10 Type Product Query 17 as the name of the new query and then click OK.

Figure 11.33
Creating a Parameter Query

Figure 11.34
Enter Parameter Value Dialog Box

Figure 11.35
Products and Quantity for Lopez

| 閏 | Query1 |  | $-\square \times$ |  |
| :---: | :---: | :---: | :---: | :---: |
| Buyer Name - | Product Name * |  | Quantity * | $\wedge$ |
| Lopez | Nalu Air |  | 4 |  |
| Lopez | Sleeping One |  | 4 |  |
| Lopez | Makani |  | 12 |  |
| Lopez | Blaster |  | 4 |  |
| * |  |  |  | $\checkmark$ |
| Record: 14 1 of 4 | - M ${ }^{\text {a }}$ | $\nabla_{x}$ No Filter | Search |  |

11 Close the query.

The last action query Kyle wants to demonstrate deletes specific records from your database.

## Delete Queries

"Occasionally," Kyle explains, "you might want to delete some records from your database based on specific criteria. For example, you may want to delete all records in a table that have a quantity balance of zero."
"I'll bet you set the criteria to $=0$, right?" asks Meagan.
"Well, almost," Kyle answers. "First you must create a specific delete query, include all the fields from the table, and specify the criteria that must be met for deletion of a record. But just as with the update queries you created previously, it always makes sense to back up your database before making massive changes."
"Let's give it a try," says Nathan.

## To back up a database and then create a delete query to delete specific records:

1 Double-click on Product Table.
2 Scroll down the table and note that ProductID 106 (Glide GS) has a quantity of 0 .
3 Close the Product Table.
4 Create a backup of your database and then click Query Design from the Queries group on the Create tab of the Ribbon.
5 Double-click Product Table from the list of tables in the Tables tab of the Show Table window; then click the Close button.

6 Resize the window so that all fields are visible.

7 Double-click * (asterisk) to add all fields in the product table to the query.
8 Double-click Quantity.
9 Click Delete from the Query Type group of the Design tab of the Ribbon. Note that "From" appears on the Delete: line of the design grid under the field Product Table.* and that "Where" appears on the Delete: line under Quantity.
10 Type $\mathbf{0}$ in the Criteria: row of the design grid under the column Quantity, as shown in Figure 11.36.


Figure 11.36
Creating a Delete Query

11 Click Run and then click Yes (in the dialog box presented) to delete one record from the Product table.
12 Click File, Save As, Save Object As, and Save As to save this new object as you've done before.
13 Type Product Query 18 as the name of the new query and then click $\mathbf{O K}$.
14 Close the query.
15 Double-click Product Table and note that there are no more products with a quantity of 0 . (Product ID 106 has been removed.)
16 Close the Product table.

## Print a Query

All that is left is to print a query. Kyle explains that printing a query is similar to printing a table (as you did in the previous chapter), but he'll review the process anyway.

## To print a query:

1 Double-click Product Query 17 (as an example).
2 Type $\mathbf{N g}$ as the Buyer's Name then click OK.
3 Click the File tab and then click Print located under the File tab and then click Print.

4 Click OK to print. The printed query should look like Figure 11.37.
Figure 11.37
Printed Product Query 17

Product Query 17

| Buyer Name | Product Name | Quantity |
| :--- | :--- | ---: |
| Ng | Shubu X | 3 |
| Ng | Candice Appleby | 1 |
| Ng | Badfish | 5 |
| Ng | Badfish 2 | 2 |

## End Note

In this chapter you have learned how to use select queries with characters, numbers, wildcards, comparison operators, and compound criteria. You've also performed calculations, computed statistics, created computed fields, and created parameter queries and action queries to update and delete records. In the next chapter you will learn how to create forms.

## practice

## Chapter 11 Questions

1 Describe the difference between the Query Wizard and Design view methods of creating a query.

2 Describe the process for using criteria in a query using the Design view method.

3 How and why are wildcards used in a query?
4 Describe the process for adding to an existing query a field that exists in a table not currently included in the query.

5 What are the three key comparison operators used in a query?
6 What will compound criteria allow you to accomplish in Access?
7 Are the results of a calculation stored as a field in a table?
8 What is an action query? Give examples.
9 What is a parameter query?
10 When might you use a delete query?

## Chapter 11 Assignments

1 Create select queries for What SUP using specific criteria (use the Ch1102 student file).
a. Create and print a select query that lists the buyer name, buyer phone number, and product name of product number GS233. (Hint: The product number should not appear on your printed query if you answered the question correctly.) Save this query as Ch 11 Assignment la before you print it.
b. Create and print a select query that lists the category name, product name, product number, and lead times for all products with a lead time in excess of 10 days. Save this query as Ch 11 Assignment 1b before you print it.

2 Create select queries for What SUP. (Use the Ch11-02 student file, or use the file you used in answering the previous question.)
a. Create and print a select query that lists the product name, quantity, supplier contact name, and supplier phone number for any River SUPs. Save this query as Ch 11 Assignment 2a before you print it.
b. Create and print a select query that lists the supplier name, city, and phone number for any supplier located in the state of New Jersey. Save this query as Ch 11 Assignment 2 b before you print it.

3 Edit select queries for What SUP. (Use the Ch11-02 student file, or use the file you used in answering the previous question.)
a. Edit Query1 by adding the field PostalCode from the Supplier Table and deleting the field StateorProvince. Save this query as Ch 11 Assignment 3a before you print it.
b. Edit Query 2 to include the field Category Name and to include only the category Race, sorted by product ID in ascending order. Save this query as Ch 11 Assignment 3 b before you print it.

4 Create select queries for What SUP using comparison operators. (Use the Ch11-02 student file, or use the file you used in answering the previous question.)
a. Create and print a select query that lists the product name, unit cost, supplier name, and supplier contact name for any unit cost between $\$ 300$ and $\$ 600$, sorted in descending order by unit cost. Save this query as Ch 11 Assignment 4a before you print it.
b. Create and print a select query that lists the product name, unit cost, and category name for any unit cost less than or equal to $\$ 700$, sorted in ascending order by unit cost. Save this query as Ch 11 Assignment 4b before you print it.

5 Create additional select queries for What SUP using computed fields. (Use the Ch11-02 student file, or use the file you used in answering the previous question.)
a. Create and print a select query that lists the product name unit price, unit cost, and unit gross profit for all products. Sorted in descending order by unit gross profit price. (Hint: You'll need to create a computed field titled Unit Gross Profit whose formula is the product's unit price minus unit cost.) Save this query as Ch 11 Assignment 5a before you print it.
b. Create and print a select query that lists the product name, unit price, quantity, and sales value for all paddles. (Hint: You'll need to create another computed field, Sales Value, whose formula is the unit price times quantity; format the computed field to Currency using the Property Sheet.) Sort the query by unit price in ascending order. Save this query as Ch 11 Assignment 5 b before you print it.

6 Create additional select queries for What SUP using statistics. (Use file you used in answering the previous question.)
a. Create and print a select query that calculates the total sales value of all Flatwater SUPs in inventory. (Hint: You'll need to use your completed query from assignment 5 b as the source for this query. If you did not complete 5 b, do it now. Format this computed field to Currency with two decimal places with a caption Sales Value of all Flatwater SUPs.) Save this query as Ch 11 Assignment 6a before you print it.
b. Create and print a query that includes all products and lists category name, product name, unit price, unit cost, unit gross profit, quantity, and gross profit. To do this, create two computed fields: Unit Gross Profit (unit price less unit cost) and Gross Profit (unit gross profit times quantity). Both calculated fields should have a Currency format and a caption with spaces. Save this query as Ch 11 Assignment 6 b before you print it.
c. Next create and print a query that sums the gross profit of each category, using the query just created in assignment $6 b$ as the source. Format this totaled value as Currency with two decimal places and a caption of Gross Profit. Save this query as Ch 11 Assignment 6c before you print it.

7 Create action queries for What SUP. (Use the Ch11-02 student file, or use the file you used in answering the previous question.)
a. Create and run an action query that increases the unit price for all products by 6 percent. Save this query as Ch 11 Assignment 7a. Create and print an additional query listing the product name and unit price after running the update query. Do not save this query.
b. Create a parameter query that lists products purchased from a particular supplier. The query should ask "Enter supplier's name:" and list the supplier name, product name, quantity, and unit cost. Save this query as Ch 11 Assignment 7b. Run and print the query entering Bark as the supplier.
c. Create and run a delete query that deletes all products where Quantity $=0$. Save this query as Ch 11 Assignment 7c. Create and print a query listing the supplier ID and product name for all products still in the database.

## Chapter 11 Case Problem 1: KELLY'S BOUTIQUE

Note: You must have completed Case 1 in the previous chapter in order to continue working on this case.

In the last chapter you added and modified some tables for Kelly's Boutique. She would now like you to create, run, and print some select, parameter, and action queries. Make the following changes for Kelly, using the ch10-03_student_ name file you created in Chapter 10. (Note: Open your ch10-03_student_name
file and then save it as ch11-03_student_name before making the indicated changes.)

Add a field Quantity (Data Type $=$ Number) to the Book Table and then enter values as follows:

| Book Title | Quantity |
| :--- | :---: |
| Angela's Ashes | 18 |
| Betsy - Tacy | 4 |
| Blueberries for Sal | 5 |
| Caddie Woodlawn | 4 |
| Deep End of the Ocean | 2 |
| Divine Secrets of the YaYa Sisterhood | 3 |
|  |  |
| Book Title | Quantity |
| Green Eggs and Ham | 15 |
| Harry Potter and the Chamber of Secrets | 10 |
| Harry Potter and the Prisoner of Azkaban | 8 |
| Harry Potter and the Sorcerer's Stone | 6 |
| Hop on Pop | 8 |
| The Cat in the Hat | 4 |
| The Notebook | 3 |

Add a field Markup (Data Type $=$ Number, Field Size $=$ Decimal, Format $=$ Percent, Scale $=2$, Decimal Places $=0$ ) to the Dept Table and then enter values as follows:

| Dept | Markup |
| :--- | :---: |
| Adult | $100 \%$ |
| Children | $50 \%$ |

a. Create and print a select query that lists the author and book title for all books written by Seuss. Save this query as Ch 11 Kelly Case a before you print it.
b. Create and print a select query that lists the book title and author for all books purchased and supervised by Barbara Manchester, sorted in ascending order by book title. Save this query as Ch 11 Kelly Case b before you print it.
c. Create and print a select query that lists the book title and list price for all book titles that start with Harry. Save this query as Ch 11 Kelly Case c before you print it.
d. Edit the query you just created. Add fields for author and for publisher and delete the list price field. Change the criteria from "starting with Harry" to "containing the word Secrets". (Hint: Place a wildcard character in front of and behind the word.) Save this query as Ch 11 Kelly Case d before you print it.
e. Create and print a select query that lists the book title and the publisher contact person and phone number for all books with a list price
greater than $\$ 17$. Save this query as Ch 11 Kelly Case e before you print it.
f. Create and print a select query that lists the ISBN, book title, and list price for all books with a list price greater than $\$ 20$ or less than $\$ 10$, sorted in ascending order by list price. Save this query as Ch 11 Kelly Case f before you print it.
g. Create and print a select query that lists the book title, list price, quantity, and retail value (a computed field equal to list price multiplied by quantity), sorted in descending order by retail value. Be sure to format the field as Currency. Save this query as Ch 11 Kelly Case g before you print it.
h. Create and print a select query that lists book title, list price, markup, unit cost, quantity, and cost. Unit cost is a computed field (list price divided by 1 plus markup). Cost is another computed field (unit cost times quantity). Be sure to format both computed fields as Currency and to sort the query alphabetically by book title. Save this query as Ch 11 Kelly Case h before you print it.
i. Create and print a select query that sums the total cost of the book inventory. (Hint: Use the query just created in part h as your source for this new query and use the currency format.) Save this query as Ch 11 Kelly Case i before you print it.
j. Modify the query created in part h so that it includes the Department field. Save the query as Ch 10 Kelly Case h 1, and then use that modified query as the source for a query that sums the cost of inventory by department. Save this latter query as Ch 11 Kelly Case j before you print it.
k. Create and run an action query that increases all books' list price by 5 percent. Be sure to back up your file first! Save this query as Ch 10 Kelly Case k. Create another query that lists the book title and list price for all books, sorted alphabetically by book title. Save this query as Ch 11 Kelly Case k 1 and then print it.

1. Create a parameter query that lists books from a particular publisher. The query should ask "Enter publisher's name:" and then list the publisher, book title, and quantity for that publisher. Save this query as Ch 11 Kelly Case 1 . Run and print the query after entering "Harper Collins" as the publisher.
m . Create and run a delete query that deletes all products with a quantity of 0 . Save this query as Ch 11 Kelly Case m.
n. Create a query listing the book title and quantity for all the remaining books in inventory, sorted by quantity in descending order. Save this query as Ch 11 Kelly Case n and then print it.
o. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 11 Case Problem 2: WINE DEPOT

Note: You must have completed Case 2 in the previous chapter in order to continue working on this case.

In the last chapter you modified some tables for the Wine Depot. Now Barbara would like you to help her create some queries to extract some information from the database. Make the following changes for Barbara using the ch1004 _student_name file you created in Chapter 10. (Note: Open your ch1004 _student_name file and then save it as ch11-04_student_name before making the indicated changes.)
a. Create a select query that lists the type, winery, and price for all wines on hand from winery \#4. Save this query as Ch 11 Wine Depot Case a and then print it.
b. Create a select query that lists the type, winery name, and price for all wines whose buyer name is Michael Jackson. Save this query as Ch 11 Wine Depot Case b and then print it.
c. Create a select query that lists the SKU and type for wines types that contain the word "Blanc". Save this query as Ch 11 Wine Depot Case c and then print it.
d. Edit the query you just created in 2c above. Add fields for cost and vintage and remove the SKU field. Change the criteria of the query from "types that include the word Blanc" to "types that begin with the letter S". Save this query as Ch 11 Wine Depot Case d and then print it.
e. Create a select query that lists type, price, winery name, buyer name, and phone number for all wines with a price greater than $\$ 35$. Save this query as Ch 11 Wine Depot Case e and then print it.
f. Create a select query that lists type, price, winery name, buyer name, and phone number for all wines with a price greater than $\$ 35$ but less than $\$ 50$. Save this query as Ch 11 Wine Depot Case f and then print it.
g. Create a select query that lists SKU, type, winery name, price, quantity, and retail value (a computed field: quantity times price, formatted as currency) for all Chardonnay wines, sorted in descending order by retail value. Save this query as Ch 11 Wine Depot Case $g$ and then print it.
h. Create an update query that changes the price of all wines to be $150 \%$ of cost. (Remember to back up your file first.) Save this query as Ch 11 Wine Depot Case h.
i. Create a parameter query that lists SKU, type, winery name, and price. The query should ask "What type of wine?" Sort the query in descending order by price. Save this query as Ch 11 Wine Depot Case i. Run the query for Pinot Noir wines and then print it.
j. Create a select query that sums the total retail value of the Chardonnay wine inventory, formatted as currency. Be sure to list the wine type in your query. (Hint: Use the Ch 10 Wine Depot Case g query you created previously as the source for this new query.) Save this query as Ch 11 Wine Depot Case j and then print it.
k. Create a select query that lists SKU, type, winery name, cost, quantity, and total cost (a computed field: quantity times cost, formatted as currency) for all wines, sorted in ascending order by SKU. Save this query as Ch 11 Wine Depot Case k and then print it.

1. Create a select query that sums the cost of wine inventory by type (in currency format), sorted by type. (Hint: Use the Ch 11 Wine Depot Case k query as the source for your new query.) Save the new query as Ch 11 Wine Depot Case 1 and then print it.
m. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 11 Case Problem 3: SNICK'S BOARD SHOP

Note: You must have completed Case 3 in the previous chapter in order to continue working on this case.

In the last chapter you modified some tables for the Snick's Board Shop. Now Caitlin would like you to help her create some queries to extract information from the database. Make the following changes for Caitlin, using the ch1005_student_name file you created in Chapter 10. (Note: Open your ch1005_student_name file and then save it as ch11-05_student_name before making the indicated changes.)
a. Create a select query that lists the category name, manufacturer name, product name, and price for all products from Manufacturer ID 888. Save this query as Query A and then print it.
b. Create a select query that lists the manufacturer name, product name, and price for all products with a Category ID of 1. Save this query as Query B and then print it.
c. Create a select query that lists the product ID, category name, and style for styles that contain the word "Black". Save this query as Query C and then print it.
d. Edit the query you just created in the previous step. Add the manufacturer name field and remove the category name field. Change the criteria of the query from styles that contain the word "Black" to styles that contain the word "Blue". Save this query as Query D and then print it.
e. Create a select query that lists product name, price, and quantity for all products with a price greater than $\$ 100$. Save this query as Query E and then print it.
f. Create a select query that lists product name, price, and quantity for all products with a price greater than $\$ 100$ but less than $\$ 130$. Save this query as Query F and then print it.
g. Add a number field "Discount" to the Manufacturer table. Set the field size of this new field to Single and the Format to Percent. Set the Discount to $10 \%$ for manufacturers EMT and MOJ. All other manufacturers discount should be set to $0 \%$. Create a select query that lists Product ID, Price, and Discounted Price (a new computed field: Price times 1 - Discount, formatted as currency) for all products sorted in ascending order by Discounted Price. Save this query as Query G and then print it.
h. Create an update query that increases the price of all products by $10 \%$. (Remember to back up your file first.) Save this query as Query H. Open Query G again and then print it with the new prices.
i. Create a parameter query that lists the manufacturer name, product name, price, style, and quantity. The query should state "Enter Manufacturer ID". Sort the query in ascending order by product name. Save this query as Query I. Run the query for Manufacturer ID SC and then print it.
j. Create a select query that sums the total retail value of the complete boards in inventory, formatted as currency. (Hint: First create a query with the fields CategoryID, CategoryName, Price, Quantity, and a computed field titled Retail Value, which is the price times quantity.) Save this query as Query $\mathbf{J}-1$, and then create the summation query. Save this query as Query J - 2 and then print it.
k. Create a select query that sums the retail value of all products by category (in currency format), sorted by type. (Hint: Use the Query J - 1 query, modify it by removing the criteria, then save it as Query K - 1, using Query K - 1 as the source for your new query.) Your new query should have two fields: CategoryName and SumOfRetailValue. Save the new query as Query K - 2 and then print it.

1. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 11 Case Problem 4: ROSEY'S ROSES

Note: You must have completed Case 4 in the previous chapter in order to continue working on this case. In the last chapter, you modified some tables for Rosey's Roses. Now the company would like you to help it create some queries to extract information from the database. Make the following changes using the ch10-06_student_name file you created in Chapter 10. (Note: Open your ch1006_student_name file and then save it as ch11-06_student_name before making the indicated changes.)
a. Create a select query using the Grower ID field from the Grower table, the Description field from the Product table, and the Cost/ Unit for all products from Grower ID 100. Do not show the Grower ID on the resulting query. Save this query as Query A and then print it.
b. Create a select query that lists the Grower Name, product Description, and Quantity for all products where the Description field contains the word "Drift". Save this query as Query B and then print it.
c. Create a select query that lists the product Description, Grower Name, Contact, Phone Number, and Cost/Unit for all products with a Cost/Unit less than $\$ 18$. Save this query as Query C and then print it.
d. Create a select query that lists the product Description, Grower Name, Contact, Phone Number, and Cost/Unit for all products with a Cost/Unit greater than $\$ 18$ but less than $\$ 50$. Save this query as Query D and then print it.
e. Create and print a new table called Customer as follows:

## Customer Table Structure:

| Field Name | Data Type | Field Size/Format | Primary Key? |
| :--- | :--- | :--- | :---: |
| Customer <br> Number <br> Customer Name | Text | 2 | Yes |
| Discount | Text | 30 |  |
|  | Number | Single/Percent |  |

## Customer Table Data:

| Customer Number | Customer Name | Discount |
| :---: | :--- | :---: |
| 10 | Jan Muller | $10 \%$ |
| 11 | Robert Frost | $10 \%$ |
| 12 | Juliet Inch | $0 \%$ |

f. Add a number field "Markup" to the Grower table. Set the field size of this new field to Single and the Format to Percent. Set the Markup to $100 \%$ for Grower ID 100 and 200 and then set the markup to $125 \%$ for Grower ID 300 and 400. Print the Grower table.
g. Create and print a new table called Quote as follows:

Quote Table Structure:

| Field Name | Data Type | Field Size | Primary Key? |
| :--- | :--- | :--- | :---: |
| Quote Number <br> Customer | Number |  | Yes |
| Number | Text | 2 |  |
| ID (from the <br> Product table) | Number |  |  |
| Quantity <br> Ordered | Number |  |  |

Quote Table Data:

| Quote Number | Customer Number | ID | Quantity Ordered |
| :---: | :---: | :---: | :---: |
| 100 | 10 | 4 | 10 |
| 101 | 11 | 11 | 20 |
| 102 | 12 | 12 | 40 |

h. Establish a relationship between the Quote table and the Product table (ID) and the Customer table and the Quote table (Customer Number) enforcing referential integrity. Print the Relationships report.
i. Create a select query that contains the Quote Number, Customer Name, Product Table Description, Quantity Ordered, Sales Price (a new computed field: Cost/Unit $\times(1+$ Markup $)$ formatted as currency, and Quote Amount (a new computed field: Quantity Ordered $\times$ Sales Price) also formatted as currency. Save as Query E and then print.
j. Modify the query you created in (i) above to include a new field called Cost (a computed field: Quantity Ordered $\times$ Cost/Unit) and a new field called Gross Profit (a computed field: Quote Amount Cost). Format both as currency. Save as Query F and then print.
k. Create and run an update query that increases the Cost/Unit of all products by 7\%. (Remember to back up your file first.) Save this query as Query G. Create a new select query that lists all products showing the ID, Description, and Cost/Unit fields. Save this query as Query H and then print it.

1. Create a parameter query that lists the product Description and Grower Name. The query should state "For which type of rose?" (Hint: Include Type in your query but don't show it when you run the query.) Save this query as Query I. Run the query for type Tree and then print it.
m. Create a select query that sums the total cost of all roses currently in inventory, formatted as currency. (Hint: First create a query with
the fields product Description, Quantity, and Cost/Unit and a computed field titled Cost, which is the product of Quantity and Cost/ Unit formatted as currency.) Save this query as Query J - 1, run it, and then print it. Then create the summation query, save it as Query J-2, run it, and then print it.
n. Create a select query that sums the cost of all products by category (in currency format), sorted by type. (Hint: Modify the Query J - 1 you previously created by adding the field Type. Save the new query as $K-1$.) Your new query should use Query $K-1$ as its source and have two fields: Type and Cost. Save the new query as Query $\mathrm{K}-2$, run it, and then print it.
o. Make sure you keep a copy of this file for use in the next chapter.


## Case: What SUP, Inc.

Nathan and Meagan are now ready to expand the use of forms in their rapidly expanding database. They recall that forms have a variety of purposes. Previously they created a form to capture additional information about their products. Now Kyle suggests they create a form with more features.

Kyle tells them that they can add functionality to forms with such features as calculated controls, check boxes, option buttons, list boxes, combo boxes, and subforms.
"Once again this sounds like more than we need!" Nathan exclaims.
"Don't panic," says Meagan. "Kyle seems to know just how much of this stuff we can take. Give him a chance."

Kyle thanks Meagan for her confidence and convinces them that, in the long run, using forms in their database will allow them to use their product database more efficiently and to improve the integrity of the data input.

## Labels and Text Box controls

In this section you will become familiar with the steps necessary to modify a form's labels and text box controls. Forms are often created using the Forms Wizard, but once created they often need to be customized. Customization includes moving controls and labels and resizing the form itself.

Kyle suggests that you modify a form that was previously created using the Forms Wizard. This would yield a form more like the one Nathan used to keep on each supplier.
"That would be helpful," Nathan comments. "I feel more comfortable using an electronic version of a form I've already worked with on paper."

Kyle explains that the purpose of this exercise is to become familiar with the process for moving controls around a form.

## To modify the Suppliers form:

1 Start Access.
2 Click the File tab and then click Open.
3 Navigate the Open window to the location of this text's student files. (The location would be the CD provided with text or from your computer lab's server.)

4 Double-click ch12-01, which should be located in a Ch 12 folder. (This is a modified version of the completed What SUP Inventory file from previous chapters. Do not use the file you completed in the previous chapter.)
5 Click the File tab and then click Save Database As.
6 Navigate the Save As window to the location you wish to save this file and type Ch12-01_student_name in the File Name: text box (replacing student_name with your name).
7 Click Save.
8 Double-click Supplier to view the form shown in Figure 12.1.


Figure 12.1
Existing Supplier Form

9 Click View and then click Design View.
10 Click and hold in the lower right corner of the Supplier form to reveal the dragging tool, then move the window down and to the right to reveal the Form Footer. The process will expand the size of the Form Design view window so that you can manipulate all the objects on the form.

Figure 12.2
Increasing the Size of the Form

11 Click the top portion of the Form Footer and drag down to expand the size of the form and make space available to move controls around, as shown in Figure 12.2.


12 Click in the upper left-hand corner of the First Purchase label and drag the label to move it. Next click the upper left-hand corner of the First Purchase text box and drag it to move the view. Position the label and text box as shown in Figure 12.3.

Figure 12.3
Separating a Label from a Control


13 Click in the ST label and change this label to read State. Select this label, click the Home tab, and then click the Center tool in the Text Formatting group.

14 Click the right center handle on the State label and drag it to the left to resize the label.

15 Click the top of the State label and then drag it to reposition it on the form.

16 Resize, reposition, and center the StateOrProvince text box using the same process used for the State label until your screen looks like Figure 12.4.
17 Click View to view the form in Form View. The form should look like Figure 12.5.
18 Click File, Save As, Save Object As, and Save As to save this new object.


19 Type Supplier A as the new form name and then click OK.
20 Click the Home tab and then close the form.

Figure 12.4
Modified Supplier Form

Figure 12.5
Form View of Modified Form
"Modifying a form's controls was fairly intuitive," Meagan comments, "although it was a bit difficult to line up labels and text boxes so they were properly aligned."

Kyle agrees and now suggests that you and Nathan explore the use of form controls-such as list and combo boxes-to help simplify the data entry process and improve the integrity of information captured in your database. He will also show you how to specify locations of controls more precisely.

## List Box and Combo Box Controls

The form you just modified included a series of text box controls containing information such as a supplier's name, address, and so on. These text boxes are referred to as a type of form control. You use text boxes on a form or report to display data from a record source. This type of text box is called a bound text box because it's bound to data in a field. In this case, for example, the text box
control Supplier Name was bound to the field Supplier Name in the Supplier table. Text boxes can also be unbound. For example, you can create an unbound text box to display the results of a calculation or to accept input from a user. Data in an unbound text box isn't stored anywhere, but we will discuss unbound text boxes later.

Kyle explains that it's often quicker and easier to select a value from a list than to remember a value when using a form to enter new information, such as a new supplier. A list of choices also helps to ensure that the value entered in a field is correct. If you have enough room on your form to display the list at all times, you might want to use a list box. If you want to create a control that displays a list but requires less room then you would use a combo box, which provides the combined functionality of a list box and a text box.
"Which should we use, and when?" asks Meagan.
"Well, let's try something simple first, like modifying an existing text box control in our supplier form to a list box," answers Kyle.

## List Box Control

Kyle explains that modifying a control on a form simply requires changing the form control (from text to list) and creating the list of choices.
"Let's modify the Country text box control on our previously created supplier form to a list box control," suggests Kyle. "We will also add a new supplier from Canada."

## To change the Country text box control to a list box control and add a new supplier:

1 Double-click the Supplier A form.
2 Click View and then click Design View. Move the First Purchase label and field to a location under the Fax label and field.

3 Right-click the Country text box control; then click Change To and click List Box, as shown in Figure 12.6.

Figure 12.6
Shortcut Menu to Transform a Text Box

Control to a List Box Control


4 Right-click the Country list box control; then click Properties.

5 In the Property Sheet for List Box: Country, click the Data tab, click Value List in the Row Source Type section, and then type USA; CAN; UK in the Row Source (see Figure 12.7).


6 Close the Property Sheet window. The form should now look like Figure 12.8.


7 Click View and then click Form View.
8 Enter a new supplier by clicking on the New (blank) record button located at the bottom of the form and then typing the information provided in Figure 12.9. Observe that, in order to specify the country for this new supplier, all you had to do was click CAN.
9 Click File, Save As, Save Object As, and Save As to save this new object.
10 Type Supplier B as the name of the new form and then click OK.
11 Click the Home tab and then close the form.

Figure 12.7
Modifying the Properties of the Country Control

Figure 12.8
Modified Form with List Box Control for Country

Figure 12.9
New Record

Supplier


You have now modified an existing form to include a list box control. Now Kyle suggests you look at the combo box control as an alternative.

## Combo box Control

Once again, a combo box control is a control that is used on a form and provides the combined functionality of a list box and a text box. In this situation, someone entering a new supplier using the Supplier form can either type new information into a combo box control (like a text box control) or select from an existing list of information (like a list box control) without taking up much space.

Kyle suggests you try out a combo box control by changing the State text box control to a combo box control that lists the four most common states in which your suppliers reside.

## To change the State text box control to a combo box control:

1 Double-click Supplier B.
2 Click View and then click Design View.
3 Right-click the State Or Province text box control; then click Change To and click Combo Box.

4 Increase the size of the StateOrProvince combo box control and related label slightly.

5 Right-click the State Or Province combo box control and then click Properties.
6 Click the Data tab.
7 Click Value List from the Row Source Type drop-down list.
8 Type CA;NY;MA;NJ in the Row Source section. The Properties Sheet should look like Figure 12.10.
9 Close the Properties window.

| Property Sheet <br> Selection type: Combo Box <br> StateOrProvince <br> Format Data Event <br> Other All  <br> Control Source StateOrProvince  <br> Row Source Value List  <br> Row Source Type 1  <br> Bound Column No  <br> Limit To List Yes  <br> Allow Value List Edits   <br> List Items Edit Form Yes  <br> Inherit Value List No  <br> Show Only Row Source Values   <br> Input Mask   <br> Default Value   <br> Validation Rule   <br> Validation Text   <br> Enabled   <br> Locked Yes  <br> Auto Expand No  |
| :--- |

10 Click View and then click Form View.
11 Click the Next Record arrow in the lower left-hand corner of the Supplier form until you see record 7 supplier 8 Jimmy Lewis.
12 Click the drop-down arrow in the State control. Your screen should look like Figure 12.11. Note that the combo box shows four options (those that you just set up for that control). The state indicated, however, is BC, which is acceptable even though it is not one of the options you set up.

"What if I wanted to move the State control to the left and the Zip control to the right. Would that change the order in which I tab through the controls?" Nathan asks.
"Actually no. Moving controls doesn't change tab order. However, there is a way to do both," Kyle explains. "Let me show you."

## To move controls and change the tab order:

1 Click View and then click Design View. Move the Zip and State labels and fields so that State is next to City and is followed on the
right by Zip, and then make the Zip label and field smaller. Switch back to the Form view and click in the ID field. Then press the [Tab] key several times to work your way through the supplier form. Note that from the City field, tab moves you to the Zip field and then back to the State field. Switch back to the Design View.
2 Right-click anywhere in the Supplier B form and then click Tab Order.

3 Click the far left-hand side of the State Or Province control and move it up. Then move other fields so that your screen looks like Figure 12.12.

Figure 12.12
Changing the Tab Order


4 Click OK to save the changed tab order.
5 Click View and then click Form View.
6 Click the New (blank) record arrow.
7 Type $\mathbf{9}$ as the ID and then press [Tab] to move to the Supplier field.
8 Type Rigid as the supplier name and then press [Tab] to move to the next field.
9 Type Rex Tander as the supplier contact and then press [Tab] to move to the next field.

10 Type Sales Associate as the supplier title and then press [Tab] to move to the next field.

11 Type 253 Cabrillo Blvd. as the supplier address and then press [Tab] to move to the next field.

12 Type Santa Barbara as the supplier city and then press [Tab] to move to the next field. (Note that this moves you to the State field since you changed the tab order.)
13 Select CA as the supplier state and then press [Tab] to move to the next field.
14 Type 93101 as the supplier zip and then press [Tab] to move to the next field.

15 Select USA as the supplier country and then press [Tab] to move to the next field.

16 Type 8055554127 as the supplier phone and then press [Tab] to move to the next field.
17 Type 8055554128 as the supplier fax and then press [Tab] to move to the next field.
18 Type $\mathbf{1 0} / \mathbf{1 / 2 0 1 5}$ as the supplier first purchase date and then press [Tab]. That last tab should have entered the new supplier and brought you to a new supplier form.
19 Click File, Save As, Save Object As, and Save As to save this new object.
20 Type Supplier C as the form name, click OK, click the Home tab, and then close the form.

You have now created a combo box control on a form to ease the creation of new supplier records, and you have found that it acts like both a text box and list box control. Now it is time to experiment with other features, such as calculated controls.

## Calculated Controls

A calculated control uses an expression as its source of data. An expression is any combination of mathematical or logical operators, constants, functions, names of fields, controls, and properties that evaluate to a single value. For example, an expression can use data from a field in an underlying table, from a query of a form or report, or from another control on the form or report.

Bound controls obtain their data from fields in a table, whereas unbound controls don't have any particular data source other than an expression. Kyle explains that, in order to calculate the total cost invested in any particular product, Nathan would have to multiply the units on hand times the unit cost. He demonstrates that both the units on hand and the unit cost are already on the product form as bound controls Quantity and UnitPrice. However, creating a control on the form that calculates the total cost will require that Nathan create an unbound control (referred to in this case as a calculated control) to calculate the product of Quantity times Unit Price.
"Bound, unbound, I'm bound up just thinking about these," Meagan complains. "Do we really have to understand this to create a useful form?"
"Well," responds Kyle, "I think you'll find them useful in many forms you might create and they are really not that difficult. Here, let me show you."

## To add a control to calculate the total cost in inventory of each item:

1 Double-click the Products form.
2 Click View and then click Design View.
3 Click the Text Box control from the Controls group on the Design tab of the Ribbon, as shown in Figure 12.13.

Figure 12.13
Form Design Tools on the Ribbon


4 Place the cursor in the product form under the Picture label click and then drag to the right and down while holding the left mouse button down, then release the left mouse button down to create a new text box control as shown in Figure 12.14.

Figure 12.14
Adding a New Text Box Control to the Products Form


5 Right-click the Unit Cost label control; then click Properties.

6 Click the All tab to view format properties for the Unit Price label control. A portion of the Format Properties window is shown in Figure 12.15.


7 Note the width, height, and left properties. (Width defines how wide the label should be, height defines how tall the label should be and the left defines how far from the margin the label should be.)
8 Click the newly created text box control and then click the newly created text box label control; note how the Property Sheet now reflects properties for the new text box label. (Be sure you select the label, not the text box.)
9 Click the All tab if it is not already selected.
10 Type Total as the name property of the new text box label.
11 Type Total as the caption property of the Total text box label.
12 Type $\mathbf{1 . 2 0 8 3}$ as the width property.
13 Type .2083 as the height property.
14 Type 3.5 as the top property.
15 Type $\mathbf{0 . 0 4 1 7}$ as the left property. Your Properties window should look like Figure 12.16.


Figure 12.15
A Portion of the Properties Window for the Unit Cost Label Control

Figure 12.16
A Portion of the Properties Window of the Total Text Box

Figure 12.17
A Portion of the Properties Window for the Unit Price Control

Figure 12.18
A Portion of the Properties
Window for the Total Amount Text Box


26 Close the Properties window.

27 Click View and then click Form View. The format seems a bit out of place. Move controls around the form (in Design View) so that your new form looks like Figure 12.19.

Products


Trouble? If you did not type the expression exactly as specified, then you may end up with the message "\#Name?" in the text box where you expected to see the $\$ 1,400.00$ total cost. Reexamine the Control Source section of the Properties window for the total text box to verify that you've typed the expression correctly.
28 Click File, Save As, Save Object As, and Save As to save this new object.
29 Type Products A as the new form name and then click OK.
30 Click the Home tab and then close the form.

You've now seen the process for creating a calculated control. Both Nathan and Meagan seem more comfortable with the terms and processes and are anxious to know if there are any other useful controls available in Access.

## Check Box Control

When implemented on a form, the check box control gives the user the choice of activating all, none, or some of the check boxes. In each case, a check box control returns a Yes value if checked and returns a No value if unchecked. This control, like other controls, can be bound or unbound. To create a bound check box control, you must be working in a form or report that is bound to a record source.

Kyle asks Meagan if there are any situations in which she thinks a control like this might be helpful on a form. She suggests that, in the Buyers table, it would be nice to know who specializes in what category of product. For

Figure 12.19
New Product Form with a Total Control
instance, some buyers specialize in only one category, like Flatwater boards, while others specialize in several categories.
"Would a check box control be appropriate here?" she asks.
"Yes," you respond. "But if you want to store this information for later use, doesn't it have to be a bound control? And if so, don't we have to create some new fields in the Buyers table?"

Kyle compliments you on your comprehension of this topic. He agrees that this is a situation where a bound control is appropriate, but he points out that the buyer table fields must first be created and set up in a data type called Yes/No.

## To create additional fields in the Buyers table:

1 Right-click Buyers Table and then click Design View.
2 Add six new fields to the table and specify each as a Yes/No data type, as shown in Figure 12.20.

Figure 12.20
Modifying the Buyers Table

| Field Name |  | Data Type | $1 \pm$ |
| :---: | :---: | :---: | :---: |
| 8 | BuyerID | Number |  |
|  | BuyerName | Short Text |  |
|  | BuyerPhone | Short Text |  |
|  | Flatwater | Yes/No |  |
|  | Inflatable | Yes/No |  |
|  | Race | Yes/No |  |
|  | Surf | Yes/No |  |
|  | River | Yes/No |  |
|  | Paddles | Yes/No | $\checkmark$ |
|  |  |  |  |
|  |  |  | $\checkmark$ |

3 Close the Buyers Table. Click Yes to save changes.

Now that the Buyers table includes the field for data storage, you offer to modify the Buyers form to include check boxes for quick data entry.
"How do I create check boxes on the form?" you ask.
"All you'll need to do is add the fields you just created in the Buyers table to the Buyers form. Because they are of the data type Yes/No, they will automatically be added to the form as a check box control," Kyle responds.

## To create a check box control bound to a field:

1 Right-click the Buyers form and then click Design View.
2 Resize and move the Buyers form and Field list windows so that your screen looks like Figure 12.21.
3 Click Add Existing Fields from the Tools group of the Design tab on the Ribbon.
4 Click and drag all six fields you just created, one at a time, to the Buyers form (see Figure 12.22).


5 Click View and then click Form View.
6 Update each record from the Buyers form to indicate in what category each buyer specializes by clicking in the check box to place a check mark in the box. (Note: Clicking a second time will remove the check mark.) Buyer 601 specializes in Flatwater, Inflatable, and Race SUPs. After updating Buyer ID 601, your Buyers form should look like Figure 12.23.


Figure 12.21
Modifying the Buyers Form

Figure 12.22
Adding Existing Fields to a Form

Figure 12.23
Buyer ID 1 Updated Record

7 Continue your update. Buyer 602 specializes in Inflatable, Race, Surf, and River SUPs. Buyer 603 specializes in Flatwater SUPs and Paddles. Buyer 604 specializes in Surf SUPs only.
8 Click File, Save As, Save Object As, and Save As to save this new object.
9 Type Buyers A as the name of the new form and then click $\mathbf{O K}$ to save the form.

10 Click the Home tab and then close the form.
"I like using these new controls," comments Meagan. "But I still have a question on the combo box controls we did before. Is there a way to give our database users a choice of options that change as our company grows?"
"There sure is," Kyle responds. "I'll introduce you to special combo box controls next."

## Special Combo Box Control

An additional possible use of a combo box control would be to give the user a choice of options that change as a function of other changes that may occur in the database. For instance, let's say you want to give the user the option of selecting a specific supplier for each product but that you want the list to be dynamic, not static. In other words, you'd like the user's available choices to be limited to those suppliers currently in your Supplier table. Thus, when you add a supplier the list expands and, of course, when you delete a supplier the list contracts.
"That would be perfect for our product form," you suggest. "I can see using that form to add new products and then choosing from a list of existing suppliers to provide the product."
"How is that different from what we just did with the state and country combo boxes?" Meagan asks.
"In those situations," Kyle explains, "we provided a list of choices for the combo list. However, the user could type in a different state or country from those we listed. Plus, the list never changes unless we physically rewrite the list in the control."
"So where do we create the list?" you ask.
"Actually, we just point the control to the Supplier table. As names are added to or removed from that table, the combo box control changes," says Kyle. "Nathan, let me show you how it is done."

Kyle explains that Nathan's goal will be to modify the existing Product form so that the Supplier text box control is transformed to a combo box control with a list containing the supplier ID numbers and names that exist in the Supplier table. This will require that the existing relationship between the Product table and the Supplier table be temporarily eliminated (since it currently enforces referential integrity) and that the data type of the SupplierID fields be changed.

## To modify the Product table and change the Supplier ID field's data type:

1 Click Relationships from the Relationships group on the Database Tools tab of the Ribbon.

2 Resize the windows so that your screen looks like Figure 12.24.


3 Right-click the relationship between the Product table and the Supplier table; click Delete and then click Yes in the dialog box that appears in order to confirm your deletion.
4 Close the Relationships window and click Yes if asked to save changes.
5 Right-click Product Table and then click Design View.
6 Click Lookup Wizard from the drop-down list of data types for the Supplier ID field, as shown in Figure 12.25.


Figure 12.24
Existing Relationships

Figure 12.25
Changing Data Type to Lookup Wizard

Figure 12.26
Identifying Fields to be Included in the Lookup Column

Figure 12.27
Organizing Columns in the Lookup Column

7 Click on the first option button (I want the lookup field to get the values from another table or query.) and then click Next.
8 Click Table: Supplier Table from the next Lookup Wizard dialog box; then click Next.
9 Double-click Supplier ID and Supplier Name in the list of Available Fields in order to move them to the list of Selected Fields, as shown in Figure 12.26.


10 Click Next; then click Supplier Name from the drop-down list in box 1 as the field to sort on.
11 Leave Ascending as the sort order, and then click Next.
12 Uncheck the Hide key column check box and resize the column widths if necessary so that your screen looks like Figure 12.27.


## 13 Click Next.

14 Click Next again to keep the Supplier ID as the field being stored.

15 Click Finish to keep Supplier ID as the label for your column.
16 Click Yes to save the table.
17 Close the modified Product table.
18 Once again, click Relationships from the Relationships group on the Database Tools tab of the Ribbon.
19 Double-click the relationship between the Product table and the Supplier table.
20 Click in the Enforce Referential Integrity check box and then click OK.

21 Close the Relationships window.

Kyle explains that now Nathan can modify the Products form to include the new and revised Supplier ID field as a combo box control. But first, he cautions, Nathan will have to remove the old Supplier ID text box control from the form.

## To create a combo box control linked to the Supplier table:

1 Right-click Products A and then click Design View.
2 Click the existing Supplier ID text box control; then press the [Delete] key to delete both the SupplierID label and text box.
3 Click Add Existing Fields from the Tools group of the Design tab on the Ribbon.
4 Click and drag the Supplier ID field to the Products A form, as shown in Figure 12.28.


Figure 12.28
Adding the Newly Modified Supplier ID Field to the Products A Form


8 Click File, Save As, Save Object As, and Save As to save this new object.
9 Type Products B as the name of the new form.
10 Go to record 7, the Sleeping One, and change the Supplier ID from 5 to 6 (Fanatic.) as shown in Figure 12.30.

Figure 12.30
Modifying an Existing

| 3 | Bark |
| :--- | :--- |
| 1 | Boardworks |
| 6 | Fanatic |
| 8 | Jimmy Lems |
| 2 | Naish |
| 7 | Paddle Surf Han |
| 9 | Rigid |
| 5 | Ron House |

11 Now change the Supplier ID of the same record by typing 4 in the combo box control and then moving to the next record.

12 An alert dialog box should appear, indicating that this choice is not acceptable because a related record is required in the Supplier table. Since there is no supplier with an ID of 4, the system rejects your change. Click OK.

13 Change the Supplier ID of record 7 back to 5 .
14 Close the form.

In addition to form controls, subforms are helpful in situations where a one-to-many relationship exists. Kyle suggests that understanding subforms may actually help resolve some of their previously expressed inventory tracking concerns.

## Subforms

Subforms are simply forms within forms. Subforms require that information in one form have a one-to-many relationship with the information in another form. Kyle explains that users often like to see specific information on one form that has some common characteristic.
"For instance," says Kyle. "You have already established a relationship between the categories of your products and the products themselves, so we have a one-to-many relationship. One category, for example, includes many products."
"So we could create a form showing all the products we have that fall within any of our categories?" asks Meagan.
"That's it!" Kyle responds. "Let's have you create this form within a form using the Forms Wizard."

## To create a form and subform of categories and products:

1 Click Forms Wizard, from the Forms group of the Create tab.
2 Select Table: Category Table from the list of Tables/Queries.
3 Click Category Name from the list of Available Fields; then click the > button to move Category Name from the list of Available Fields to the list of Selected Fields.
4 Select Table: Product Table from the list of Tables/Queries.
5 Click ProductName from the list of Available Fields and then click the $>$ button.
6 Click Quantity from the list of Available Fields and then click the > button.
7 Double-click UnitCost from the list of Available Fields (note how this accomplishes the same task of moving the field from Available Fields to Selected Fields). Your window should now look like Figure 12.31.
8 Click the Next button.
9 Click by Category Table.

Figure 12.31
Using the Forms Wizard


10 Click the Form with subform(s) option button. Your window should look like Figure 12.32.

Figure 12.32
Creating Forms with Subforms


11 Click Next.
12 Click the Data sheet layout option button and then click Next.
13 Type Products by Category as the form title and Products Subform as the subform title.

14 Click Finish to save the new forms. Your window should look like Figure 12.33.

15 Observe that not all products, quantities, or unit costs may be visible. Click View and then Layout View.


16 Modify the width of each column by double-clicking between column titles until your window looks like Figure 12.34.

17 Click View and then Design View. Resize the Products Subform control to make it smaller and then click View and then Form View.
18 Navigate the newly created form by clicking on the category record navigator at the bottom of the form until you get to the Surf category. The Surf category should look like Figure 12.35.
19 Click Save on the Quick Access toolbar.
20 Keep this form open for printing.

Figure 12.33
Newly Created Products by Category Form and Subform

Figure 12.34
Changing Column Widths in a Form

This newly created form and subform is ideal for viewing products by categories. Nathan is impressed.

Figure 12.35
Completed Products by Category Form


## Printing a Form

All that is left is to print a form. Kyle remarks that printing a form is much like printing a table or query, as you did in previous chapters. In this case he just needs you to print the first record (Watches).

## To print a form:

1 With record 4 showing on the Products by Category form you just created; click the File tab and then click Print.
2 Click Print again, and then choose the Selected Record(s) option in the Print Range section of the Print window and then click OK. The printed form should look like Figure 12.36.
3 Close and save the Products by Category form.

Figure 12.36
Printed Products by Category Form for Surf SUPs

Products by Category

Category Name

Products
Surf

| Product Name | Quantity | Unit Cost |
| :--- | ---: | ---: |
| Badfish | 5 | $\$ 410.00$ |
| Ridley | 3 | $\$ 1,275.00$ |
| Ripper | 6 | $\$ 1,500.00$ |

## Documenting a Form

Kyle suggests that you document all changes made to a form so that you can verify the underlying attributes that were changed in the course of creating or modifying the form. In particular, he suggests you examine and print the data properties that were changed when you converted a text box to a combo box for the StateOrProvince field in the supplier form.

## To view and print the changes made in the State Or Province field in the supplier form:

1 Double-click Supplier C form.
2 Click Database Documenter in the Analyze group of the Database Tools tab on the Ribbon.
3 Click the Forms tab in the Documenter window.
4 Click in the check box next to Supplier C (you may have to scroll down the window to find it).
5 Click Options.
6 Uncheck all check boxes listed under the Include for Form section title.
7 Click the Names and Properties option button under the Include for Sections and Controls section title. Your screen should look like Figure 12.37.


8 Click the Properties button.
9 Deselect all Print Categories other than Data Properties, as shown in Figure 12.38 .
10 Click OK in the Property Categories window.

Figure 12.38
Selecting Print Categories


11 Click OK in the Print Form Definition window.
12 Click OK in the Documenter window.
13 Click Print and then click OK. Page 2 of the printout should refer to the combo box control established for the StateOrProvince field, as shown in Figure 12.39.

Figure 12.39
Part of the Documenter for the Supplier C Form

| Combo Box: StateOrProvince |  |  |  |
| :--- | :--- | :--- | :--- |
| AllowValueListEdits | True | AutoExpand: | True |
| $:$ |  |  |  |
| BoundColumn: | 1 | ControlSource: | StateOrProvince |
| Enabled: True | InheritValueList: | True |  |
| LimitToList: | False | Locked: | False |
| RowSource: | CA;NY;MA;NJ | RowSourceType: | Value List |
| ShowOnlyRowSour <br> ceValues: | False |  |  |

14 Close the Print Preview window and then close all windows.

## End Note

In this chapter you have learned how to modify a form's labels and text box controls, how to use list box, combo box, calculated, and check box controls, how to create a form with a subform, and how to print document a form. Feeling fairly confident, you're ready to finish up with variations on report creation.

## practice

## Chapter 12 Questions

1 What view of a form is used to edit an existing form?
2 What is the difference between bound and unbound controls?
3 Why are text box controls used on a form?
4 Why are list box controls used on a form?
5 Why are combo box controls used on a form?
6 Why are calculated controls used on a form?
7 Why are check box controls used on a form?
8 When is the Lookup Wizard used?
9 Why must an existing relationship be deleted before modifying a field's data type?

10 What type of relationship must exist if a subform is used on a form?

## Chapter 12 Assignments

1 Using the Ch12-02 file, modify the Buyers form for What SUP so that it looks like Figure 12.40. Save this form as Ch 12 Assignment 1, and print record 1 using this form.


2 Modify the Products form by changing the Category ID text box control to a list box control that lists the choices as A, B, C, D, E, or F. Save the form as Ch 12 Assignment 2. Print the newly created form for Product ID 101.

3 Modify the Product form (not the Ch 12 Assignment 2 form you just created) by changing the Category ID text box control to a combo box control that lists choices of A, B, C, D, E, or F. Save the form as Ch 12 Assignment 3. Print the newly created form for Product ID 101.

Figure 12.40
New Buyers Form

4 Salespeople earn a 10 percent commission on the price of each sale. Create a new unbound calculated control to compute the possible commission on each product. Modify the Products form (not the Ch 12 Assignment 3 form you just created) by adding a calculated control called Commission. (The expression created should multiply the unit price by .10.) Format the control in a currency format. Save the form as Ch 12 Assignment 4. Print record 7 using this form.

5 Add a new field (Taxable) to the Product Table. Make the field a Yes/ No data type. Add this new field to the Products form (not the Ch 12 Assignment 4 form you just created) to the right of the Reorder Level control. Make record 6 (Glide GS) taxable. Save the form as Ch 12 Assignment 5. Print record 6 using this form.

6 Modify the Products form (not the Ch 12 Assignment 5 form you just created) by changing the Category ID text box control to a special combo box control, listing the choices of CategoryID and CategoryName from the Category table. (Hint: Be sure to first remove the relationship between the Product and Category tables and then, after you've created the combo box control, to reestablish the relationship and related referential integrity. Save the form as Ch 12 Assignment 6. Print the newly created form for Product ID 101.

7 For each buyer name, create a form (using the Forms Wizard) that contains the product name, quantity, and unit price of each product that the buyer is responsible for. Use the subform option with a datasheet layout. Save the form as Ch 12 Assignment 7 and the subform as Ch 12 Assignment 7 Subform. Format the subform so that columns fit in the form created. Print record 4 (Buyer $=$ Fortier) using this form.

## Chapter 12 Case Problem 1: KELLY'S BOUTIQUE

Note: You must have completed Case 1 in the previous chapter in order to continue working on this case.

In the last chapter you added and modified some queries for Kelly's Boutique. She would now like you to create some new forms. Make the following changes for Kelly using the ch11-03_student_name file you created in Chapter 11. (Note: Open your ch11-03_student_name file and then save it as ch12-03_student_name before making the indicated changes.)
a. Create a form to look like Figure 12.41. Save the form as Ch 12 Kelly Case a. Print record Hop on Pop.
b. Create a list box control using the form created in part a. This control should provide the user with a list of departments: Adult, Children. Move the picture control down to make room for the list box control.


Save the modified form as Ch 12 Kelly Case b. Print record 7 (Green Eggs and Ham).
c. Create a combo box control using the form created in part a. This control should provide the user with a list of departments (as in b above) but with a combo box instead of a list box. Dept choices should be Adult, Children, and Teen. Save the modified form as Ch 12 Kelly Case c. Print the documenter page that documents the combo box for Dept.
d. Create a special combo box control using the Book Form. This control should provide the user with a dynamic list of publishers based on the publishers listed in the Publisher table. The combo box should list publisher number and name, and referential integrity must be enforced. Label the combo box column Publisher. Save the modified form as Ch 12 Kelly Case d. Print the documenter page that documents the combo box for Publisher.
e. Using the Book Form, create a calculated control to compute the total retail value of each book in stock. First add the quantity field to the form and then add the calculated control. Format the control in currency, and label the control Total Retail Value. Save the modified form as Ch 12 Kelly Case e. Print the record containing the book title "Angela's Ashes"
f. Using the Book Form, create a check box control to indicate whether or not the text is a bestseller. Label the field and control Best Seller. Mark the book Green Eggs and Ham as a bestseller using your new form. Print the record that contains the book title "Green Eggs and Ham" and then save the modified form as Ch 12 Kelly Case f .
g. Create a form and subform that shows all books by publisher, listing ISBN and Book Title in datasheet layout. Then save the modified form and subform as Ch 12 Kelly Case g and Ch 12 Kelly Case g

Figure 12.41

New Books Form

Subform. Print the record with Arthur A. Levine Books as the publisher.
h. Make sure to keep a copy of this file for use in the next chapter.

## Chapter 12 Case Problem 2: WINE DEPOT

Note: You must have completed Case 2 in the previous chapter in order to continue working on this case.

In the last chapter you modified some queries for the Wine Depot. Now Barbara would like you to help her create some new forms. Make the following changes for Barbara using the ch11-04_student_name file you created in Chapter 11. (Note: Open your ch11-04_student_name file and then save it as ch12-04_student_name before making the indicated changes.)
a. Change the Type field in the Wine Products table to a short text type with a field size of 30 . Use the Forms Wizard to create a new form from the Wine Products table and Winery Table that includes the following fields: SKU, Cost, Price, Quantity, Size, Vintage, Type, Picture, and Winery Name. Use a justified layout and entitle the form Wine Products; then modify the form to look like Figure 12.42. Save this form as Ch 12 Wine Depot Case a. Navigate to SKU 14539 and print that selected record only. (Hint: Be sure to set the picture properties field to size mode "zoom" by right-clicking the picture object in the design view, selecting properties, and choosing zoom as the size mode.)

Figure 12.42
New Wine Products
Form

b. Modify the form you created and saved in a above by changing the Type text box to a list box control that provides a list of all wine types: Cabernet Sauvignon, Chardonnay, Fume Blanc, Merlot, Pinot Noir, Sauvignon Blanc, Syrah, Red Chianti, and Zinfandel. Save the modified form as Ch 12 Wine Depot Case b. Print the record containing SKU 12895 only.
c. Modify the form you created in part b by replacing the Winery Name field with a Winery field (from the Winery Table). Then change the Winery text box to a combo box control that provides a drop-down list of all 21 wineries. Your new combo box should contain a value list that you create listing each winery by number. For example: 1,2,3 etc. Save the modified form as Ch 12 Wine Depot Case c. Print the documenter page that documents the combo box for Winery.
d. Modify the form you created in part c by deleting the Winery combo box control and replacing it with a Winery combo box control based on the winery and name fields in the Winery Table. The field should use the winery and name fields of the Winery Table and then list the winery name when requested. (Don't forget to modify the relationships window first and then to reestablish referential integrity!) Save the modified form as Ch 12 Wine Depot Case d. Print the documenter page that documents the new combo box for Winery.
e. Modify the form you created in part d by adding a check box control in the lower right-hand corner of the form to indicate if this product has been recommended by the Wine Spectator (a noted magazine of wine-tasting professionals). Label the field and control "Wine Spectator Recommended". (Hint: Don't forget to create a field in the Wine Products Table first.) Only three wines currently have that designation: SKU 11475, 13883, and 15347. Save the modified form as Ch 12 Wine Depot Case e, and print the record containing SKU 15347 only.
f. Modify the form you created in part e by adding a calculated control below the Winery Number to compute the total cost in inventory of each product (cost times quantity). Format the control in currency and label the control Total Cost. Save the modified form as Ch 12 Wine Depot Case f. Print the record containing SKU 11475 only.
g. Create a new form with a subform using the Winery Table and Wine Products Table. Use the Winery Name field from the Winery Table and the SKU and Type fields from the Wine Products table. View the data by winery in a datasheet layout. Use the default names provided for the form and subform. Save the modified form as Ch 12 Wine Depot Case g. Print the record containing the Melville winery only.
h. Make sure you keep a copy of this file for use in the next chapter.

## Chapter 12 Case Problem 3: SNICK'S BOARD SHOP

Note: You must have completed Case 3 in the previous chapter in order to continue working on this case.

In the last chapter you created some queries for the Snick's Board Shop. Now Caitlin would like you to help her create some forms to view information from the database. Make the following changes for Caitlin using the ch11-05_student_name file you created in Chapter 11. (Note: Open your
ch11-05_student_name file and then save it as ch12-05_student_name before making the indicated changes.)
a. Note the existing relationships between the Product, Manufacturer, and Category tables. Now delete those relationships, and then change the field size of ProductID to 10, ProductName to 35, ManufacturerID to 10 , Style to 15 , CategoryName to 25 , ManfacturerName to 25 , and PhoneNumber to 15 . Now reestablish the relationships you previously deleted enforcing referential integrity. Use the Forms Wizard to create a new form that includes the ProductID, ProductName, CategoryName, ManufacturerName, Price, Style, Quantity, and Picture fields. View the data by Product in a Columnar layout. Name your form Form A and then navigate to ProductID 62-01296 and print that record only.
b. Modify the form you created and saved in (a) by changing the CategoryName text box to a list box control that provides a list of all Categories: Complete, Ramp, Longboards, Protective Gear, Rails, and T-Shirts. Move the fields below CategoryName down so all are viewable on the form. Change the title of the form to Form B in the form header and then save the modified form as Form B. Print the record containing 65-00335 only.
c. Create a new form containing all of the fields from the product table in columnar layout with a title of Form C. Make the ManufacturerID a combo box control based on the ManufacturerID field of the Manufacturer table. Print the documenter page that documents the new combo box.
d. Add a new data type Yes/No field titled Green to the Manufacturer table and then add a new form containing all the fields in the Manufacturer table in columnar format titled Form D. The new Green field designates whether a manufacturer has qualified for the energy-saving status granted by the state. Currently only Zero, Anti-Hero, and Goldcoast are designated "Green" by the state. Place checks in the Green fields for those three manufacturers. Print the Anti-Hero record.
e. Create a new form containing the ProductID, ProductName, Price, Discount, and Picture fields viewed by Product in a Columnar layout titled Form E. Delete the Picture label and move the picture control to the right hand side of the form. Resize the ProductName and Price fields so that your form looks like Figure 12.43:

Now add a new calculated control titled DiscountedPrice and formatted as currency below the Discount field to compute the discounted price (Price less discount, if any). Print the record for ProductID 65-00358.
f. Create a new form with a subform containing the fields CategoryName, ProductName, Price, and Style viewing the data by Category is a Datasheet layout and title Form F. Resize the fields displayed in the subform and then print the form for the LongBoard category.
g. Make sure you keep a copy of this file for use in the next chapter.


## Chapter 12 Case Problem 4: ROSEY'S ROSES

Note: You must have completed Case 4 in the previous chapter in order to continue working on this case. In the last chapter, you created some queries for Rosey's Roses. Now the company would like you to help it create some forms to illustrate information from the database. Make the following changes using the ch11-06_student_name file you created in Chapter 11. (Note: Open your ch11-06_student_name file and then save it as ch12-06_student_name before making the indicated changes.)
a. Note the existing relationships between existing tables. Now delete those relationships, and then change the field size of ID, Quantity, Quote Number, Quantity Ordered, and GrowerID to integer with 0 decimal places, Cost/Unit to currency with 2 decimal places, Customer Number to a field size of 5, Type to field size of 10 , and Grower Name and Contact to field size 40. Now reestablish the relationships you previously deleted enforcing referential integrity. (Hint: Be sure to change all instances of the fields you just changed.) Use the Forms Wizard to create a new form that includes the ID, Product Description, Type, type Description, Grower Name, Quantity, and Picture fields. View the data in a columnar layout with no grouping. Save your form as Form A and then navigate to ID 6 and print that record only.
b. Modify the form you created and saved in (a) by changing the Type field text box to a list box control that provides a list of all Types: Climber, Creeper, Shrub, and Tree. Move the fields below Type down so all are viewable on the form. Change the title of the form to Form B in the form header and then save the modified form as Form B. Print the record containing product ID 10 only.

Figure 12.43
Form E as Modified
c. Create a new form containing all of the fields from the Product table in columnar layout with a title of Form C. Make the Grower ID a combo box control that provides a list of all Grower IDs: 100, 200, 300 , and 400 . Print the documenter page that documents the new combo box control.
d. Modify the form you created and saved in (c) by removing the existing GrowerID field combo box control and creating a new GrowerID field special combo box control based on the GrowerID and Grower Name fields of the Grower table. The field should use the GrowerID and Grower Name fields of the Grower table and then just list the Grower Name when activated. (Don't forget to modify the relationships first and then re-establish referential integrity.) Change the title of the form to Form D and then save the modified form as Form D; then print the documenter page that documents the new special combo box control.
e. Add a new data type Yes/No field titled Organically Grown to the Grower table and then create a new form containing all the fields in the Grower table in columnar format titled Form E. Currently only Owen Farms is designated "Organically Grown" by the state. Place checks in the Organically Green field for that grower. Print the Owen Farms Form E.
f. Create a new form with a subform containing the fields Grower Name, product Description, Cost/Unit, and Type viewing the data by Grower in a Datasheet layout and form title Products by Grower and subform title Product Subform. Resize the fields displayed in the subform and then print the form for the Jackson \& Perkins grower.
g. Make sure you keep a copy of this file for use in the next chapter.

## Reports

## In this chapter you will learn:

- How to Use a query to create a report
- How to Use grouping and summarizing in a report
- How to Modify an existing report design
- How to Export a report to MS Word and/or Excel


## Case: What SUP, Inc.

You, Nathan, and Meagan are feeling rather confident in using Access. So far you've created and modified tables, queries, and forms in your database, but you are anxious to see some results of your work in a more formal presentation.
"How are reports different from queries and forms?" Meagan asks.
"Remember that forms are used to view and update information in the database," Kyle answers. "Queries are your means of asking questions about the data, and reports are your means of expressing that information in a usable fashion."

He reminds you that, when exploring queries, you were able to use select, update, and delete queries to locate certain information and were also able to compute totals and statistics. However, those queries when printed were not formatted very well. Although they could be sorted, they didn't have the header, footer, grouping, or summarizing features of reports.

Kyle suggests that you start with using a query as your basis for a report and as a means to learn more about the available reporting features of Access.

## Use a Query to Create a Report

To demonstrate the use of queries in a report, Kyle created a simple select query that lists the category id, product name, quantity, unit cost, and total cost of all products in inventory. We can now create a report using this query. The first question he asks is what information from this query needs to be displayed in a report.
"Well, if you ask me," says Nathan, "I'd like to see a report of our products sorted alphabetically by product name. And I'd like to see each product's quantity, unit cost, and total cost."
"Could we also add information to the report like the category name for each item?" Meagan asks.
"Sure," Kyle responds.
He then explains the process for creating such a report and offers to demonstrate it to you now.

## To create a report using a query:

1 Start Access.
2 Click the File tab and then click Open.
3 Navigate the Open window to the location of this text's student files. (The location would be the CD provided with the text or from your computer lab's server.)
4 Double-click ch13-01, which should be located in a Ch 13 folder. (This is a modified version of the completed What SUP Inventory file from previous chapters.)
5 Click the File tab and then click Save Database As.
6 Navigate the Save As window to the location where you wish to save this file and type Ch13-01_student_name in the File Name: text box (replacing student_name with your name).
7 Click Save.
8 Click Report Wizard in the Reports group of the Create tab on the Ribbon. Click Open to bypass the security warning if need be.
9 Select Query: Product Query from the Tables/Queries drop-down list.
10 Click $\gg$ to select all fields for inclusion into this report, as shown in Figure 13.1.

Figure 13.1
Creating a Report Using the Report Wizard


## 11 Click Next.

12 Click by Product Table to remove the automatic grouping (more on this later), as shown in Figure 13.2.
13 Click Next two times, then select Product Name from the drop-down list 1 when asked about sorting; this will sort your report by product name.


14 Click Next; then check the Adjust the field width check box so that all fields fit on a page.
15 Click Tabular under the Layout section and Portrait under the Orientation section; then click Next.
16 Type Report 1 as the title of your report, click the Modify the report's design option button, and then click Finish. Your window should look like Figure 13.3.

Click on the far right of this text box and you should see a two arrow size cursor. Click and drag to the right to increase the width of the text box. Click on the top of the text box to see a four arrow move cursor. Click and hold here to relocate a text box.


Figure 13.3
Design View of Report 1
17 Resize the Product Name, Category ID, Quantity, Unit Cost, and Total Cost fields and titles as shown in Figure 13.4.

Figure 13.2
Using the Report Wizard


Figure 13.4
Modified Design View of Report 1
18 Click View and then click Report View. The top of your finished report, created from a query, should look like Figure 13.5.


Figure 13.5
Top Portion of Report 1

19 Close the report and click Yes to save changes.

Kyle further explains that it is best to create a report from a query that has all the information you need. Kyle suggests that you learn more about reports by working on grouping and summarizing information.

## Use Grouping and Summarizing in a Report

Kyle explains that grouping arranges the records in your report. When you group records, each group that shares a common characteristic is displayed together. You can group based on one or several characteristics. Furthermore, Kyle explains that-once a report has groups assigned-those groups can be summarized in many ways, including subtotals, grand totals, average, and so on.
"Can I get a report that lists my inventory by category and also subtotals each group?" Nathan asks.
"Sure," says Kyle. "But I suggest we learn how to group first and then worry about summarizing later."

## Grouping

"Let's create a report similar to the one we just created but grouped by category name," suggests Kyle.

## To create a report using grouping:

1 Click Report Wizard in the Reports group of the Create tab on the Ribbon.
2 Select Query: Product Query from the Tables/Queries drop-down list.
3 Click $\gg$ to select all fields for inclusion in this report.
4 Click Category ID in the Selected Fields section, then click $<$ to remove the Category ID field from the list.
5 Select Table: Category Table from the Tables/Queries drop-down list.
6 Double-click Category Name to add that field to the Selected Fields list. (Note: It should appear just below ProductName.)
7 Click Next and then double-click CategoryName to add a grouping level.
8 Click Next.
9 Select Product Name from the drop-down list 1 when asked about sorting; this will sort your report by product name.


Figure 13.6
Partial View of Report 2
13 Close the report.
"Is it possible to group more than once?" Meagan asks.
"Yes," explains Kyle. "Access will let you group on any number of fields."
He suggests you create a report listing the product name and quantity by category and by supplier. In this way you can see what products are in each category as well as which suppliers provide them.

## To create a report using multiple field grouping:

1 Click Report Wizard in the Reports group of the Create tab on the Ribbon.
2 Select Table: Product Table from the Tables/Queries drop-down list.

3 Double-click ProductName and Quantity from the list of available fields.
4 Select Table: Category Table from the Tables/Queries drop-down list.
5 Double-click Category Name from the list of available fields.
6 Select Table: Supplier Table from the Tables/Queries drop-down list.
7 Double-click Supplier Name from the list of available fields; then click Next.
8 Click by Category Table as your data view and then click Next.
9 Double-click Supplier Name to add a grouping level. Your window should look like Figure 13.7.


Figure 13.7
Multiple Grouping Levels

10 Click Next and the select Product Name from the drop-down list 1 when asked about sorting; this will sort your report by product name.
11 Click Next; then check the Adjust the field width check box so that "All fields fit on a page."
12 Click Stepped under the Layout section and Portrait under the Orientation section; then click Next.

13 Type Report 3 as the title of your report and then click Finish. Modify the size of each field so that your report looks like Figure 13.8.

| Report 3 |  |  |
| :--- | :--- | :--- |
| Category Name | SupplierName | Product Name |
| Flatwater | Boardworks | Quantity |
|  | Naish | Veneer Raven |
| Inflatable | Noardworks | 2 |
| Naish | Shubu X | 3 |

Figure 13.8
Partial View of Report 3
14 Save and then close the report.
"I can imagine all sorts of reports I would like to generate in our business," says Meagan. "But you said we could summarize as well, right?"
"Correct," Kyle responds. "Let me introduce you to the summarizing process."

## Summarizing

Kyle explains that Access will automatically provide summaries on numeric fields in your report if you use the Report Wizard and establish groups. He tells you that a group is a collection of records, along with any introductory and summary information displayed with the records, such as a header. A group consists of a group header, nested groups (if any), detail records, and a group footer. Grouping allows you to separate groups of records visually and to display introductory and summary data for each group. The available functions include summation, average, minimum, and maximum. Access will also calculate the percent of total for sums if you like.
"It's important to remember that Access won't let you sum text or other nonnumeric fields, for obvious reasons," says Kyle. "So if you accidentally set up a field in a table that contains numeric values but identify the field as a data type other than number, you won't be able to use the summary features."

He suggests creating a product value by category report that sums the total value of products in each category.

## To create a report using grouping and summary options using the Report Wizard:

1 Click Report Wizard in the Reports group of the Create tab on the Ribbon.

2 Select Query: Product Query from the Tables/Queries drop-down list.
3 Double-click ProductName, Quantity, UnitCost, and TotalCost from the list of available fields.
4 Select Table: Category Table from the Tables/Queries drop-down list.
5 Double-click CategoryName from the list of available fields; then click Next.
6 Double-click CategoryName as your group level, and then click Next.
7 Click ProductName from the drop-down list 1 when asked about sorting; this will sort your report by product name.
8 Click the Summary Options button in the Report Wizard box.
9 Click Sum on the TotalCost row to direct Access to add the total value of each product by group.
10 Click OK in the Summary Options window.
11 Click Next; then check the Adjust the field width check box so that "All fields fit on a page."
12 Click Stepped under the Layout section and Portrait under the Orientation section; then click Next.

13 Type Report 4 as the title of your report and then click Finish. Modify the size of each field so that your report looks like Figure 13.9.

| Report 4 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| CategoryName | Product Name | Quantity | Unit Cost | Total Cost |
|  | Nalu | 3 | \$850.00 | \$2,550.00 |
|  | Veneer Raven | 2 | \$750.00 | \$1,500.00 |
| Summary for 'CategoryName' = Flatwater (2 detail records) |  |  |  |  |
| Sum |  |  |  | \#\#\#\# |
| Inflatable |  |  |  |  |
|  | Nalu Air | 4 | \$650.00 | \$2,600.00 |
|  | Shubu X | 3 | \$550.00 | \$1,650.00 |
| Summary for 'CategoryName' = Inflatable (2 detail records) |  |  |  |  |
| Sum |  |  |  | \#\#\#\# |
| Paddles |  |  |  |  |
|  | BW Hybrid | 15 | \$160.00 | \$2,400.00 |
|  | Makani | 12 | \$150.00 | \$1,800.00 |
| Summary for 'CategoryName' = Paddles (2 detail records) |  |  |  |  |
| Sum |  |  |  | \#\#\#\# |

Figure 13.9
Partial View of Report 4
14 Close Print Preview but leave the Report window open.

Kyle further explains the nature of the report just generated. In addition to the total provided for each category, the report created a grand total value of all products (see again Figure 13.8). However, the description of the summary amount is a bit odd, and the value amounts are shown as \#\#\#.
"To help you understand how this summary was created, I think it's best to show you the Report Design view of this report," Kyle suggests. "Let's open up the report, take a look, fix these problems, and print the report."

## To examine the sum functions created in the previous report and then print the report:

1 Click View and then Design View to view the design view of Report 4, as shown in Figure 13.10.


Figure 13.10
Design View of Report 4

2 Note the Sum label control and the $=$ Sum([TotalCost]) formula in a text box control, both located in the Category ID footer.
3 Also note the Grand Total label control and the $=$ Sum([TotalCost] $)$ formula in a text box control, both located in the Report footer.
4 Click the left side of both Sum controls and drag to the left to increase their size, as shown in Figure 13.11.
5 Right-click the $=\mathbf{S u m}([$ TotalCost]) control in the Category ID footer; then click Properties to reveal the Property Sheet window.
6 Click the All tab to view the Property Sheet window, as shown in Figure 13.12.
7 Observe that the formula in the Control Source section of the Properties window contains the formula to sum the TotalCost field of the report.
8 Close the Properties window.
9 Click View and then click Report View.


Click and drag the Sum control in the CategoryID footer to make it larger

Figure 13.11
Increasing the Size of a Report Control

Figure 13.12
Partial View of the Properties Window of the Sum([TotalCost]) Control


10 Click the File tab, click Print, click Print again, and then click OK to print the report. It should look like Figure 13.13.

11 Close the Report window. Click Yes to save the changes.

| Report 4 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| CategoryName | Product Name | Quantity | Unit Cost | Total Cost |
| Flatwater |  |  |  |  |
|  | Nalu | 3 | \$850.00 | \$2,550.00 |
|  | Veneer Raven | 2 | \$750.00 | \$1,500.00 |
| Summarv for 'CategorvName' = Flatwater (2 detail records) |  |  |  |  |
| Sum |  |  |  | \$4,050.00 |
| Inflatable |  |  |  |  |
|  | Nalu Air | 4 | \$650.00 | \$2,600.00 |
|  | Shubu X | 3 | \$550.00 | \$1,650.00 |
| Summarv for 'CategorvName' = Inflatable (2 detail records) |  |  |  |  |
| Sum |  |  |  | \$4,250.00 |
| Paddles |  |  |  |  |
|  | BW Hybrid | 15 | \$160.00 | \$2,400.00 |
|  | Makani | 12 | \$150.00 | \$1,800.00 |
| Summarv for 'CategorvName' = Paddles (2 detail records) |  |  |  |  |
| Sum |  |  |  | \$4,200.00 |
| Race |  |  |  |  |
|  | Candice Appleby | 1 | \$950.00 | \$950.00 |
|  | Glide GS | 8 | \$850.00 | \$6,800.00 |
|  | Sleeping One | 4 | \$1,150.00 | \$4,600.00 |
| Summarv for 'CategorvName' = Race (3 detail records) |  |  |  |  |
| Sum |  |  |  | \$12,350.00 |
| River |  |  |  |  |
|  | Badfish 2 | 2 | \$550.00 | \$1,100.00 |
|  | Zoomer | 5 | \$1,800.00 | \$9,000.00 |
| Summarv for 'CategorvName' = River (2 detail records) |  |  |  |  |
| Sum |  |  |  | \$10,100.00 |
| Surf |  |  |  |  |
|  | Badfish | 5 | \$450.00 | \$2,250.00 |
|  | Ridley | 3 | \$1,350.00 | \$4,050.00 |
|  | Ripper | 6 | \$1,600.00 | \$9,600.00 |
| Summarv for 'CatesorvName' = Surf (3 detail records) |  |  |  |  |
| Sum |  |  |  | \$15,900.00 |

Figure 13.13
Printed Report 4
"Placement of these controls determines what gets summed," Kyle explains. "The first control, placed in the CategoryName footer, sums the total value for each category, while the second control, placed in the report footer, sums the total value for the whole report."
"Why is Total Value in brackets?" asks Meagan, "and why are the sum amounts and totals without commas, dollar signs or full decimals?"
"The brackets indicate that a field name is being used in a formula," explains Kyle. "The Sum function will sum all the fields named Total Value located within the CategoryName detail section. The formatting of the controls is something we can take care of next."

Kyle now advises you to learn more about reports by modifying an existing report.

## Modify an Existing Report

Not all reports you create with the Report Wizard will look the way you want or present the information you need. It is therefore important that you be able to modify an existing report. Kyle has explained how placement of controls in the various sections of a report dictate the information displayed. He suggests that you learn about each report section by creating controls to count and sum and then modifying the properties of those controls.

## Counting and Summing in Report Sections

Kyle explains that all reports have a detail section, but a report can also include a report header, a page header, a group header, group footer, page footer, and a report footer section. Each section has a specific purpose and prints in a predictable order in the report.

In Design view, sections are represented as bands, and each section that the report contains is represented once. In a printed report, some sections might be repeated many times. You determine where information appears in every section by placing controls such as labels and text boxes.

The Report header appears once at the beginning of a report. You can use it for items such as a logo, report title, or print date. The Report header is printed before the Page header on the first page of the report. The Page header appears at the top of every page in the report; you use it to display items such as column headings. The Detail section contains the main body of a report's data. This section is repeated for each record in the report's underlying record source. The Page footer appears at the bottom of every page in the report; you use it to display items such as page numbers. The Report footer appears once at the end of the report. You use it to display items such as report totals. The Report footer is the last section in the report design but appears before the Page footer on the last page of the printed report.

Kyle explains that the CategoryName footer generated by the Report Wizard created a text box control for this report that specified not only which CategoryName was being totaled but also how many detail records were in each category section. This was accomplished by using the field name in the control and using the Count function to add up the number of detail records in each
category section. The CategoryName Header describes the field information being grouped below it. In this case you chose to group information by CategoryName. Alternatively, you could have chosen to group the product information by buyer name or supplier name for example.

The formula used in the text box control was $=$ "Summary for " \& "'Category ID' $=" \& ">$ \& [CategoryName] \& " ("\& Count(*) \& "" \& $\operatorname{IIf}(\operatorname{Count}(*)=1, "$ detail record"," detail records") \& ")" In the report, this text box control printed the following result for the first category: "Summary for 'CategoryName' $=1$ ( 5 detail records)". The most important part of the formula is the function Count. To count records in a section, the formula Count ${ }^{(*)}$ is used. The \& symbol is used to separate text from fields, and the IIf function changes the final text to read either record or records, depending on whether one or more records were counted.

The CategoryName footer also included a text box control to sum the total value for each category (note that the Report footer included the identical text box control). The placement of the control in the CategoryName footer caused the control to calculate the total value for each category, while the control placed in the Report footer caused that control to calculate the total value for the entire report.
"Why don't you use the report you just created to experiment on modifying report sections by adding a control to sum the quantity of each category and adding a control to count all detail records in the entire report?" Kyle suggests.

## To modify report sections to sum and count:

## 1 Right-click Report 4 and then click Design View.

2 Right-click the Sum Of TotalCost control in the CategoryName footer, click Properties, and note that the format is set to Currency by clicking the Format drop-down list as shown. Currency (see Figure 13.14).


3 With the Property Sheet still open, click the Sum control in the Report footer and note that the format of this control is also already set to currency.

Figure 13.14
Formatting the Sum Control


Figure 13.15
Creating a New Control in a Report

7 Click inside the new text box control (labeled Unbound) and type $=$ Sum([Quantity]).
8 Delete the new text box control label by clicking in the upper left corner of the label, and then press the [Delete] key.
9 Move and resize the newly created text box to line up with Quantity in the detail section.
10 Click the top of the Grand Total label control in the Report footer to see a move cursor; then, holding the mouse button down, move the label to the right and place it next to the Grand Total amount.
11 Type Report 5 in the Report header, replacing the old title Report 4.
12 Click the File tab, click Save As, then click Save Object As, then click Save As, then type Report 5 as the title and then click OK.
13 Right-click in the bottom section of the Design view under the Report footer and click Properties to display the Property Sheet.
14 Type Report 5 as the caption, replacing the text Report 4.

15 Select the Textbox button in the Controls group of the Design tab of the Ribbon.

16 Click and drag your mouse in the Report footer to create a new text box control.

17 Click inside the new text box control (labeled Unbound) and type $=\operatorname{Count}\left({ }^{*}\right)$.

18 Type Total detail records in the new text box control label.
19 Move and resize the newly created text box to line up with records count in the detail section.
20 Click View and then click Layout View. (This allows you to see the report in a view with the data provided and often makes it easier to align fields and labels.)
21 Click View and then Report View, and then scroll to the bottom of the report. Your screen should look like Figure 13.16.

| Race |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Candice Appleby | 1 | \$950.00 | \$950.00 |  |
| Glide GS | 8 | \$850.00 | \$6,800.00 |  |
| Sleeping One | 4 | \$1,150.00 | \$4,600.00 |  |
| Summary for 'CategoryName' = Race (3 detail records) |  |  |  |  |
| Sum | 13 |  | \$12,350.00 |  |
| River |  |  |  |  |
| Badfish 2 | 2 | \$550.00 | \$1,100.00 |  |
| Zoomer | 5 | \$1,800.00 | \$9,000.00 |  |
| Summary for 'CategoryName' = River (2 detail records) |  |  |  |  |
| Sum | 7 |  | \$10,100.00 |  |
| Surf |  |  |  |  |
| Badfish | 5 | \$450.00 | \$2,250.00 |  |
| Ridley | 3 | \$1,350.00 | \$4,050.00 |  |
| Ripper | 6 | \$1,600.00 | \$9,600.00 |  |
| Summary for 'CategoryName' = Surf (3 detail records) |  |  |  |  |
| Sum | 14 |  | \$15,900.00 |  |
| Total detail records 14 |  | Grand Total | \$50,850.00 |  |
| Friday, September 06, 2013 |  |  |  | Page 1 of 1 |

## Figure 13.16

Bottom Half of Report 5 in Report View

22 Close the report, saving your changes.

Having added controls to Count records and Sum different values, it is now time to modify various properties of those controls like borders, lines, fonts, and so forth.

## Lines, Borders, and Formatting in Report Sections

Access allows you to modify reports by adding lines and modifying properties of existing controls like the font name, size, and weight. Kyle suggests that you and Nathan look over the report you just modified and determine what changes you think would add to its look and usefulness.
"I think it would be nice to better separate each category section with a line," Nathan comments, "and get rid of that border around the grand total."
"I agree," you respond. "We should also have a line above each total for the sum of watches, earrings, et cetera. Plus I would like to change the font style of the controls in the Report footer to Times New Roman, size 10, bold, and italicized."
"How about making the total cost of each category look like currency?" Meagan suggests.
"Go for it!" Kyle exclaims.

## To add lines, modify borders, and change formatting:

1 Right-click Report 5 and then click Design View.
2 Type Report 6 in the Report header, replacing the old title Report 5.
3 Click the File tab and then click Save As, then click Save Object As, then click Save As, then type Report 6 as the title and then click OK.
4 Right-click in the grayed-out section of the Design view under the Report footer and click Properties to display the Property Sheet.
5 Type Report 6 as the caption, replacing the text Report 5; then close the Property Sheet.
6 Click at the top of the Page Footer separator and then with the leftmouse button held down, drag down to increase the size of CategoryName Footer. You may also need to move the Sum label, and two sum controls down a bit and then click the Line tool located in the Controls group of the Design tab of the Ribbon.
7 Click and drag the mouse cursor from just under the label Sum in the CategoryName footer to just under the lower right corner of the $=$ Sum([Total]) text box. A line should appear.
8 With the line selected, click the Format tab of the Report Design Tools section and then select the Shape Outline drop-down list, and then select Line Type and then select Solid (it may already be solid).
9 With the line still selected, click the Format tab of the Report Design Tools section and then select the Shape Outline drop-down list, and then select Line Thickness and then select $\mathbf{1} \mathbf{~ p t}$.

10 With the line still selected, click the Format tab of the Report Design Tools section and then select the Shape Outline drop-down list, and then select a black square to select a color for the line (it may already be black).
11 Click the Line tool again.
12 Add a short line just above the =Sum([Quantity]) control in the Category ID footer. A line should appear. Format the line in the same manner as above.

13 Click View and then Layout View. Your screen should look like Figure 13.17.


Figure 13.17
Adding Lines to Report 6

14 Type Products by Category (in place of Report 6) in the Report header.

15 Click Save in the Quick Access toolbar to save changes to Report 6.
16 Click the File tab, click Print, and then click Print again.
17 Click OK in the Print window to print your report. The printed report should look like Figure 13.18.

| Products by Category |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| CategoryName <br> Flatwater | Product Name | Quantity | Unit cost | Total cost |
|  | Nalu | 3 | \$850.00 | \$2,550.00 |
|  | Veneer Raven | 2 | \$750.00 | \$1,500.00 |
| Summarv for 'CategorvName' = Flatwater (2 detail records) |  |  |  |  |
| Sum |  | 5 |  | \$4,050.00 |
| Inflatable |  |  |  |  |
|  | Nalu Air | 4 | \$650.00 | \$2,600.00 |
|  | Shubu X | 3 | \$550.00 | \$1,650.00 |
| Summarv for 'CatecorvName' = Inflatable (2 detail records) |  |  |  |  |
| Sum |  | 7 |  | \$4,250.00 |
| Paddles |  |  |  |  |
|  | BW Hybrid | 15 | \$160.00 | \$2,400.00 |
|  | Makani | 12 | \$150.00 | \$1,800.00 |
| Summarv for 'CategorvName' = Paddles (2 detail records) |  |  |  |  |
| Sum |  | 27 |  | \$4,200.00 |
| Race |  |  |  |  |
|  | Candice Appleby | 1 | \$950.00 | \$950.00 |
|  | Glide GS | 8 | \$850.00 | \$6,800.00 |
|  | Sleeping One | 4 | \$1,150.00 | \$4,600.00 |
| Summarv for 'CategorvName' $=$ Race (3 detail records) |  |  |  |  |
| Sum |  | 13 |  | \$12,350.00 |
| River |  |  |  |  |
|  | Badfish 2 | 2 | \$550.00 | \$1,100.00 |
|  | Zoomer | 5 | \$1,800.00 | \$9,000.00 |
| Summarv for 'CateporvName' = River (2 detail records) |  |  |  |  |
| Sum |  | 7 |  | \$10,100.00 |
| Surf |  |  |  |  |
|  | Badfish | 5 | \$450.00 | \$2,250.00 |
|  | Ridley | 3 | \$1,350.00 | \$4,050.00 |
|  | Ripper | 6 | \$1,600.00 | \$9,600.00 |
| Summarv for 'CategorvName' = Surf (3 detail records) |  |  |  |  |
| Sum |  | 14 |  | \$15,900.00 |
| Total detail records 14 |  |  | Grand Tot | \$50,850.00 |

Figure 13.18

## Printed Products by Category Report

18 Close the report window.
"Wow, that was a lot of work," Meagan complains. "Why can't the Report Wizard do all this for us in the first place?"
"Good question," Kyle answers. "Reports have so many variations that the Report Wizard can only begin to create reports. The rest is up to us!"

## End Note

In this chapter you have learned how to use a query to create a report, how to use grouping and summarizing to enhance a report's usefulness, and how to modify a previously generated report so that it will be more useful. Now you are ready to take on the world and create your own solutions to database organization and reporting problems.

## Chapter 13 Questions

1 Why create a report from a query? Why not just print your query results?

2 Can you always add a field from any table to a report based on a query?
3 When creating a report, what does grouping accomplish?
4 When creating a report, what does the process of summarizing accomplish?

5 Is it possible to group more than one item?
6 What do the [ ] (brackets) signify in an Access formula?
7 How do you determine where information appears in a report?
8 What type of control is used in a report to add values?
9 What function is used (and how is it written) to count records in a report?

10 Describe the process of adding lines to a report.

## Chapter 13 Assignments

1 Using the Ch13-02 file, create a report using all the fields present in the Buyer Query. View the data by Product Table with no grouping or summarization in a portrait orientation and adjusting the field width so all fields fit on a page. Title and save the new report as Ch 13 Assignment 1. Print the new report.

2 Create a report using the BuyerName, ProductName, Quantity, UnitCost, and TotalCost fields present in the Buyer query. View the data by Buyers Table and group by BuyerName. Use the summary option feature of Access to the sum TotalCost, showing detail and summary in a stepped layout with portrait orientation and adjusting the field width so all fields fit on a page. Title and save the new report as Ch 13 Assignment 2. Make sure all values are visible, and then print the new report.

3 Open the report created in Assignment 2. Change the title of the report to Products by Buyer. Add lines to separate each buyer. Add a line above the grand total amount. Save the new report as Ch 13 Assignment 3. Make sure all values are visible and then print the new report. Your printed report should look like Figure 13.19.

Figure 13.19
Completed Product by Buyer Report

| Products by Buyer |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Buyer Name | Product Name | Quantity | Unit Cost | Total Cost |
| Fortier |  |  |  |  |
|  | Zoomer | 5 | \$1,800.00 | \$9,000.00 |
|  | BW Hybrid | 15 | \$160.00 | \$2,400.00 |
|  | Nalu | 3 | \$850.00 | \$2,550.00 |
|  | Veneer Raven | 2 | \$750.00 | \$1,500.00 |
| Summarv for 'BuverName' = Fortier (4 detail records) |  |  |  |  |
|  |  | Sum |  | \$15,450.00 |
| Lopez |  |  |  |  |
|  | Ripper | 6 | \$1,600.00 | \$9,600.00 |
|  | Makani | 12 | \$150.00 | \$1,800.00 |
|  | Sleeping One | 4 | \$1,150.00 | \$4,600.00 |
| Summary for 'BuyerName' = Lopez (3 detail records) |  |  |  |  |
|  |  | Sum |  | \$16,000.00 |
| Ng |  |  |  |  |
|  | Ridley | 3 | \$1,350.00 | \$4,050.00 |
|  | Badfish 2 | 2 | \$550.00 | \$1,100.00 |
|  | Badfish | 5 | \$450.00 | \$2,250.00 |
|  | Candice Appleby | 1 | \$950.00 | \$950.00 |
|  | Shubu X | 3 | \$550.00 | \$1,650.00 |
| Summarv for 'BuverName' = Ne ( 5 detail records) |  |  |  |  |
|  |  | Sum |  | \$10,000.00 |
| Smith |  |  |  |  |
|  | Glide GS | 8 | \$850.00 | \$6,800.00 |
|  | Nalu Air | 4 | \$650.00 | \$2,600.00 |
| Summarv for 'BuverName' = Smith (2 detail records) |  |  |  |  |
|  |  | Sum |  | \$9,400.00 |
|  |  | Grand Total |  | \$50,850.00 |

## Chapter 13 Case Problem 1: KELLY'S BOUTIQUE

Note: You must have completed Case 1 in the previous chapter in order to continue working on this case.

In the last chapter you added and modified some forms for Kelly's Boutique. She would now like you to create some new reports. Make the following changes for Kelly using the ch12-03_student_name file you created in Chapter 12. (Note: Open your ch12-03_student_name file and then save it as ch1303_student_name before making the indicated changes.)
a. Kelly would like you to modify an existing query (Ch 11 Kelly Case h) to include the publisher name and then to save the new query as Ch 11 Kelly Case o. Use this new query to generate a report listing all of the field names provided in the query and grouped by publisher, sorted by book title, with no summarizing, in a stepped layout with portrait orientation. Save the newly created report as Ch 13 Kelly Case a and then print the report, making sure that all fields of information are clearly readable before printing.
b. Next, Kelly would like you to add some grouping to the report created in Case 1a. Rather than modify the existing report, create a new report using the Ch 11 Kelly Case o query to generate a report listing only the publisher, book title, quantity, and cost, grouped by publisher and sorted by book title, summing cost in a stepped layout with portrait orientation. Save the newly created report as Ch 13 Kelly Case b and then print the report, making sure that all fields of information are clearly readable before printing.
c. Next, Kelly would like you to use the parameter query created previously (Ch 11 Kelly Case 1) to create a report containing the fields book title and quantify for a specified publisher and viewed by Book Table, sorted by book title, with portrait orientation. Save the newly created report as Ch 13 Kelly Case c. Add a field to count the number of titles for the publisher specified and then sum the quantity of books for that publisher. Add line controls, change the report title, and move controls around so that your report looks like Figure 13.20.

# Books Published by Random House 

Figure 13.20
Report Example for Kelly Case C

Run the report for Random House and then print the report, making sure that all fields of information are clearly readable before printing.

## Chapter 13 Case Problem 2: <br> WINE DEPOT

Note: You must have completed Case 2 in the previous chapter in order to continue working on this case.

In the previous chapter you modified some forms for the Wine Depot. Now Barbara would like you to help her create some new reports. Make the following changes for Barbara using the ch12-04_student_name file you created in Chapter 12. (Note: Open your ch12-04_student_name file and then save it as ch13-04_student_name before making the indicated changes.)
a. Use the Report Wizard to create and print a new report based on the query created in Chapter 11 (Ch 11 Wine Depot Case b), which listed all wine products purchased by Michael Jackson. Include all the fields available from the query, view the data by wine products with no grouping, sorted by type in ascending order, with portrait orientation. Title the report Ch 13 Wine Depot Case a and then print the report, making sure that all fields of information are clearly readable before printing.
b. Use the Report Wizard to create and print a new report that lists the following fields: buyer name, type, winery name, vintage, and quantity. View your data by buyer and then by winery name, in ascending order by type, in stepped layout with portrait orientation. Title the report Ch 13 Wine Depot Case $b$ and then print only page 1 of the report, making sure that all fields of information are clearly readable before printing.
c. Create a new report of product total cost by winery. Using your previous query (Ch 11 Wine Depot Case k) as the basis for this report, include all the fields in that query and view them by winery. Sort the detail by type in ascending order, and add a summary option for total cost (in a Currency format) that shows detail and summary in a stepped layout with portrait orientation. Title the report Ch 13 Wine Depot Case c and then print only the last page of the report, making sure that all fields of information are clearly readable before printing.
d. Modify your previous query (Ch 11 Wine Depot Case k) to be a parameter query by asking the user to specify a type of wine. Save the new query as Ch 11 Wine Depot Case m. Use that query to create a report of costs by type of wine. The report should include all the fields from the query except type. View the data by winery name, in ascending order by SKU, and in a stepped layout with portrait orientation. The report should calculate the sum of total cost for the wine selected. Run the report for Pinot Noir wines. Modify the report to look like Figure 13.21 by adding a line and a Grand Total in the report footer. Then title the report as Ch 13 Wine Depot Case d and print it, making sure that all fields of information are clearly readable before printing.

## Ch 12 Wine Depot Case d

| Name | SKU | Cost | Quantity | Total Cost |
| :--- | :---: | :---: | :---: | :---: |
| Babcock | 11475 | $\$ 17.50$ | 48 | $\$ 840.00$ |
| Melville | 11350 | $\$ 24.00$ | 12 | $\$ 288.00$ |
| Robert Mondovi | 12380 | $\$ 18.00$ | 24 | $\$ 432.00$ |
|  |  | Grand Total | $\$ 1,560.00$ |  |

Figure 13.21
Total Cost of Wines by

Name

## Chapter 13 Case Problem 3: SNICK'S BOARD SHOP

Note: You must have completed Case 3 in the previous chapter in order to continue working on this case.

In the previous chapter you modified some forms for Snick's Board Shop. Now Caitlin would like you to help her create some new reports. Make the following changes using the ch12-05_student_name file you created in Chapter 12. (Note: Open your ch12-04_student_name file and then save it as ch13-05_student_name before making the indicated changes.)
a. Use the Report Wizard to create and print a new report based on the query created in Chapter 12 (Query B), which included all products in CategoryID 1. Include all the fields available from the query, view the data by products with no grouping, sorted by manufacturer name in ascending order, in a tabular layout with portrait orientation. Title the report Report A and then print the report, making sure that all fields of information are clearly readable before printing.
b. Use the Report Wizard to create and print a new report that lists the following fields: ManufacturerName, CategoryName, ProductName, and Price. View your data by manufacturer and then by category, in ascending order by ProductName, in stepped layout with portrait orientation. Title the report Report B and then print only page 1 of the report, making sure that all fields of information are clearly readable before printing.
c. Create a new parameter query that includes the CategoryName, ManufacturerName, ProductName, Quantity, and Price for a CategoryName specified when the query is run. Name this query Query $L$ and then create a new report containing the ManufacturerName, ProductName, Quantity, and Price for a specified CategoryName and viewed by ManufacturerName, sorted by ProductName, with portrait orientation. Be sure to include a summary option which sums the quantity field in detail and summary. Save the newly created report as Report C. Run the report for CategoryName Complete and for CategoryName Longboards, and then print both reports.
d. Create a new query that includes the CategoryName, ProductName, Quantity, Price, and Discount fields. Add a calculated field called DiscountedRetailValue to this query, which computes the quantity times the discounted price (Price x (1-Discount)) formatted as currency. Save the new query as Query M.
e. Now create a report based on Query M that lists the CategoryName, ProductName, and DiscountedRetailValue grouped by CategoryName, sorted by ProductName with a sum of DiscountedRetailValue in the detail and summary portions of the report. Save the new report as Report D.

## Chapter 13 Case Problem 4: ROSEY'S ROSES

Note: You must have completed Case 4 in the previous chapter in order to continue working on this case. In the last chapter you created some forms for the Rosey's Roses. Now the company would like you to help it create some reports to extract information from the database. Make the following changes using the ch12-06_student_name file you created in Chapter 12. (Note: Open your ch1206_student_name file and then save it as ch13-06_student_name before making the indicated changes.)
a. Use the Report Wizard to create and print a new report based on Query D. Include all the fields available from the query, view the data by Grower with no grouping, sorted by product Description in ascending order, in a stepped layout with portrait orientation. Title the report Report A and then print the report, making sure that all fields of information are clearly readable before printing.
b. Use the Report Wizard to create and print a new report that lists the following fields: Grower Name, Type, product Description, and Cost/Unit. View your data by Grower and then by Type, in ascending order by product Description, in stepped layout with portrait orientation. Title the report Report B and then print only page 1 of the report, making sure that all fields of information are clearly readable before printing.
c. Create a new parameter query that includes the Type, Grower Name, product Description, Quantity, and Cost/Unit which asks "For which type?" when the query is run. Name this Query L and then create a new report containing the Grower Name, product Description, Quantity, and Cost/Unit for a specified Type and viewed by Grower Name, sorted by product Description, with a stepped layout and portrait orientation. Be sure to include a summary option which sums the Quantity field in detail and summary. Save the newly created report as Report C. Run the report for Type Shrub and for Type Tree, and then print both reports.
d. Create a new query that includes the Quote Number, Customer Name, product Description, and Quantity Ordered fields. Add a calculated
field called Sales Price which is the Cost/Unit times (1 plus Markup) times ( 1 - Discount). Also include another calculated field called Total Quote which computes the Quantity Ordered times the Sales Price also formatted as currency and 2 decimal places. Save the new query as Query M and then print it. (Hint: be sure to include the Grower table in your query construction.)
e. Now create a report based on Query M that lists all the fields available in that query in a tabular layout and landscape orientation. Save the report as Report D. Using the Design View; delete the two existing controls in the page footer. Now add two textbox controls. Add one which sums the Quantity Ordered (general number format) and one which sums the Quote Totals (currency format) in the report footer. Also add a Totals label, and resize all labels and fields so that your report looks like Figure 13.22.


Save the modified report and print it.

Figure 13.22
Quotes

## Index

\# (pound sign), 26, 352
$\$$ (dollar sign), 28

* (asterisk), 267
$<$ (less than symbol), 273-274
$=$ (equal sign), 273-274
$=,+,{ }^{*}, /, 29$
$=\mathrm{DDB}, 91$
$=\mathrm{IF}, 93$
$=$ PMT, 107-108
$=$ SLN, 85, 86, 92-93
=SUM, 10, 30, 78, 79
=SYD, 95
$>$ (greater than symbol), 273-274


## A

absolute references, 36-38
Access basics, 188-193
Access capabilities and new features, 187-188
accounting examples, 194-196
forms, 211-214
"help" feature, 193-194
queries, 209-211
reports, 214-221
starting Access, 188
tables, 199-209
Access files, starting to work with, 188-193
Access window (graphic), 190
demonstration, 191-192
navigation pane, 191
other Access window items, 191
Quick Access toolbar, 189
ribbon, 190-191
sample form, 196
sample query, 196
start menu, 188-189
Access "Help" feature, 193-194
Access "Help" window, 194
Access window (graphic), 190
accounting examples, 16-22
cash receipts budget, 20
double declining balance depreciation, 19
expense chart, 18
horizontal income statement, 18
inventory listing, 17
loan amortization schedule, 20
predicting future costs, 21-22
present value analysis, 21
straight-line depreciation, 19 trial balance, 17
Accounting Number Format tool, 28
action queries, 286-296. See also queries
delete, 294-295
parameter, 292-294
update, 287-292
activities budget, 131-144
investing and financing, 143-144
operating, 131-143
aging method, 176
allowance for uncollectible accounts, 174-177
annuity table, 164-166
asterisk (*), 267
AutoFill, 34-35
AutoSum, 30-31

## B

balance sheet
horizontal analysis, 69-70
vertical analysis, 62-64
bond amortization schedule, 115-116
borders, 360-362
bound text box, 311
budget. See cash budgeting
Buyers table, modifying, 322

## c

calculated control, 317-321
calculations
computing statistics, 280
displaying results of, 279-281
case problems. See Kelly's Boutique; Snick's Board Shop; Wine Depot
cash budgeting, 131-151
finalizing and formatting, 144-150
investing and financing activities budgets, 143-144
operating activities budget, 131-143
what-if-analysis and goal seeking, 150-151
cash receipts budget, example of, 20
Category Name footer, 356
Category Name header, 357
category table
creating, 203-204
print preview, 208
cells
applying currency format to, 28-29
formatting with double underline, 29
character data, 265-267
chart layout, modifying, 65
charts
column, 70-74
cost behavior, 172
creating, 15-16
depreciation expense, 96-100
depreciation expense charting, 96-100
expense, 18, 64-67
line, 97
modifying layout, 65
check box control, 321-324
bound to a field, 322-324
Click to add header, 12,44
column charts, 70-74
comparing expenses, 71-74
creating, 71-74
editing data source, 73
modifying, 72
printed income statement with, 74
column width, changing, 26-27, 240-241, 331
columns
charts, 70-74
deleting, 38-39
inserting, 38-39
width, 26-27, 240-241
combo box control, 314-317
changing State text box control to, 314-315
changing tab order, 315-317
linked to Supplier table, 327-329
moving controls, 315-317
commands, 6-7, 190
comparison operators, 273-276
component analysis. See vertical analysis
compound criteria, 276-279
cost behavior chart, 172
count query, 285-286
Country text box control, changing, 311-314
currency format, applying, 28
current ratio, 78

## D

data
controlling appearance of, 28-30
editing, 27-28
entering, 24-26, 204-205
manipulating, 34-51
database
changing structure of, 238-249
column width, 240-241
creating, 201
default values, 245-246
documenting, 253-256
field size, 239-240
field's data type, 241-242
formats, 246-249
input masks, 246-249
new database window, 201
row height, 240-241
validation rules, 242-245
Database Documenter, 253
database management system (DBMS), 187
debt-to-equity ratio, 79
declining balance method, 90-91
default values, 245-246
delete queries, 294-295
depreciation, 85-100
calculating, 85-88, 90-96
charting depreciation expense, 96-100
and declining balance method, 90-91
double declining balance, 19, 92-94
schedules, 93-94
straight-line, 19, 96-98
summary, 89-90
what-if-analysis, 88-89
worksheets, 87-88
depreciation calculations, 85-88
declining balance method, 90-91
methods, 92-96
sum-of-the-year's digits, 94-96
using Excel's built-in function, 87-88
design view, 218, 345, 353
Detail section, 356
Documenter window, 253
documenting, forms, 333-334
double declining balance (DDB) depreciation, 92-94
calculating, 92-94
depreciation schedules, 93-94
example of, 19
schedule, 93-94
double underline, 29

## E

editing
data, 27-28
data source, 73
formulas, 32-34
pie chart axis labels, 66
entering information, 24-32
changing column width and row height, 26-27
controlling appearance of data, 28-30
editing data, 27-28
entering data, 24-26
entering formulas and using functions, 30-32
equal sign (=), 273-274
Excel basics
accounting examples, 16-22
data and worksheets, 34-35
entering information, 24-32
Excel capabilities, 4
formulas, 32-34
"help" feature, 15-16
starting Excel, 4-14
Excel files, starting to work with, 4-14
demonstration, 7-10

Excel window (graphic), 6
other Excel window items, 7
page layout view, 10
Quick Access toolbar, 5-6
ribbon, 6-7
sample workbook, 8
saving a worksheet, 9
start menu, 4-5
Excel "Help" feature, 15-16
Excel "Help"' window, 15
Excel window (graphic), 6
expenses, charting depreciation expense, 96-100
expenses chart
example of, 18
pie charts, 64-67
expression, 318

## $F$

F1 function key, 15, 193
field size, 239-240
File menu, 189
File tab, 6
financial statement analysis, 49-50
column charts, 70-74
horizontal analysis, 67-70
and liquidity, 78-79
pie charts, 64-67
and profitability, 76-77
ratio analysis, 74-80
and solvency, 79-80
vertical analysis, 60-64
first financial ratio, calculating, 75-76
fixed costs, calculating, 173-174
footers, 44-45
form control, 312
format (Access), creating, 246-249
format (Excel)
currency format, 28
double underline, 29
Format Painter tool, 28
formatting, report sections, 360-362
forms, 211-214, 308-334
calculated control, 317-321
check box control, 321-324
combo box control, 314-317
creating, 212
documenting, 333-334
labels, 308-311
list box control, 312-314
modifying, 309-311
printing, 214, 332
special combo control, 324-329
subforms, 329-332
text box controls, 308-311
viewing, editing, or adding information, 213-214
Forms Wizard, 330
formulas
editing, 32-34
entering, 30-34
printing, 49-50
viewing, 49-50
functions
F1 function key, 15, 193
IF function, 92
payment function, 110-111
Slope function, 173
SUM, 30-31, 352-356
sum, 352-356
using, 30-32
future costs, predicting, 21-22, 169-174
future value worksheet and table, 166-168

## G

Goal Seek Window, 118
goal seeking, 117-119
greater than symbol ( $>$ ), 273-274
gridlines, 46-48
gross margin, 77
grouping, 347-350
creating report with, 347-348
multiple field, 348-350
groups
Access, 190
cash budget, 147-150
Excel, 6
show/hide, 11

## H

headers, 44-45
Help feature, 15-16
Help window, 15
Hi-Lo method analysis, 170-171
horizontal analysis, 67-70
on balance sheet, 69-70
on income statement, 67-69
horizontal income statement, example of, 17

## I

IF function, 92
income statement
example of, 18
horizontal, 18
horizontal analysis, 67-69
information, entering, 24-32
changing column width and row height, 26-27
controlling appearance of data, 28-30
editing data, 27-28
entering data, 24-26
entering formulas and using functions, 30-32
Input Mask Wizard, 248
input masks, 246-249
inventory cost query, 280
inventory listing, example of, 17
inventory turnover ratio, 78
investing and financing activities budgets, 143-144

## K

Kelly's Boutique, 53-54, 82, 103-104, 126-127, 154-155, 180-181, 224-226, 258-259, 299-301, 336-338, 364-365

## L

labels, 24, 308-311
layout view, 218, 359
less than symbol $(<), 273-274$
liability ratio, 79
line chart, creating, 97
lines, 360-362
liquidity ratios, $75,78-79$
list box control, 312-314
loan amortization schedule, example of, 20
loan and bond amortization, 107-124
bond amortization schedule, 115-116
loan amortization schedule, 108-109
loan calculations, 107-108
monthly periods, $122-124$
names in worksheet, 111-113
present value and bonds, 113-115
scenario manager, 119-121
what-if-analysis and goal seeking, 117-119
what-if-analysis and payment function, 110-111
loan calculations, 107-108
lookup column
identifying fields to be included in, 326
organizing columns in, 326
Lookup Wizard, 325

## M

monthly periods, 122-124
multiple field grouping, 348-350
multiple worksheets, working with, 40-44

N
names in worksheets, 111-113
navigation pane, 191

## 0

OLE field, 236
operating activities budget, 131-143
operating cash payments budget, 141-143
operating cash payments for purchases, 138-140
operating cash receipts budget, 134-136
purchases budget, 136-138
sales and administrative expenses budget, 140-141
sales budget, 132-133
operating cash payments budget, 141-143
operating cash payments for purchases, 138-140
operating cash receipts budget, 134-136

## P

Page footer, 356
Page header, 356
page setup, 46-48
parameter queries, 292-294
payment function, 110-111
percent of sales method, 175-176
pictures, adding to table, 237-238
pie charts, 64-67
creating, 65
editing axis labels, 66
of expenses, 64-66
modifying chart layout, 65
and vertical analysis income statement, 67
Pivot Table feature, 13
pound sign (\#), 26, 352
present value analysis, 21
present value and bonds, 113-115
present value worksheet and table, 161-166
and annuity, 164-165
proof of lump sum present value, 162-163
proof of present value calculations, 161
present/future value analysis, 160-168
future value worksheet and table, 166-168
present value worksheet and table, 161-166
print preview, 46-48
Print Table Definitions window, 254
printing, 45-50
forms, 214, 332
formulas, 49-50
print preview and page setup, 46-48
queries, 211, 296
reports, 220-221
tables, 208-209
workbook, 48
worksheets, 48-49
product form, 212
product query, 211
product report, 217. See also reports
design view, 218
layout view, 218
product table, 201
adding OLE field to, 236-237
adding pictures to, 237-238
adding unit price field and related unit prices to, 287
creating, 201-202
modifying, 325-327
profit margin, 77
profitability analysis, 75, 76-77
purchases budget, 136-138

## Q

queries, 209-211, 264-296
action, 286-296
calculations in, 279-286
character data in, 265-267
comparison operators in, 273-276
compound criteria in, 276-279
count query, 285-286
creating, 209-211
creating report with, 343-347
by design, 267
editing, 269-272
inventory cost query, 280
limiting output in, 276-279
printing, 211, 296
sorting in, 273-276
sum query, 281-285
wild cards in, 267-269
Query Design tool, 267-268
Query Wizard, 267
Quick Access Toolbar, 6
Quick Access toolbar, 189
quick ratio, 78

## $R$

ratio analysis, 74-80
calculating first financial ratio, 75-76
liquidity and, $75,78-79$
profitability and, 75-78
solvency and, 75
receivable turnover ratio, 78
records
adding, 233-234
changing, 234
deleting, 234-235
referential integrity, 250-256
relationships, 205-208
established, 207
relationships window, 207
relative references, 36-38
Report footer, 356
Report header, 356
report sections, 359
borders, 360-362
counting and summing in, 356-360
formatting, 360-362
lines, 360-362
report view, 359
Report Wizard, 215, 344-345, 351-352
reports, 214-221, 343-362
creating, 215-217, 343-347
design view, 217, 345, 353
editing, 217-220
grouping in, 347-350
layout view, 359
modified design view, 346
modifying, 356-362
printing, 220-221
report view, 359
resized report in print preview, 220
resizing fields in, 219
selecting sort order for, 216
summarizing in, 350-356
return on owners' investment, 75
return on total investment, 76-77
Ribbon, 6-7, 190-191
commands, 6,190
groups, 6, 190
tabs, 6, 190
Rosey's Roses, 58-59, 84, 105-106, 129-130,
158-159, 183-184, 229-231, 262-263, 304-307,
341-342, 368-369
row height, changing in Access, 240-241
in Excell, 26-27
rows, 26-27 deleting, 38-39
height, 26-27, 240-24
inserting, 38-39

## S

sales and administrative expenses budget, 140-141
sales budget, 132-133
saving a worksheet, 9
scenario manager, 119-12
screen
resolution, 10
size, 10-13
select queries. See queries
Show/Hide Group, 11
Simple Query Wizard, 210
Slope function, 173
Snick's Board Shop, 56-58, 83-84, 105, 128-129,
157-158, 182-183, 227-229, 261-262, 303-304,
339-341, 367-368
solvency ratios, 75, 79-80
special combo control, 324-329
changing Supplier ID field's data type, 325-327
modifying Product table, 325-327
starting Access. See Access files, starting to work with
starting Excel. See Excel files, starting to work with
State text box control
changing, 314-315
property sheet for, 315
straight-line depreciation, 19
charting, 96-98
and DDB depreciation schedule, 93
subforms, 329-332
SUM function
Access, 352-356
Excel, 30-31
sum query, 281-282. See also queries
by category, 283
creating, 281-282
of quantities by category, 284-285
summarizing, 350-356
Report Wizard, 351-352
sum functions, 352-356
summary worksheets, 42-43
sum-of-the-year's digits, 94-96
Supplier form. See also forms
form view of modified, 311
increasing size of, 310
modifying, 308-331
separating label from control, 310
viewing, 309
supplier table
combo box control linked to, 327-329
creating, 202-203
SYD. See sum-of-the-year's digits
system date, 45

## T

tables, 199-209, 232-256
adding OLE field to, 236-237
adding picture with OLE field, 235-238
adding pictures to, 237-238
adding records to, 233-234
changing records in, 234
changing structure of database, 238-249
creating category table, 203-204
creating product table, 201-202
creating supplier table, 202-203
deleting records in, 234-235
entering data into, 204-205
printing, 208-209
referential integrity, 250-256
relationships, 205-208
tabs, 6, 190
text box controls, 308-311
changing to combo box control, 314-315
changing to list box control, 311-314
trial balance
and entering information, 24-26
example of, 17
opening, 24-25
partially completed, 25
U
uncollectible accounts, allowance for, 174-177
update queries, 287-292. See also queries
adding unit price field and related unit prices to product table, 287
to increase product prices by 5 percent, 288-289
to update reorder levels, 289-292

## v

validation rules, 242-245
value analysis, present/future, 160-168
values, 24
variable cost per day, calculating, 173-174
vertical analysis, 60-64
on balance sheet, 62-64
on income statement, 60-62
viewing
additional worksheets in workbook, 13-14
formulas, 49-50
information, 213-214
page layout view of the Excel window, 11
Supplier form, 309

## W

weekly worksheets, 43-44
What SUP, Inc., 3, 24, 60, 85, 107, 131, 160, 187 199, 232, 264, 308, 343
what-if-analysis, 88-89 and depreciation, 88-89 and goal seeking, 117-119 and goal seeking with cash budget, 150-151 using payment function, 110-111
window
page layout view of, 11 size, 10
Wine Depot, 54-56, 83, 104, 127-128, 155-156, 181-182, 226-227, 259-261, 302-303, 338-339, 365-367
workbook
printing, 48
sample, 8
viewing additional worksheets, 13-14
worksheets
absolute reference, $36-38$
columns, 38-39
depreciation, 87-88
depreciation summary, 89-90
footers, 44-45
headers, 44-45
names in, 111-113
print preview and page setup of, 46-48 printing, 48-49
printing and viewing formulas in, 49-50
rows, 38-39
saving, 9
structuring, 34-51
summary, 42-43
viewing additional, 13-14
weekly, 43-44
working with multiple, 40-44


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