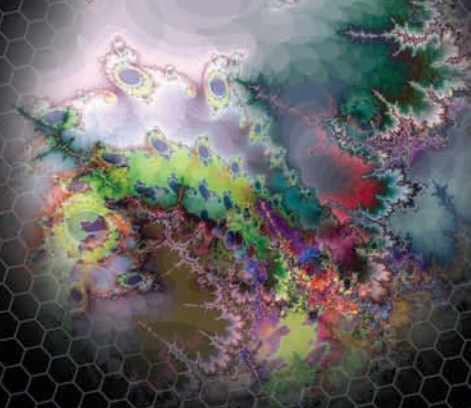# Beginning
Pivot Tables
in Excel 2007

Debra Dalgleish

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The source code for this book is available to readers at http://www.apress.com in the Source Code/ Download section.

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About the Author

■**DEBRA DALGLEISH** is a computer consultant in Mississauga, Ontario, Canada, serving local and international clients. Self-employed since 1985, she has extensive experience in designing complex Microsoft Excel and Microsoft Access applications and sophisticated Microsoft Word forms and documents. She has led hundreds of Microsoft Office corporate training sessions, from beginner to advanced level.

For her contributions to the Excel newsgroups, she has been recognized as a Microsoft Office Excel MVP each year since 2001. You can find a wide variety of Excel tips, tutorials, and sample files on her Contextures web site at `www.contextures.com/tiptech.html`.

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Following an honors degree in agricultural economics and business management, Roger gained a lot of hands-on experience of management running companies both for himself and for other private and public companies. During this time, Roger developed a lot of accounting skills and focused on control through the better utilization of company data.

He has been involved with computing from 1980, and since 1997 most of his work has centered on Excel. Microsoft recently awarded Roger the prestigious MVP status as recognition of his Excel skills and help to the community through newsgroups.

Acknowledgments

Many people helped me as I worked on this book. Above all, love and thanks to Keith, who convinced me I could do it again, and to Jason, Sarah, Neven, and Dylan for their encouragement and for providing a few hours of diversion from the task at hand.

Many thanks to my wonderful editor, Dominic Shakeshaft, who challenged me when I needed it most and who steered me in the right direction when I veered off track. Special thanks to Roger Govier, who did a fantastic job of the technical review and whose enthusiasm kept me motivated.

Thanks also to the great people at Apress: Richard Dal Porto, who kept everything on track; Kim Wimpsett, who polished the text; and Katie Stence, who made it all look terrific on the printed page.

Many thanks to Dave Peterson, from whom I've learned much about Excel and who bravely tested some of the examples in this book. Thanks to Jon Peltier, who has shown me a thing or two about charts and flood insurance and who convinced me to start writing about pivot tables. Thanks to Ron Coderre, who generously shared his pivot table add-in on my web site and inspired me to explore connections to external data.

Thanks to my clients, who remained patient as I juggled projects and writing and who continue to challenge me with interesting assignments.

Finally, thanks to my parents, Doug and Shirley McConnell, and my sister, Nancy Nelson, for their continued love, support, and chocolate. And thanks to Brad, Robert, and Jeffrey Nelson for their cross-country marketing efforts on my behalf.

Introduction

Excel's pivot tables are a powerful tool for analyzing data. With only a few minutes of work and no previous experience, you can create an attractively formatted report that summarizes thousands of rows of data. This book guides you through the process of planning and creating a pivot table; enhancing it with formatting, calculations, and special settings; and creating a polished final report.

Even if you've used pivot tables in previous versions of Excel, much has changed in Excel 2007. The user interface is dramatically different, and pivot tables have many new features. Instead of struggling to find things on your own, you can use this book to accelerate the process of learning how things work in the new version.

Who This Book Is For

This book is for anyone who has little or no experience with pivot tables or who has used pivot tables in earlier versions of Excel and wants to learn about the new features in Excel 2007. It's designed to take you from the planning stages to the final product. A variety of sample data is used in the book to show how pivot tables can help you create reports for different industries or departments and many types of data.

How This Book Is Structured

Starting with the planning process in Chapter 1, this book leads you through the process of designing, modifying, and formatting a pivot table. Several different examples are used to show you what you can achieve with a few simple steps. The following is a brief summary of the material contained in each chapter:

- Chapter 1, "Introducing Pivot Tables": Understanding what a pivot table is and what benefits it provides. Preparing to create a pivot table by organizing the data in a formatted Excel table. Exploring the features and benefits of a formatted Excel table.

- Chapter 2, "Creating a Pivot Table": Taking the first steps in building a simple pivot table from your data. Changing the pivot table layout and creating a simple pivot chart.

- Chapter 3, "Modifying a Pivot Table": Using report filters to limit the data that is summarized. Updating a pivot table when data is added or changed. Changing the summary function that is used in the pivot table. Applying a pivot table style to enhance the report's appearance.

- Chapter 4, "Summarizing Data": Using different summary functions to report on the data. Showing and hiding the grand totals. Creating subtotals in the pivot table and changing the subtotal function. Grouping numbers and dates in the report.

- Chapter 5, "Formatting a Pivot Table": Using report layouts and pivot table styles to change the pivot table's appearance. Creating custom pivot table styles. Using themes to affect the workbook's colors and fonts.

- Chapter 6, "Sorting and Filtering in a Pivot Table": Adding and arranging multiple report filters. Filtering row and column labels and removing filters. Filtering for a dynamic date range, such as Last Month. Filtering values in the total column. Applying manual filters and filtering by selection. Showing a selection of top or bottom items. Sorting labels and values.

- Chapter 7, "Creating a Pivot Table from External Data": Creating a pivot table from data in a text file, an Access query, or an OLAP cube. Modifying the connection. Creating a pivot table from an existing connection.

- Chapter 8, "Updating a Pivot Table": Updating a pivot table when the source data changes. Refreshing all the pivot tables in a workbook. Changing the Access data source. Refreshing a pivot table at regular intervals. Saving the source data with the Excel file. Retaining deleted items in the pivot table filter lists.

- Chapter 9, "Creating Calculations in a Pivot Table": Creating custom calculations, such as Running Total In, % of Row, and % Difference From. Creating and modifying calculated fields and calculated items. Listing the formulas used in a pivot table and changing the solve order for calculated items.

- Chapter 10, "Enhancing Pivot Table Formatting": Applying conditional formatting using color scales, icon sets, and data bars. Changing pivot table settings to control column widths, visible items, and label buttons.

- Chapter 11, "Creating a Pivot Chart": Creating and modifying a default pivot chart. Adding fields and changing the chart style. Formatting a pivot chart and adding titles and labels. Adding trend lines and creating a dynamic chart title.

- Chapter 12, "Printing and Extracting Data from a Pivot Table": Extracting underlying records from a value cell by using the Show Details feature. Creating multiple copies of a pivot table by using the Show Report Filter Pages feature. Printing a pivot table. Adjusting the print options to achieve the best results. Using the GetPivotData function to extract specific data from a pivot table. Using cell references in a GetPivotData formula.

Prerequisites

The instructions in this book are written for Microsoft Excel 2007. Basic skills in Excel 2007 are assumed, and no previous knowledge of pivot tables is required.

Downloading the Code

Sample workbooks and code are available on the Apress web site at `www.apress.com`.

Contacting the Author

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■■■■

Introducing Pivot Tables

Using a pivot table in Microsoft Office Excel 2007 is a quick and exciting way to slice and dice a large amount of data. With it, you can turn your data inside out, upside down, sideways, and backwards to see how your business is doing. You can examine the data for similarities, differences, highs, and lows. What's going up, what's going down, and what's staying the same? Compare one region to another, view key results for several years of data, or zero in on one product's sales results. Make a few quick changes to the pivot table, and you can see your data from a completely different angle.

Pivot tables are even easier to use in Excel 2007 than they were in previous versions. With just a few clicks of the mouse and no complex formulas, you can summarize thousands of rows of data to show sums, averages, or other calculations. In this chapter, you'll get an overview of what pivot tables are, how you can benefit from using them, and how to prepare your data in Excel so you can use it as the source for a pivot table.

What Is a Pivot Table?

A *pivot table* is a tool in Excel that helps you summarize many rows and columns of data into a concise report. In Figure 1-1, you can see the first few of several thousand rows of data about food sales. Each row details what was sold, where it was sold, and the date and amount of the sale.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	OrderDate	Region	City	Store	Category	Product	Qty	LowFat	LowCal	TotalCost	SellPrice	Promo	Discount	TotalPrice	Profit
2	03-Jan-06	South	Dallas	3005	Cookies	Oatmeal Raisin	88	No	No	96.8	249.92	No	0	249.92	153.12
3	03-Jan-06	East	Boston	3000	Cookies	Chocolate Chip	59	No	No	43.66	110.33	No	0	110.33	66.67
4	03-Jan-06	West	San Diego	3659	Cookies	Chocolate Chip	28	No	No	20.72	52.36	No	0	52.36	31.64
5	03-Jan-06	North	Chicago	3055	Snacks	Potato Chips	43	No	No	27.95	72.24	Yes	14.45	57.79	44.29
6	03-Jan-06	East	Boston	3000	Bars	Carrot	39	Yes	No	27.69	69.03	No	0	69.03	41.34
7	03-Jan-06	South	Miami	3045	Crackers	Whole Wheat	58	Yes	No	81.2	202.42	No	0	202.42	121.22
8	03-Jan-06	North	Detroit	3074	Bars	Bran	73	Yes	Yes	52.56	136.51	No	0	136.51	83.95
9	03-Jan-06	South	Miami	3045	Snacks	Potato Chips	34	No	No	22.1	57.12	Yes	11.42	45.7	35.02

Figure 1-1. *The food sales data*

If you were asked to create a report from this data, with a count of orders for each region per product category where there was a promotional discount, you could manually list all the regions and product categories and then enter complex formulas to calculate the number of orders. If you create a pivot table instead, the report could be ready with a few clicks of the mouse.

With a pivot table, you simply drop the data into one of four areas, as shown in Figure 1-2. When you do this with the food sales data, row and column labels for the regions and product categories will be automatically created, and the orders will be counted. And you can add a filter to view only the orders with a promotional discount, instead of all the orders.

Figure 1-2. *The four areas of a pivot table*

In Figure 1-3, you can see a pivot table that summarizes the thousands of rows of food sales data, showing the counts of discounted orders.

From the report filter at the top of the pivot table, Yes has been selected so only the orders with a promotional discount are counted. The Grand Total row/column shows that there are 718 discounted orders. Bars and cookies have the highest number of discounted orders, and the West region has the lowest number of discounted orders.

	A	B	C	D	E	F
1	Promo	Yes				
2						
3	Count of OrderDate	Column Labels				
4	Row Labels		Bars	Cookies	Crackers	Snacks	Grand Total
5	East		97	71	18	13	199
6	North		81	114	21	69	285
7	South		81	61	19	10	171
8	West		34	25	1	3	63
9	Grand Total		293	271	59	95	718

Figure 1-3. *A pivot table summarizes the food sales data.*

With a few more mouse clicks, you could quickly pivot the data to see a different summary. For example, your marketing director may ask how the sales of low-fat cookies are going in each of the cities you service. You could remove the regions from the pivot table and put in the cities. Instead of product categories as headings across the columns, you could show the Yes and No columns for low-fat items. To focus on cookie sales, you would move the product category to the report filter area and select Cookies.

In a minute or two, you could e-mail a report to the marketing director to show that the low-fat cookies are selling about half as well as the non-low-fat cookies (see Figure 1-4).

	A	B	C
1	Category	Cookies ☜	
2			
3	Sum of TotalPrice	Column Labels ▾	
4	Row Labels ▾	No	Yes
5	Boston	42,261	16,496
6	Chicago	37,824	24,382
7	Dallas	34,464	9,046
8	Detroit	24,623	11,694
9	Houston	27,174	9,039
10	Los Angeles	33,975	9,941
11	Miami	45,318	18,978
12	New York	35,439	15,997
13	Philadelphia	33,452	13,793
14	Phoenix	4,246	3,841
15	San Diego	16,078	3,965
16	Seattle	30,669	8,685
17	Grand Total	365,523	145,857

Figure 1-4. *The food sales data summarized by city*

Anxious to see whether the low-fat cookies sales are getting better or worse, the marketing director asks for the numbers broken down by year to see whether sales are increasing or decreasing. You simply add the order date to the pivot table and summarize the sales by year (see Figure 1-5). The pivot table shows that in most cities, the sales for low-fat cookies are increasing. Overall, the sales are increasing for low-fat and non-low-fat products.

	A	B	C	D	E
1	Category	Cookies ☜			
2					
3	Sum of TotalPrice	Column Labels ▾			
4		⊟ No		⊟ Yes	
5	Row Labels ▾	2006	2007	2006	2007
6	Boston	15,554	26,707	7,244	9,252
7	Chicago	15,557	22,266	12,729	11,653
8	Dallas	10,841	23,624	3,306	5,740
9	Detroit	10,415	14,208	4,101	7,593
10	Houston	11,104	16,070	3,569	5,470
11	Los Angeles	15,069	18,906	4,262	5,679
12	Miami	18,445	26,873	7,749	11,229
13	New York	14,141	21,298	5,430	10,566
14	Philadelphia	11,982	21,469	4,425	9,367
15	Phoenix	1,534	2,712	710	3,130
16	San Diego	5,742	10,335	560	3,405
17	Seattle	12,369	18,300	3,298	5,387
18	Grand Total	142,754	222,768	57,385	88,473

Figure 1-5. *The food sales data summarized by city and year*

You get one more phone call, just as you're heading out the door. The vice president of sales is flying to Chicago and wants a summary of the product sales in that market. What direction is each product's sales headed, and what are the market's strengths and weaknesses?

Again, you pivot the data, moving a few fields to different positions in the layout. This time you show the sales for one year as a percent change from the previous year to give a quick snapshot of the sales directions (see Figure 1-6). The sales of bars increased by 11.16 percent, and the sales of cookies increased by 19.92 percent; however, potato chips sales have declined. The Grand Total row shows that there is an overall increase in sales.

	A	B	C
1	City	Chicago 🔽	
2			
3	Sum of TotalPrice	Column Labels 🔽	
4	Row Labels 🔽	2006	2007
5	⊟ Bars		11.16%
6	Banana		-15.95%
7	Bran		-8.53%
8	Carrot		38.75%
9	⊟ Cookies		19.92%
10	Arrowroot		-8.45%
11	Chocolate Chip		89.78%
12	Oatmeal Raisin		24.39%
13	⊟ Crackers		9.51%
14	Cheese		
15	Saltines		6.78%
16	Whole Wheat		6.47%
17	⊟ Snacks		11.38%
18	Potato Chips		-21.10%
19	Pretzels		221.20%
20	Grand Total		13.97%

Figure 1-6. *Percent change per year in the food sales data*

The vice president of sales is happy with the report you created and asks you to create a visual summary to use in the Chicago meeting. The chart should show the totals per year for each product category in the Chicago area. You make a couple of quick changes to the pivot table, press a key on the keyboard, add a title, and your pivot chart is ready (see Figure 1-7).

The vice president of sales leaves for the airport, ready for the Chicago meeting, and you are relieved that you completed all those last-minute jobs without having to stay late!
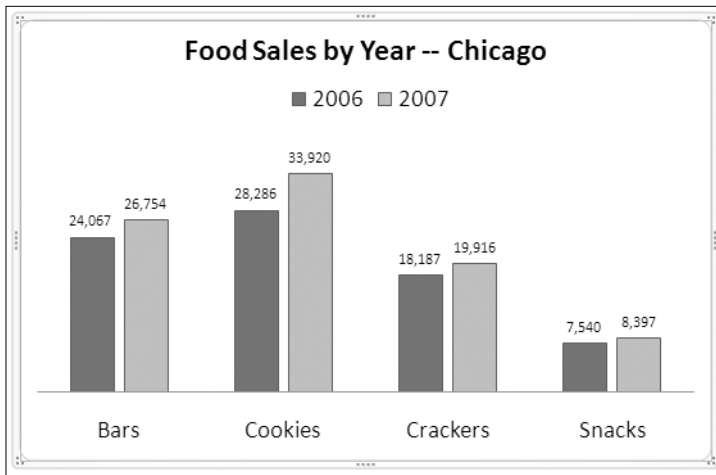
Figure 1-7. *Quickly create a chart from the pivot table data.*

Understanding the Benefits of Using Pivot Tables

Some people avoid using pivot tables because they're convinced they are complicated and difficult. Those people are missing out on one of Excel's most powerful and easy-to-use features. While they're spending hours writing complex formulas to summarize their data, you can summarize the data in a pivot table in a minute or two with a few clicks of the mouse. With pivot tables, you can prepare a sophisticated report from last night's sales data before today's 9 a.m. meeting.

This book will guide you as you dive into using pivot tables, and it will use different examples to point out many ways you can use pivot tables to report on your business or personal data. Although pivot tables are easy to use, they also have many sophisticated reporting features that may not be easy to discover or to understand exactly how they work. The later examples in this book are designed to explain those enhanced features and show how you can benefit from using them.

Whether you're working with financial data, logistics records, sales orders, customer service reports, web site statistics, resource tracking, event planning, or any other set of records, a pivot table might help you review, analyze, monitor, and report on the data. When the reporting requirements change, you can make minor adjustments to the pivot table instead of starting a worksheet summary from scratch. The examples in this book may inspire you to experiment with your own data and help make your job easier.

If you have used earlier versions of Excel, you'll immediately notice that many features have changed in Excel 2007. Pivot tables are among the features that have undergone a radical transformation, including the way they're created; Excel 2007 also offers new and improved formatting tools and easier ways for connecting to data that's outside Excel. In this book, you'll thoroughly explore the pivot table features that are available through the user interface. A basic knowledge of Excel 2007 is assumed, and only those features that interact with pivot tables, such as formatted Excel tables and conditional formatting, will be explained in the main text. The appendix contains additional instructions for key Excel 2007 skills.

Preparing to Create a Pivot Table

Before you can create a pivot table, you need to collect your data and organize it in a way Excel can use. Your data may already be in the correct format, or you may have to do a little or a lot of preparation before you can create a pivot table from your data. The data can be organized in an Excel workbook, in an external database, or in other sources…even in a text file. I'll start by outlining the requirements for setting up the data. There aren't too many rules, but it's important to set up the source data correctly. Investing in a little preparation time will ensure that you get the best results from the pivot tables you build.

Planning for Source Data in Excel

Many pivot tables are created from worksheet data in Excel, such as the food sales data shown in Figure 1-1, and most of the examples in this book will use similarly arranged data in Excel as the source for a pivot table. First you'll review the requirements for setting up the source data in Excel, and in later chapters you will see how to create a pivot table from data outside Excel. The source data can consist of a few rows and columns or thousands of rows and many columns, but the basic layout requirements are similar (see "Organizing Data in Rows and Columns").

The first example you'll see involves policy information for an insurance company. When you sell a new policy, you record information such as the start and end dates of the policy, the type of business that was insured, where the policy was purchased, and the value of the property that was insured. You want to analyze the policy data to see what type of businesses are insured in each region and what the total insured value is for each type of building. You'll open a sample file with data that illustrates the source data layout requirements that follow.

Opening the Sample File

To work with this example, you can download and open the sample file named `InsurancePolicies.xlsx` available at the `www.apress.com` web site.

If you are unable to download the sample file, you can create your own data, as described in the following steps. However, the examples will be easier to follow if you use the sample file. If you downloaded the sample file, you can skip the following steps.

1. In Excel, to create a new workbook, click the Microsoft Office Button at the top left of the Excel window (see Figure 1-8).

Figure 1-8. *The Microsoft Office Button*

2. Click New to open the New Workbook dialog box.

3. In the list of templates, select Blank and Recent.

4. In the center pane, click Blank Workbook, and then click the Create button.

5. Starting in cell A1 on Sheet1, enter the headings and data shown in Figure 1-9. This is only a small view of a large table, so this data will not produce the same results as the downloaded sample file.

	A	B	C	D	E	F	G	H	I	J	K
1	Policy	Start	Expiry	Location	State	Region	InsuredValue	Construction	BusType	EQ	Flood
2	100200	02-Jan-07	28-Dec-07	Urban	NY	East	$ 1,425,000	Masonry	Apartment	N	N
3	100201	02-Jan-07	25-Dec-07	Urban	NY	East	$ 11,575,700	Frame	Apartment	Y	Y
4	100202	02-Jan-07	23-Dec-07	Urban	NJ	East	$ 3,750,000	Frame	Apartment	Y	Y
5	100203	02-Jan-07	22-Dec-07	Rural	NY	East	$ 3,724,339	Frame	Farming	N	N
6	100204	02-Jan-07	21-Dec-07	Urban	WI	Midwest	$ 1,400,000	Masonry	Organization	N	N
7	100205	02-Jan-07	30-Nov-07	Rural	WI	Midwest	$ 4,064,995	Masonry	Farming	N	N
8	100206	02-Jan-07	28-Nov-07	Urban	NY	East	$ 5,213,100	Frame	Apartment	Y	Y
9	100207	02-Jan-07	26-Nov-07	Urban	WI	Midwest	$ 212,700	Frame	Apartment	Y	N

Figure 1-9. *The insurance policy data*

Organizing Data in Rows and Columns

The Excel data to be used as the source for a pivot table must be organized in rows and columns, with each row containing information about one record, such as a sales order or inventory transaction. In this example, each row, or *record*, contains information about one insurance policy.

The information in each record is stored in the same order, with the policy number in the first column, the start date in the second column, and other data continuing across the columns. The first row contains headings to indicate what information is stored in each column. Each column can also be called a *field*, and the headings in the first row are the *field names*.

In Figure 1-9 you can see eight records in the insurance policy data and eleven columns, or fields. The last visible record is for policy 100207, and it has an entry of N in the Flood field. In the sample file there are 11 columns and 927 rows of data.

Adding Column Headings

Each column in the source data must contain a heading. The heading can be one word or multiple words, and all characters are allowed. You should use a short, descriptive, unique heading for each column in the source data. The headings should indicate the specific data that is contained in the column. For example, in the sample file, EQ is a concise heading for the column that indicates whether earthquake coverage is included.

■**Note** If you try to create a pivot table from data that has blank heading cells, you will see an error message.

Although you can use the same heading for multiple columns, that might cause confusion for you and anyone else who is using the pivot table. If headings are duplicated, Excel will add numbers to make them unique when you create a pivot table.

Entering Similar Data in Each Column

Each column in the source data should contain one type of data. In the insurance policy example, column B contains dates, column G contains currency, and column H contains text.

Separating Data into Multiple Columns

To create an effective pivot table, some of the source data should be separated into multiple columns, instead of using a single column. For example, instead of having a column labeled Address, with the full address for each record, use three columns—one for Street, another for City, and another for State. Then you will be able to analyze the data by city or state instead of having that information buried in with the street address.

Removing Repeated Columns

Don't create multiple columns to store the same type of information. For example, because there is a separate column for each region's dollar amounts in Figure 1-10, it will be difficult to analyze the data by region in a pivot table.

	A	B	C	D	E	F	G
1	Policy	Start	Construction	East	Midwest	Central	Northeast
2	100200	02-Jan-07	Masonry	$ 1,425,000			
3	100201	02-Jan-07	Frame			$ 11,575,700	
4	100202	02-Jan-07	Frame	$ 3,750,000			
5	100203	02-Jan-07	Frame				$ 3,724,339
6	100204	02-Jan-07	Masonry		$ 1,400,000		
7	100205	02-Jan-07	Masonry		$ 4,064,995		

Figure 1-10. *Data in repeating columns will make it difficult to analyze by region.*

Although the data arrangement in Figure 1-10 may be ideal for creating totals on the worksheet, it's not efficient if the data will be analyzed in a pivot table. Instead, all the related dollar amounts should be in the same column, with the region name in another column. The data arrangement in Figure 1-11 will make it easier to analyze the data by region in a pivot table.

	A	B	C	D	E
1	Policy	Start	Construction	Region	InsuredValue
2	100200	02-Jan-07	Masonry	East	$ 1,425,000
3	100201	02-Jan-07	Frame	Central	$ 11,575,700
4	100202	02-Jan-07	Frame	East	$ 3,750,000
5	100203	02-Jan-07	Frame	Northeast	$ 3,724,339
6	100204	02-Jan-07	Masonry	Midwest	$ 1,400,000
7	100205	02-Jan-07	Masonry	Midwest	$ 4,064,995

Figure 1-11. *Related data in a single column will make it easier to analyze by region.*

To help you decide whether something should be a column heading or an entry in the record, think about how you want that item to appear in the pivot table and how you want to summarize the data. Is the item a broad category name, such as Region, or does it describe a quality of the information that's stored in the column, such as Midwest? Do you want to create a total from the numbers in all the columns? If you find yourself creating several columns with different names to store the same type of information that you want to total in the pivot table, as in Figure 1-10, then it's likely that the headings should be changed to entries in a single column, as in Figure 1-11.

Entering Related Data in Each Row

Each row in the source data should contain the details for one record, such as a sales order (or in this example, an insurance policy). If possible, include a unique identifier for each row, such as an order number or policy number. This will make it easier to track the information that's summarized in the pivot table and do any troubleshooting later, if required.

Creating an Isolated Block of Data

The source data should not have any blank rows within it and cannot include any completely blank columns. If you want a column within the source data to appear blank for aesthetic reasons, it must at least contain a heading, which can be formatted with the same font color as the cell fill color to appear as though it is blank.

    The source data should be separated from any other data on the worksheet, with at least one blank row and one blank column between it and the other data. The ideal situation is to have only the source data on the worksheet and move other data to a separate worksheet. In the insurance policies file, there are no blank columns or rows in the data, and there is no other data on the worksheet.

Creating an Excel Table

As a final step in preparing the source data, you will create an Excel table from the data on the worksheet. This will activate special features in the source data, such as the ability to automatically extend formulas as new rows are added to the end of the existing data. In the next chapter, you'll create a pivot table from this formatted Excel table.

1. Select a cell in the table of insurance policies data.

2. On the Ribbon, click Insert to activate the Insert tab.

3. In the Tables group, click the Table command (see Figure 1-12).

■**Note** Do not click the Pivot Table command now. You'll create a pivot table later.
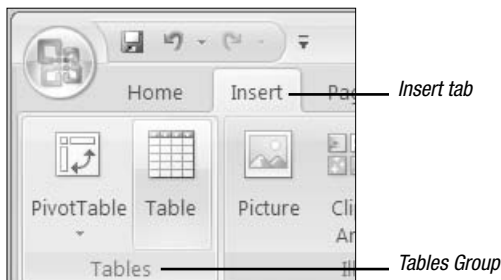
Figure 1-12. *The Table command on the Insert tab in the Ribbon*

4. In the Create Table dialog box, the range for your data should automatically appear, and the My Table Has Headers option will be checked. Click OK to accept these settings (see Figure 1-13).
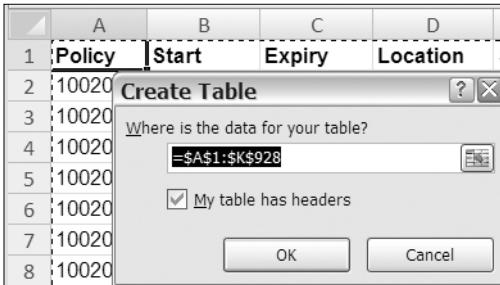
Figure 1-13. T*he Create Table dialog box*

5. The Excel table is automatically formatted with a table style, which may include row shading, borders, and heading cells formatted differently than the other rows. The heading cells have drop-down arrows that you can use to sort or filter the data (see Figure 1-14).

Figure 1-14. *The table is automatically formatted.*

■**Note** The Excel table formatting does not overwrite any existing formatting that you had manually applied to the data.

---

6. You can drag the resize handle at the bottom right of the last row in the table to make the table larger or smaller (see Figure 1-15).

Figure 1-15. *The resize handle at the bottom right of the table*

Exploring the Excel Table Features

Using Excel's table feature makes it easier to maintain the source data for a pivot table. In an Excel table, if you add rows or columns, the new data is automatically included when you update the pivot table. If you base a pivot table on unformatted source data, new rows or columns may not be detected, and you would have to manually adjust the source data range to ensure that the new data is included in the pivot table. Or, you might forget to adjust the source data range to include the new data, and the pivot table could show inaccurate results.

Because using Excel's table feature makes it easier to maintain the source data for a pivot table, you should base your pivot tables on formatted tables where possible. We'll spend some time exploring the formatted table so you can see how its features can help you.

New Rows Are Automatically Included

If you add data at the end of an Excel table, the table range automatically expands to include the new data. You can test this feature with your table.

1. Scroll down to the first blank row at the end of the table, and type the next policy number in column A to start entering a new record.

2. Press the Tab key to move to the next cell; the row is formatted, and the Excel table expands to include the new row (see Figure 1-16). The resize handle is now located in the new row.

923	101121	31-Dec-07	31-Dec-08	Urban	VT	Northeast	$
924	101122	31-Dec-07	31-Dec-08	Urban	OH	Central	$
925	101123	31-Dec-07	31-Dec-08	Urban	NY	East	$
926	101124	31-Dec-07	31-Dec-08	Urban	NY	East	$
927	101125	31-Dec-07	31-Dec-08	Urban	NY	East	$
928	101126	31-Dec-07	31-Dec-08	Urban	WI	Midwest	$
929	101127						

Figure 1-16. *The new row is automatically formatted.*

Headings Are Automatically Created for New Columns

If you expand the Excel table to the right to add columns to the table, column headings are automatically added for you. If you plan to create a pivot table from an Excel table, every column must have a heading. This feature will create temporary headings for you, which you can change to something more descriptive.

1. Scroll down the worksheet until you can see the last row of data, and point to the resize handle at the bottom right of the table.

2. When the pointer changes to a two-headed arrow, hold the left mouse button and drag to the right until you reach the right border of column L (see Figure 1-17).

Figure 1-17. *Drag the resize handle to the right to add a column.*

3. Release the mouse button, and Excel automatically formats column L to match the other columns in the table. Excel automatically adds a numbered column heading, Column1, in cell L1.

Deleting Rows and Columns

In an Excel table, you can easily delete rows and columns you no longer need. You'll delete the new row and column that you created, because they don't contain any data.

1. Select a cell in the last row of the Excel table. This row contains the policy number you entered but no other data.

2. On the Ribbon, click Home to activate the Home tab.

3. In the Cells group, click the arrow on the Delete command.

4. Click Delete Table Rows (see Figure 1-18) to delete the active row in the Excel table.
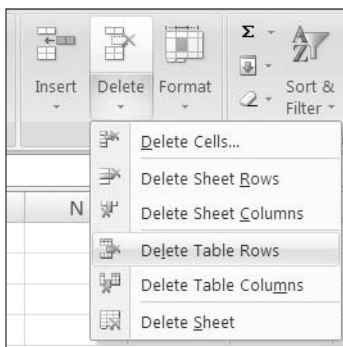
Figure 1-18. *Delete a row in the Excel table.*

Next, you'll delete the column you added at the right side of the Excel table:

1. Select a cell in the last column of the Excel table. This column contains a heading but no other data.

2. On the Ribbon, click Home to activate the Home tab.

3. In the Cells group, click the arrow on the Delete command.

4. Click Delete Table Columns to delete the active column in the Excel table.

Headings Remain Visible

Another advantage of using an Excel table is that the column headings in the first row of the table remain visible when you scroll down the worksheet. This makes it easier to identify the columns as you work in a large table.

1. Scroll down the worksheet until the first row is no longer visible, and then click one of the formatted cells in the Excel table.

2. Look at the column buttons at the top of the columns, and you'll see that the column letters have been replaced with the column headings that were entered in the first row (see Figure 1-19).

	Policy	Start	Expiry	Location
923	101121	31-Dec-07	31-Dec-08	Urban
924	101122	31-Dec-07	31-Dec-08	Urban
925	101123	31-Dec-07	31-Dec-08	Urban
926	101124	31-Dec-07	31-Dec-08	Urban
927	101125	31-Dec-07	31-Dec-08	Urban
928	101126	31-Dec-07	31-Dec-08	Urban

Figure 1-19. *Column buttons show the column heading text.*

■**Tip** The column headings are visible only in the column buttons when the first row is not visible and a cell in the Excel table is active. Click outside the Excel table, and the column buttons show their letters.

Table Is Automatically Named

An Excel table is automatically named, as in Table1, when it is created. You can refer to this name when programming or when creating a pivot table. You can leave the table name that was created, but in this example you'll change it to something more meaningful:

1. To see the table name, select a cell in the Excel table.

■Note When a cell in an Excel table is the active cell, the Ribbon displays a context tab named Table Tools. Under the Table Tools tab is a Design tab, which contains commands you can use while working with the Excel table.

---

2. On the Ribbon, under the Table Tools tab, click Design to activate the Design tab. At the far left, in the Properties group, is the table name (see Figure 1-20).
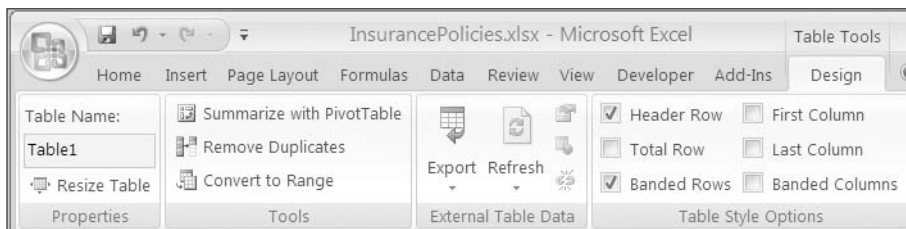
Figure 1-20. *Table name in the Design tab (under the Table Tools tab) of the Ribbon*

■Tip To make more room for the worksheet, you can hide the Ribbon commands temporarily. Double-click the active Ribbon tab to hide the commands (or to show the commands if they've previously been hidden).

Now that you've seen the Excel table name that was automatically assigned, you'll rename the Excel table so it will be easier to identify each table if other tables are added to the workbook. Later, you can look for this name when creating a pivot table, or you can use the name to navigate to the source Excel table.

1. In the Ribbon, select the existing name in the Table Name box.

2. With the existing name highlighted, type **Insurance** as a new name for the table.

3. Press the Enter key to complete the table name change.

■Tip If possible, create a short descriptive name for each Excel table. This will make it easier to identify later if there are multiple Excel tables in the workbook.

Data Is Easily Sorted

An Excel table's heading cells contain drop-down lists that let you quickly and easily sort the data in the table. This feature can help you review the data before creating a pivot table or when troubleshooting a pivot table. For example, you can sort the insured values to quickly spot the highest and lowest amounts in the table.

1. Press Ctrl+Home to return to cell A1, or scroll up to the first row so the drop-down arrows in the first row are visible.

2. Click the drop-down arrow in the Insured Value heading cell.

Note The drop-down arrows are not visible in the column heading buttons, only in the column heading cells.

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3. Click Sort Largest to Smallest (see Figure 1-21).
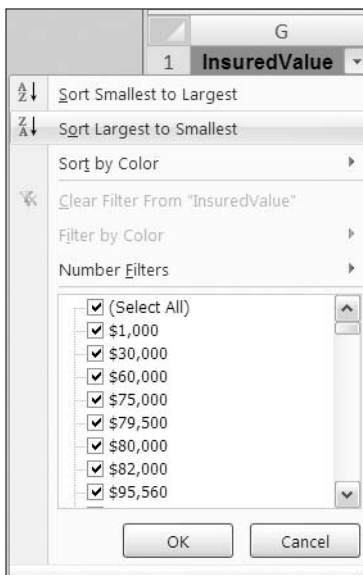
Figure 1-21. *Sorting largest to smallest*

The entire table is sorted, with records with the highest insured values at the top of the table and lowest insured values at the bottom. The heading cell's drop-down arrow now includes a small downward arrow to show that the data is sorted in descending order (see Figure 1-22).

Figure 1-22. *Arrow indicating that data is sorted in descending order*

Even if multiple cells are selected, the selection is ignored, and the entire Excel table is sorted. This prevents the problems that could occur when cells in one column of an unformatted table are sorted and the data in that column becomes detached from the rest of the record. For example, in a regular table, a user might select and sort a column of telephone numbers but not include the columns that contain the related name and address.

Data Is Easily Filtered

An Excel table's heading cells contain drop-down lists that let you quickly and easily filter the data in the table. This feature can help you review the data before creating a pivot table or when troubleshooting a pivot table. For example, you can filter the Region column to view only the policies that were written in the Central region.

1. Press Ctrl+Home to return to cell A1, or scroll up to the first row so the drop-down arrows in the first row are visible.

2. Click the drop-down arrow in the Region heading cell.

3. In the list of regions, remove the check mark from (Select All). This removes all the check marks from the list.

4. Add a check mark to Central, and then click OK (see Figure 1-23).
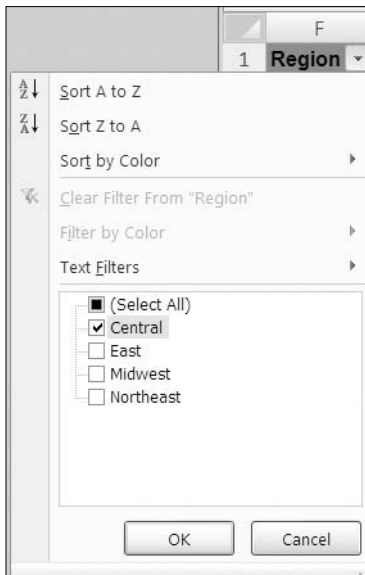
Figure 1-23. *Filtering for the Central region*

The Excel table is now filtered, with only the Central region records showing. The Region heading cell's drop-down arrow now shows a filter icon to indicate that the data in that column has been filtered (see Figure 1-24). To view the filter information, point to the drop-down arrow in the Region heading cell.

Figure 1-24. *Filter icon showing column has a filter applied*

Removing a Filter to View All the Data

After filtering an Excel table, to focus on part of the data, you can remove the filter to view all the data again:

1. In the Excel table, click the drop-down arrow in the Region heading cell.

2. Click the Clear Filter from "Region" option.

This removes the filter from the column, and all the regions are visible again. The Filter icon is no longer visible on the arrow in the column heading cell.

Saving the File

Excel 2007 offers some new file formats. You can save a file in the default file format by choosing Excel Workbook from the list of formats. The file will have an `.xlsx` file extension and can be opened in Excel 2007. Users with older versions of Excel may not be able to open the file. If you want those users to be able to open the file, you can save it as Excel 97-2003 Workbook Format. Some features from the Excel 2007 file may be lost if the file is saved in this format.

■**Note** If a pivot table is created in Excel 2007 format, it will have view-only properties in earlier versions.

You should save your file now using a different file name. That will leave the original file unchanged, and you can use the new file for your work in the next chapter.

1. Click the Microsoft Office Button at the top left of the Excel window.

2. Point to Save As, and then click Excel Workbook to open the Save As dialog box.

3. In the Save As dialog box, select a folder from the Save In drop-down list.

4. Name the file **InsurancePolicies02.xlsx**, and then click the Save button.

5. Close the file or continue to Chapter 2, where you'll create a pivot table from the Excel table.

Summary

A pivot table is a powerful Excel tool that you can use to quickly analyze a large quantity of data. It's easy to get started using pivot tables and to create one with a few clicks of the mouse. Once you understand the basics, you can explore the more sophisticated reporting features that pivot tables offer.

Before creating a pivot table, set up a data source in Excel or another program. To create an effective pivot table, ensure that the source data is structured correctly and meets the following requirements.

- The data is organized in rows and columns.

- Each column has a unique, descriptive heading.

- There is similar data in each column.

- Data, such as address detail, is separated into multiple columns.

- There are no repeating columns, such as region names, storing similar data.

- Each row contains the related data for one record.

- The data is an isolated block on the worksheet.

The best way to prepare the source data is to format it as an Excel table, which will automatically expand as data is added. The Excel table tools provide an easy way to sort and filter the data, so you can review the data for the pivot table or troubleshoot if problems occur.

CHAPTER 2

■ ■ ■ ■

Creating a Pivot Table

In this chapter, you'll get up and running with pivot tables so you can see how quickly and easily you can build and modify them. You'll create a simple pivot table from the insurance policy Excel table you created in Chapter 1. After creating the pivot table, you'll examine its key features and see how you can quickly change the pivot table layout to get a different view of the data. You'll create a pivot chart from the pivot table data to create a visual summary that will make the data easy to understand at a glance.

Exploring an Insurance Policy Example

In this example, you'll use the insurance policy Excel table from Chapter 1, which you saved in the file named InsurancePolicies02.xlsx. If you did not create the file, you can download it at the www.apress.com web site.

Your company sells insurance policies in four different regions. The claims manager wants to know which region has the highest total of insured value for the policies sold. In the insurance data, the region names are in column F, with a column heading of Region. The insured values are in column G, with the heading InsuredValue (see Figure 2-1).

	A	B	C	D	E	F	G	H	I	J	K
1	Policy	Start	Expiry	Location	State	Region	InsuredValue	Construction	BusType	EQ	Flood
2	100200	02-Jan-07	28-Dec-07	Urban	NY	East	$ 1,425,000	Masonry	Apartment	N	N
3	100201	02-Jan-07	25-Dec-07	Urban	NY	East	$ 11,575,700	Frame	Apartment	Y	Y
4	100202	02-Jan-07	23-Dec-07	Urban	NJ	East	$ 3,750,000	Frame	Apartment	Y	Y
5	100203	02-Jan-07	22-Dec-07	Rural	NY	East	$ 3,724,339	Frame	Farming	N	N
6	100204	02-Jan-07	21-Dec-07	Urban	WI	Midwest	$ 1,400,000	Masonry	Organization	N	N
7	100205	02-Jan-07	30-Nov-07	Rural	WI	Midwest	$ 4,064,995	Masonry	Farming	N	N
8	100206	02-Jan-07	28-Nov-07	Urban	NY	East	$ 5,213,100	Frame	Apartment	Y	Y
9	100207	02-Jan-07	26-Nov-07	Urban	WI	Midwest	$ 212,700	Frame	Apartment	Y	N

Figure 2-1. *Insurance policies data*

To find the region totals without a pivot table, you would list the regions in a column on a worksheet and then use formulas to sum the insured values. Another formula would sum the regional totals to create a grand total. The result would look similar to the example in Figure 2-2, where one of the formulas is displayed.

	A	B	C	D	E
1					
2	**Region**	**Insured Value**			
3	Central	$ 114,784,594			
4	East	$ 3,391,212,078			
5	Midwest	$ 774,460,695			
6	Northeast	=SUMIF(Insurance[Region],A6,Insurance[InsuredValue])			
7	**Total**	$ 4,546,318,323			
8					

Figure 2-2. *Worksheet formulas summarize the insurance data.*

Instead of building the summary manually, you'll create a pivot table to achieve the same result quickly and easily. First, you'll create an empty pivot table. Then, you'll drop the data into the pivot table to create the region labels and total the insured value.

■**Note** If you used your own data or created your own file in Chapter 1, your workbook may not match the figures in this book.

---

1. Open the InsurancePolicies02.xlsx file you created or downloaded.

2. On Sheet1, select a cell in the formatted Excel table.

3. On the Ribbon, under the Table Tools tab, click the Design tab.

4. In the Tools group, click Summarize with PivotTable (see Figure 2-3).
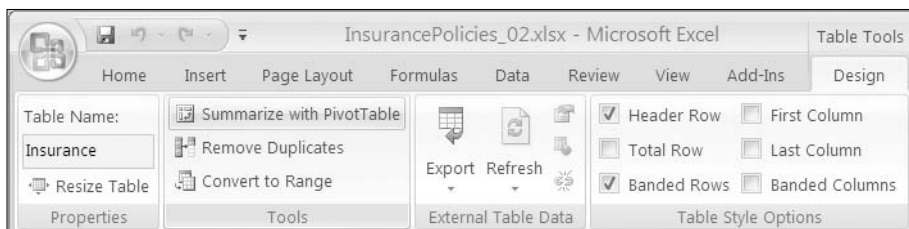
Figure 2-3. *The Summarize with PivotTable command*

5. In the Create PivotTable dialog box that opens, under Choose the Data That You Want to Analyze, the option Select a Table or Range is selected, and in the Table/Range box the name of the active table, Insurance, appears (see Figure 2-4). Leave this value unchanged.

■**Note** If a cell in an Excel table or the entire Excel table is selected when you start to create a pivot table, that Excel table is shown as the default source range for the pivot table. If you want to use a different table or range, you can type an Excel table name or range address in the Table/Range box.
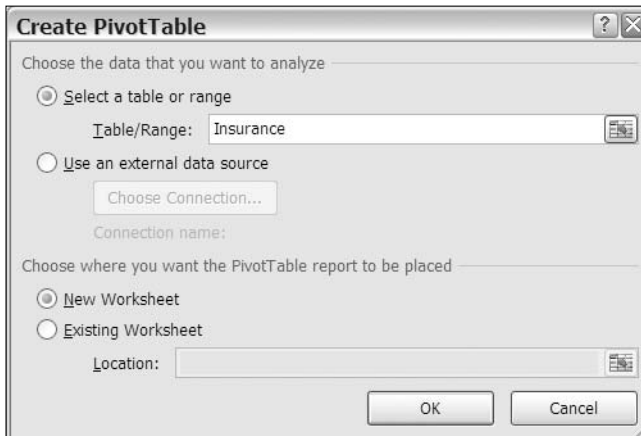
Figure 2-4. *Create PivotTable dialog box*

> **6.** Under Choose Where You Want the PivotTable Report to Be Placed, New Worksheet is the default selection. Leave that option selected, and click the OK button.

Creating the PivotTable Layout

When the Create PivotTable dialog box closes, Excel inserts a new worksheet in the workbook using the next available sheet number. In this example, the new worksheet is named Sheet4. The outline of an empty pivot table starts in cell A3. At the right of the Excel window, the PivotTable Field List pane appears (see Figure 2-5).

■**Tip** If the PivotTable Field List pane is not visible, select a cell in the empty pivot table.
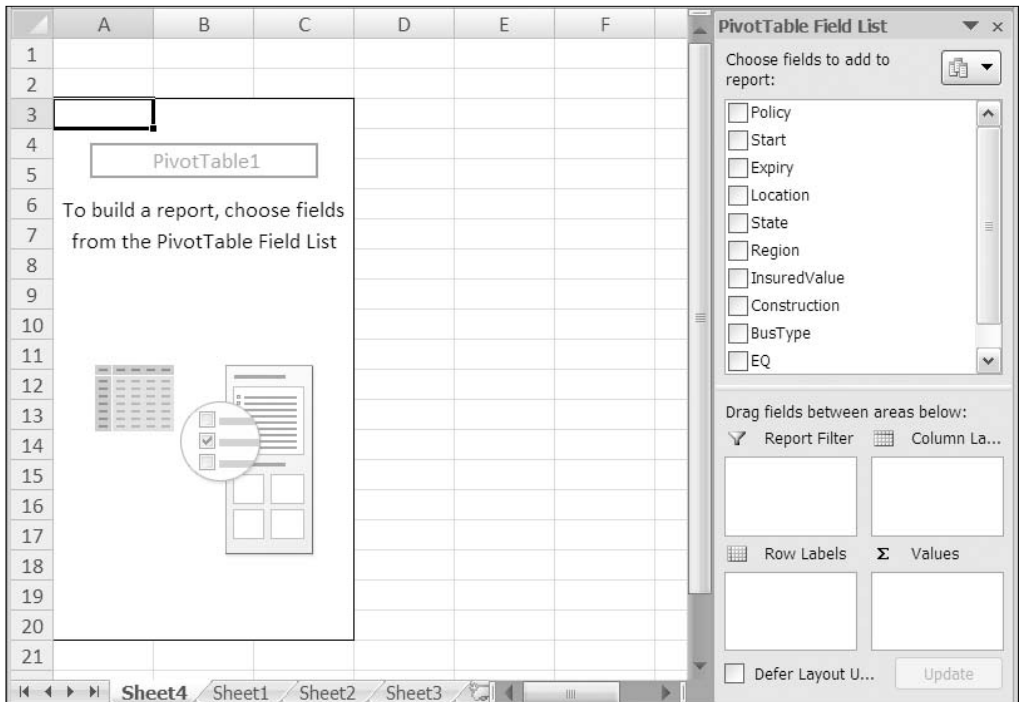
Figure 2-5. *The empty pivot table and the PivotTable Field List pane*

At the top of the PivotTable Field List pane is a list of the column headings from your Excel table; they appear in the same order as in the Excel table. In the pivot table, these are called *fields*.

At the bottom of the PivotTable Field List pane are the four areas of the pivot table: Report Filter, Column Labels, Row Labels, and Values. You will drop the fields into these areas, and they'll appear in the matching area of the pivot table layout on the worksheet (see Figure 2-6).

Figure 2-6. *The Report Filter, Column Labels, Row Labels, and Values areas in the pivot table layout*

Adding Fields to the Pivot Table Layout

In the pivot table example, you want to see a list of regions with the total insured value for each region. When planning a pivot table, you'll decide which fields you should use, and then you'll determine where each field should be dropped in the pivot table layout.

The region names are in the Region field, so that's one of the fields you'll need for this pivot table. The other field required is the InsuredValue field, which will provide the dollar amounts for the summary.

Because you want a list of region names down the left side of the pivot table, the Region field should go in the Row Labels area. To see a sum of InsuredValue amounts, that field should go in the Values area.

Once you've made the design decisions, you can add the fields to the pivot table layout by using the PivotTable Field List pane.

1. At the top of the PivotTable Field List pane, in the list of fields, add a check mark to the Region field.

2. Because it contains text data, the Region field is automatically added to the Row Labels area at the bottom of the PivotTable Field List pane. On the worksheet, the region names appear in the Row Labels area of the pivot table layout (see Figure 2-7).
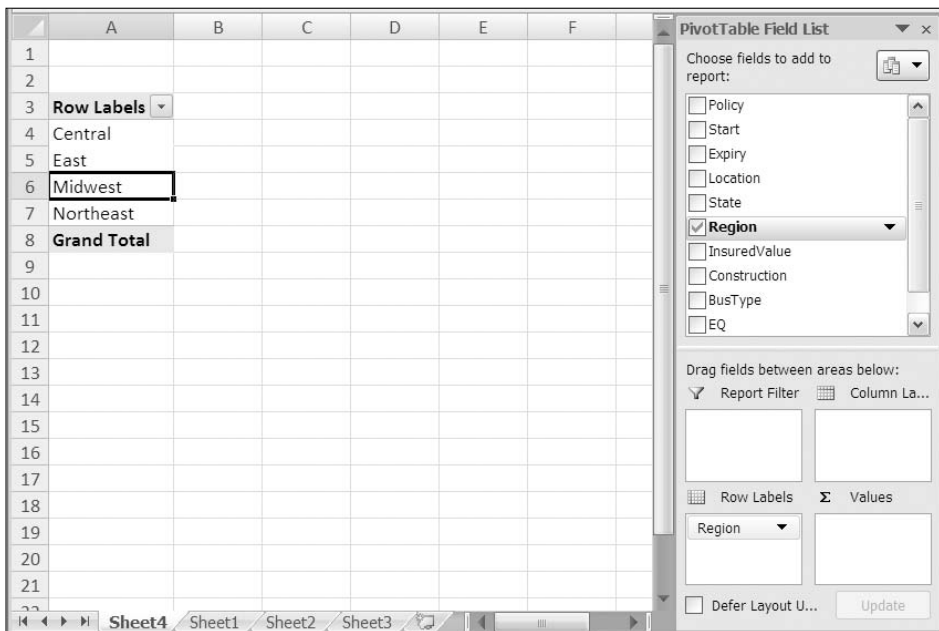
Figure 2-7. *Row Labels added to the pivot table layout*

3. Next, in the PivotTable Field List pane, add a check mark to the InsuredValue field. Because it contains numbers, the InsuredValue field is automatically added to the Values area of the PivotTable Field List pane.

■**Note** Based on the type of data they contain, fields are added to a specific area of the pivot table by default. You can manually place a field in a different area of the pivot table, as you'll see later in the "Moving Fields in the Pivot Table Layout" section.

4. On the worksheet, Sum of InsuredValue appears in the Values area of the pivot table, showing the total insured value for each region (see Figure 2-8).

■**Note** With just a few clicks of the mouse and no complex formulas, you summarized almost 1,000 records to show the total insured value per region. This ability to quickly and easily summarize data is one of the key benefits of using pivot tables.

Figure 2-8. *Adding values to the pivot table*

Changing the Pivot Table Layout

One of the advantages of using pivot tables to summarize data is that it's easy to change the pivot table layout after you've created it. You created a pivot table that summarizes the insured value by region. Next, you'll change the pivot table layout to view other summaries of the data, and you'll see how quickly and easily you can create a different summary.

The underwriting manager is concerned about the fire risk in the insured properties and has asked you for a report on the total insured value for each construction type. In the Excel table, the Construction column shows the construction type for each insured property. You can quickly change the pivot table layout to show a summary for the Construction field.

Currently, the Region field is in the Row Labels area. You'll remove it and drop the Construction field in the Row Labels area instead.

1. In the PivotTable Field List pane, remove the check mark from Region.

2. The Row Labels area disappears from the pivot table on the worksheet, and the Sum of InsuredValue area shows the grand total for all records.

3. In the PivotTable Field List pane, add a check mark to the Construction field.

4. The Row Labels area now shows the construction types, and the Sum of InsuredValue area shows the total insured value for each construction type (see Figure 2-9).

Row Labels ▾	Sum of InsuredValue
Fire Resist	766249835
Frame	2903697652
Masonry	682291853
Metal Clad	194078983
Grand Total	**4546318323**

Figure 2-9. *Change the field in the Row Labels area to see a different summary.*

You send this report to the underwriting manager to show that frame-construction buildings comprise almost two-thirds of the total insured value of all the policies sold.

Adding More Fields to the Pivot Table

After receiving your report, the underwriting manager asks you for more detail. Policies are sold for buildings in urban and rural locations, and your report would be more helpful if it showed the insured values by construction type broken down by location type. Are the frame buildings in urban locations, where fire departments can respond quickly?

Currently, Construction is the only field in the Row Labels area, so the pivot table shows total insured value for all the insurance policies of each construction type. To view the summary in greater detail, you can also add the Location field to the Row Labels area to show the insured value by construction and location (urban or rural).

1. In the PivotTable Field List pane, add a check mark to the Location field.

2. The Location field is added to the Row Labels area in the PivotTable Field List pane, below the Construction field.

3. In the pivot table layout on the worksheet, the Row Labels area shows each construc-tion type as a heading, and below each construction heading is a list of location types. The location labels are slightly indented, or *nested*, below the Construction labels. The Sum of InsuredValue area shows a total for each construction type and a total for each location type within that construction type (see Figure 2-10).

Row Labels	▾	Sum of InsuredValue
⊟ Fire Resist		766249835
Rural		2562500
Urban		763687335
⊟ Frame		2903697652
Rural		420513555
Urban		2483184097
⊟ Masonry		682291853
Rural		60764804
Urban		621527049
⊟ Metal Clad		194078983
Rural		80495532
Urban		113583451
Grand Total		4546318323

Figure 2-10. *Multiple row labels provide a more detailed summary.*

You send this more detailed report to the underwriting manager to show that most of the frame-construction buildings are in urban locations. Only a small percentage of the policies for frame-construction buildings are in rural locations.

Moving Fields in the Pivot Table Layout

The underwriting manager appreciates the work you're doing and is pleased you can adjust your reports so quickly. However, the manager has one more request—the total insured value for each location type in addition to the total insured value for the construction types.

Currently, with two fields in the Row Labels area, the pivot table is arranged like a report with headings and subheadings. If you had one set of headings down the left side of the pivot table and another set of headings across the top, you could create totals down the columns and across the rows. If you created the table manually, with formulas, it would be similar to the sample shown in Figure 2-11, where you can see the formula for cell B6 in the Formula Bar above the worksheet.

| B6 | ▾ | *fx* | =SUMPRODUCT(--(Insurance[Location]=B$2),--(Insurance[Construction]=$A6),(Insurance[InsuredValue])) |

	A	B	C	D	E	F	G
1							
2	Region	Rural	Urban	Total			
3	Fire Resist	$ 2,562,500	$ 763,687,335	$ 766,249,835			
4	Frame	$ 420,513,555	$ 2,483,184,097	$ 2,903,697,652			
5	Masonry	$ 60,764,804	$ 621,527,049	$ 682,291,853			
6	Metal Clad	$ 80,495,532	$ 113,583,451	$ 194,078,983			
7	Total	$ 564,336,391	$ 3,981,981,932	$ 4,546,318,323			
8							
9							

Figure 2-11. *Worksheet formulas create totals across rows and down columns.*

To create this arrangement in your pivot table, you will move the Location field from the Row Labels area to the Column Labels area. The locations will become labels across the top of the pivot table layout. The revised layout will show the same detail but will include the location totals that the underwriting manager needs.

1. In the PivotTable Field List pane, in the Row Labels area, point to the Location field.

2. When the pointer changes to a four-headed arrow, drag the Location field to the Column Labels area (see Figure 2-12).
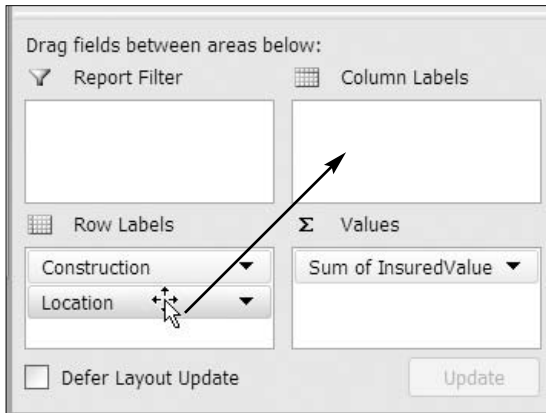
Figure 2-12. *Drag a field to the Column Labels area.*

3. The pivot table layout changes. The Row Labels area now shows only the construction types, and across the top are column labels showing the location types (see Figure 2-13).

Figure 2-13. *The pivot layout with row labels and column labels*

4. At the bottom of the pivot table is a Grand Total row, which shows the total insured value for each location type. At the right side of the pivot table is a Grand Total column that shows the total insured value for each construction type. The cell at the bottom right of the PivotTable is the grand total for insured values.

   Although the layout is different, you can compare Figure 2-10 to Figure 2-13 to see that
the totals in the Values area are the same. For example, the total insured value for Rural
Masonry is $60764804 in both layouts.

   With this layout, you can show the underwriting manager that frame-construction build-
ings have the highest total insured value, and urban locations have a higher total insured
value than rural locations.

Charting the Data in a Pivot Table

The underwriting manager is satisfied with the report and finds the location totals helpful for
analyzing the insurance policy data. To help explain the results to the executive committee,
the manager asks whether you can create a chart to illustrate the results.

   In Chapter 11 you'll learn about pivot charts in detail, but to accommodate the manager's
request, you'll create a simple chart from the current pivot table:

1. Select a cell in the pivot table.

2. On the keyboard, press the F11 key.

3. Excel inserts a chart sheet, Chart1, in the workbook, with a pivot chart based on the
   current pivot table. The Construction field row labels have become the category axis
   fields, and the Location field column labels have become series in the chart (see
   Figure 2-14). A *series* is a group of related values, like Urban, which is represented by
   the light-colored columns.
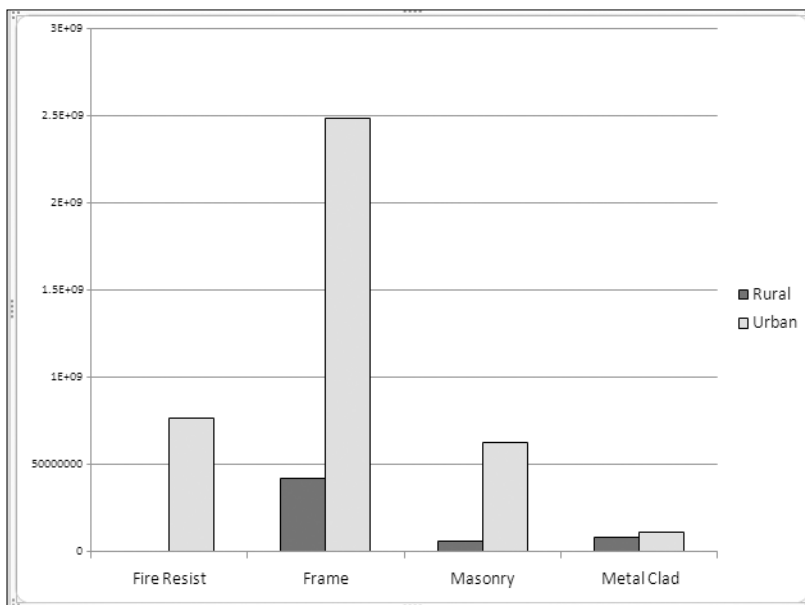
Figure 2-14. *A pivot chart provides a visual summary of the data.*

The pivot chart, at a glance, shows that policies for frame-construction buildings in urban locations are by far the largest portion of the policies that have been sold. The insured value for fire-resistant buildings in rural locations is so low that the column isn't visible in the chart.

You can save your file now as `InsurancePolicies03.xlsx`. That will leave the original file unchanged since its last save, and you can use the new file for your work in the next chapter. Close the file or continue to Chapter 3, where you'll modify the pivot table you created in this chapter.

Summary

In this chapter, you learned to create a pivot table, and then you added fields as row labels, column labels, and values. You also changed the pivot table layout by moving fields from one area to another.

With just a few clicks of the mouse and no complex formulas, you summarized almost 1,000 records to show the total insured value of policies per region and discovered just how powerful pivot tables are in analyzing data.

Finally, you created a pivot chart from the pivot table to obtain an effective visual summary of the pivot table data.

CHAPTER 3

■ ■ ■

Modifying a Pivot Table

In this chapter, you'll modify the insurance data pivot table you created in Chapter 2 by adding and removing fields and by filtering the pivot table so only specific data is summarized. You'll see what happens when the data in the source table changes, and you'll learn how to view a different type of summary for the values. You'll use a built-in formatting feature to change the appearance of the pivot table, and you'll see how to delete a pivot table if you no longer need it.

By the end of this chapter, I'll have covered the basic of creating and modifying a pivot table. In the remaining chapters, you'll explore the pivot table features in depth so that you fully understand all that a pivot table can do.

To work with the examples in this chapter, you can open the `InsurancePolicies03.xlsx` file you saved at the end of Chapter 2, or you can download and open the sample file `InsurancePolicies03.xlsx`.

Changing a Pivot Table

Sometimes you will create a pivot table and leave it in the same layout for many months without changing the fields. Weekly or monthly, you'll update the data, and you'll either review the results or distribute a report based on the pivot table summary.

Other pivot tables will change frequently because you use them to create ad hoc reports, answering the business questions of the day, as you did in Chapter 2 when you analyzed the insurance policy data by region and then by construction type and location. In this chapter, you'll use the same data and pivot table to create more ad hoc reports by using different fields to summarize the data.

Clearing a Pivot Table

There is a threat of flooding in the Midwest region, and you have been asked to report on the insured values in each region for policies with and without flood coverage. You'll clear the contents of the pivot table, and then you'll create a new layout to produce the requested report.

■**Note** You can also remove the existing fields individually by clearing the check boxes in the PivotTable Field List pane.

---

1. Select a cell in the pivot table on Sheet4.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Actions group, click Clear, and then click Clear All (see Figure 3-1).
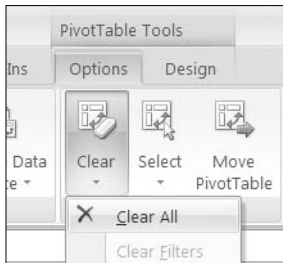
Figure 3-1. *Clear the pivot table layout.*

4. The pivot table layout is cleared of all fields, and only the empty layout is visible on the worksheet. The PivotTable Field List pane has not been cleared and still contains all the fields from the source data.

Adding Fields to Specific Areas of the Pivot Table

In Chapter 2, when you created the pivot table, you checked the fields in the field list, and Excel automatically placed them in the Areas section and in the pivot table layout on the worksheet. Later, you moved a field if you wanted it in a different area.

Instead of accepting the automatic field placement, you can control where the fields are placed. For your flood coverage report, you want regions listed in the Row Labels area and flood coverage listed in the Column Labels area, showing the total insured value for each region and coverage type:

1. In the PivotTable Field List pane, add a check mark to the InsuredValue field.

2. Because the InsuredValue field contains numeric data, Excel automatically places it in the Values area.

3. Add a check mark to the Region field.

4. Because Region is a text field, Excel automatically places it in the Row Labels area.

5. Next, you want to add the Flood field to the pivot table layout, but you want it in the Column Labels area, not the Row Labels area. In the fields section of the PivotTable Field List pane, drag the Flood field to the Column Labels area (see Figure 3-2).
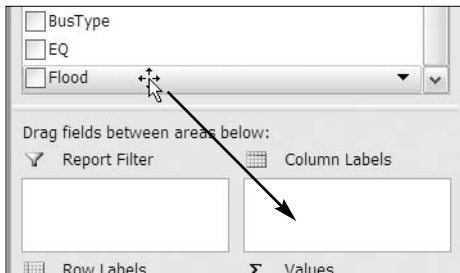
Figure 3-2. *Drag a field to the Column Labels area.*

6. Release the mouse button, and the Flood field appears in the pivot table Column Labels area, showing an N for policies with no coverage and a Y for policies that do have flood coverage.

7. To make the numbers easier to read, you can format them. Right-click one of the values in the pivot table, and from the context menu, choose Number Format.

8. In the Format Cells dialog box, select the Number category.

9. For Decimal Places, select 0, add a check mark for Use 1000 Separator, and then click OK.

With the numbers formatted, you can see that more than $3 million of the insured value is for properties with flood coverage, compared to just $1 million for properties without flood coverage. In the Midwest region, about half of the insured value is for properties with flood coverage.

Adding a Report Filter

You've reported on the overall totals for each region, but the claims manager wants more information. Each policy is for a specific type of business, and your next report should show the total insured value for the manufacturing businesses only. To limit what is included in the summarized data, you'll add a filter to the pivot table by using the BusType field, which stores the business type data.

1. In the PivotTable Field List pane, drag the BusType field to the Report Filter area (see Figure 3-3).
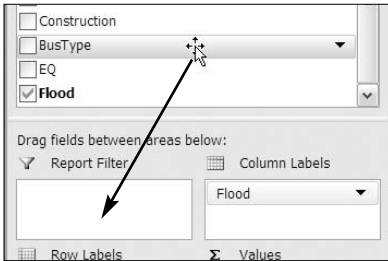
Figure 3-3. *Drag a field to the Report Filter area.*

2. On the worksheet, Excel adds the BusType field to the top of the pivot table, with the item (All) showing (see Figure 3-4). The values in the pivot table have not changed.

	A	B	C	D
1	BusType	(All)		
2				
3	Sum of InsuredValue	Column Labels		
4	Row Labels	N	Y	Grand Total
5	Central	54,984,637	59,799,957	114,784,594
6	East	584,293,144	2,806,918,934	3,391,212,078
7	Midwest	369,692,100	404,768,595	774,460,695
8	Northeast	86,544,992	179,315,964	265,860,956
9	Grand Total	1,095,514,873	3,450,803,450	4,546,318,323

Figure 3-4. *The BusType field added to the Report Filter area*

3. Click the drop-down arrow to the right of (All) to see a list of business types. Each business type from the source data is listed here.

4. You'd like to filter the data to see only the manufacturing business types, so click Manufacturing, and click OK (see Figure 3-5).
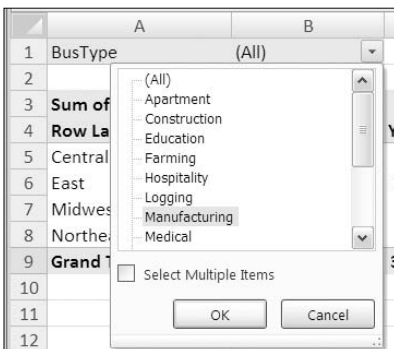
Figure 3-5. *Select an item in the Report Filter list.*

The values in the pivot table change and now show only the total insured values for policies sold to manufacturing businesses. Of the total insured values in the Midwest region, only $25 million is for manufacturing businesses with flood coverage (see Figure 3-6).

In cell B1 on the worksheet, the drop-down arrow has changed to a filter symbol with a small blue arrow. In the PivotTable Field List pane, there is a filter icon beside BusType in the field list to show that it has a filter applied to that field.

	A	B	C	D	E
1	BusType	Manufacturing			
2					
3	Sum of InsuredValue	Column Labels			
4	Row Labels	N	Y	Grand Total	
5	Central		45,459,510	45,459,510	
6	East	16,877,418	71,067,761	87,945,179	
7	Midwest	14,800,136	25,084,215	39,884,351	
8	Northeast	2,500,000		2,500,000	
9	Grand Total	34,177,554	141,611,486	175,789,040	
10					

PivotTable Field List

Choose fields to add to report:

☐ Expiry
☐ Location
☐ State
☑ Region
☑ InsuredValue
☐ Construction
☑ BusType
☐ EQ
☑ Flood

Figure 3-6. *A report filter has been applied.*

With this filter applied, you can also see that for the manufacturing businesses, all the policies sold in the Central region have flood coverage, but no policies sold in the Northeast region have flood coverage.

Changing the Filter

Now that you have reported on the totals for manufacturing, you're asked to report on the retail businesses in the Midwest. To see the results for a different business type, you can choose a different item from the report filter list.

1. Click the arrow for the BusType report filter to open the list of items.

2. Click Retail in the list, and click OK.

   The pivot table now shows a summary for the retail business type, and of the total insured values in the Midwest region, only $5.7 million is for retail businesses with flood coverage. After reporting on this business type, you can show all the data again.

3. To see a summary for all the business types, choose (All) from the top of the report filter list of items.

The pivot table shows the insured values for all business types.

Filtering for Multiple Items

The next report that the claims manager wants is for office buildings and apartments in the Midwest. These are similar types of business, and your report should show a combined total for these. You'll apply a filter to see both Apartment and Office Bldg policies.

1. In the pivot table, click the drop-down arrow for the BusType report filter.

2. At the bottom of the list, add a check mark next to Select Multiple Items.

3. Check boxes appear beside the business type items, and the currently selected item is checked. In your pivot table, (All) is selected, so all the items are checked (see Figure 3-7).
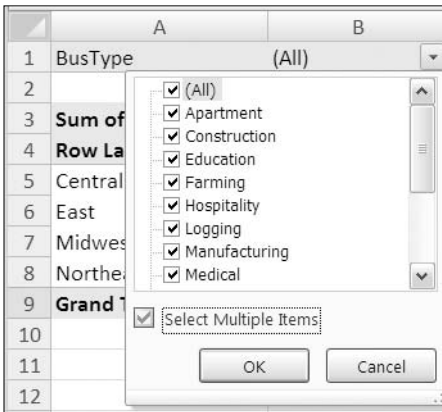
Figure 3-7. *You can select multiple items in the Report Filter list.*

4. To quickly remove the check marks from all the items, click the (All) check box to remove its check mark. This clears all the check marks in the list.

■**Note** Unless at least one item is selected, the OK button will not be available.

---

5. Add check marks to Apartment and Office Bldg. You may have to scroll down the list to see the Office Bldg item by using the scrollbar at the right side of the Report Filter list.

6. Click OK to close the list and to apply the filter.

The BusType report filter now shows (Multiple Items), indicating that two or more items have been selected (see Figure 3-8). The pivot table shows the summarized values for the apartment and office building policies, and you can report that most of the insured value is for policies with flood coverage.
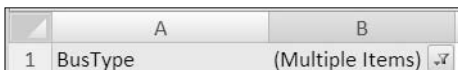
Figure 3-8. *Multiple items are selected in the Report Filter list.*

Removing a Report Filter

If you no longer need a report filter, you can remove it from the pivot table. For now, you're finished analyzing the policies by business type, so you'll remove the report filter:

1. Select a cell in the pivot table.

2. In the PivotTable Field List pane, remove the check mark from the BusType field name.

The report filter is removed from the pivot table, and the values are a summary of all the records in the source data.

When you remove a filtered field from the pivot table layout, its last setting is remembered. Before removing the BusType field from the pivot table layout, you selected the Apartment and Office Bldg items to filter the pivot table. In the PivotTable Field List pane, the BusType field still shows a filter icon, indicating that the field has a filter applied. Because the field is not in the pivot table layout, the filter currently has no effect on the displayed data.

To see the retained filter, you can examine the BusType field in the PivotTable Field List pane. You will also be able to change the filter settings for the field.

1. In the PivotTable Field List, click the BusType field.

2. Click the arrow in the field name (see Figure 3-9) to open the field's sort and filter list.
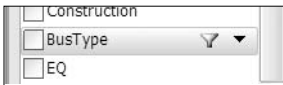
Figure 3-9. *Filter icon and arrow in the PivotTable Field List pane*

3. In the sort and filter list, you can see that the Apartment and Office Bldg items are still checked. The check mark to the left of the filter list indicates that the field has a filter applied (see Figure 3-10).
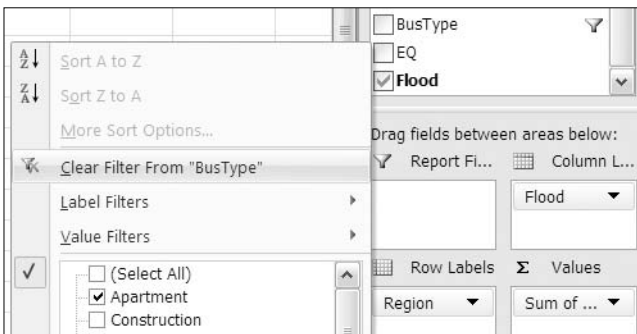
Figure 3-10. *Filter and sort list*

4. Even though the BusType field isn't in the pivot table layout, you can change its filter settings. To remove the filter, click Clear Filter from "BusType" (shown in Figure 3-10).

5. The filter and sort list closes, and the filter icon is removed from BusType in the PivotTable Field List pane.

Updating the Pivot Table

After you create a pivot table, it remains connected to the source data. If you make changes to the source data, add new records, or delete records, you can update the pivot table to reflect those changes. In the following sections, you'll make some changes to your source data, and then you'll see the effect of the changes in the pivot table.

Changing the Source Data

You have learned that there is an error in the insured value of one of the policies in the source data, and you have to correct the amount. Also, another policy has been sold, and you must add that information to the source data. You'll go to the Excel table that contains the source data and make the changes:

1. A quick way to go to the source data table is to use the Name box, which is located to the left of the Formula Bar, above the worksheet. Click the arrow in the Name box, and in the drop-down list, click Insurance, which is the name of the Excel table that contains the source data (see Figure 3-11).

Figure 3-11. *Select a name in the Name box.*

2. Sheet1, where the Excel table is located, is activated, and the entire Excel table is selected. In row 10, for policy 100208, select the InsuredValue ($30,000), which was entered with an incorrect amount.

■**Note** If policy 100208 is not in row 10, you can sort the policies by the policy number in Column A.

---

3. Type the correct entry, which is $3,000,000, and then press the Enter key to complete the correction.

4. Next, you'll move to the end of the table and enter a new record. A quick way to move
    down in a column is to point to the bottom border of the active cell (if it's not a head-
    ing cell) and double-click (see Figure 3-12). This will take you to the bottom of the table
    if there are no blank cells in the active column. Otherwise, it will stop at the cell above
    the first blank cell.

Figure 3-12. *Double-click the bottom border of the active cell.*

■**Tip** To move down a column using the keyboard, tap the End key and then the down arrow key. This will
take you to the bottom of the table if there are no blank cells in the active column. Otherwise, it will stop at
the cell above the first blank cell.

---

5. To move to the last column in the last record, double-click the right border of the
    active cell.

■**Tip** If there is no other data on the worksheet, you can press Ctrl+End to go to the last cell in the table.

---

6. Now that you're in the last cell in the Excel table, press the Tab key to create a new
    blank record in the table and to move to the first cell in that new record.

7. In the Policy column, type an apostrophe and the next available number, as in
    '101127. The leading apostrophe will force Excel to treat the policy number as text and
    will ensure that any leading zeroes are retained.

8. Press the Tab key to move to the next column, and add the rest of the data for the new
    record, as shown in Figure 3-13.

■**Tip** To copy a value from the cell above, hold the Ctrl key, and type an apostrophe.

	Policy	Start	Expiry	Location	State	Region	InsuredValue	Construction	BusType	EQ	Flood
929	101127	31-Dec-07	31-Dec-08	Urban	WI	Midwest	$ 5,000,000	Fire Resist	Office Bldg	Y	Y

Figure 3-13. *New record in the insurance table*

9. After typing **Y** in the Flood field, press the Enter key to complete the entry without cre-
    ating a new record.

Viewing New Data in the Pivot Table

Now that you've completed the changes to your source data, you'll return to the pivot table and update it so you can see the revised summary of the insurance data. You corrected an InsuredValue amount in the East region and added a new policy for the Midwest, so the totals for those regions should increase, as should the grand total.

1. Switch to Sheet4, and select any cell in the pivot table. This makes the pivot table active and displays the PivotTable Field List pane.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Data group, click the top section of the Refresh command to update the pivot table with the new and revised data (see Figure 3-14).
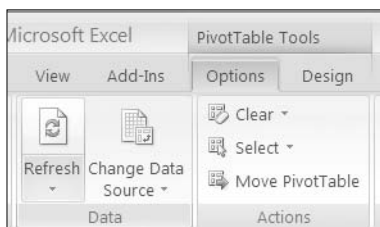
Figure 3-14. *The Refresh command in the Data group on the Ribbon*

4. In the pivot table, the data is refreshed, and it shows new totals for the East and Midwest regions and a new Grand Total amount (see Figure 3-15). For comparison, the old totals are shown in Figure 3-15 but won't remain on your worksheet.

					Old Totals
Sum of InsuredValue	Column Labels				
Row Labels	N	Y	Grand Total		Grand Total
Central	54,984,637	59,799,957	114,784,594		114,784,594
East	584,293,144	2,809,888,934	3,394,182,078		3,391,212,078
Midwest	369,692,100	409,768,595	779,460,695		774,460,695
Northeast	86,544,992	179,315,964	265,860,956		265,860,956
Grand Total	1,095,514,873	3,458,773,450	4,554,288,323		4,546,318,323

Figure 3-15. *The refreshed pivot table shows new totals.*

■Tip To quickly refresh the pivot table, right-click a cell in the pivot table, and in the context menu, click Refresh.

Changing the Summary Function

Currently, the pivot table shows a Sum of InsuredValue item for each region. Instead of seeing a dollar value, you'd like to know how many policies have been sold in each region for those with flood coverage and for those without. You'll change a setting in the pivot table so you can see a different summary for the InsuredValue field:

1. In the pivot table, right-click a cell in the Values area, such as cell C7.

2. In the context menu that appears, click Summarize Data By. In the list of functions, the Sum function is checked, because it is the function that is currently used for the InsuredValue field.

3. Click Count to summarize the data by that function (see Figure 3-16).
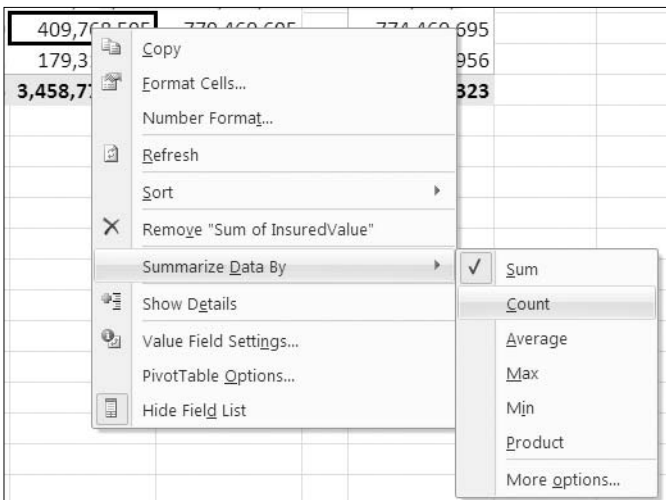
Figure 3-16. *Select a different function to summarize the data.*

4. In the pivot table, the data changes to show a Count of InsuredValue cell instead of a sum (see Figure 3-17). The grand total is 928, which is the number of policy records in the insurance table.

3	Count of InsuredValue	Column Labels		
4	Row Labels	N	Y	Grand Total
5	Central	34	4	38
6	East	245	364	609
7	Midwest	152	59	211
8	Northeast	44	26	70
9	**Grand Total**	**475**	**453**	**928**

Figure 3-17. *The Count of InsuredValue cell*

Applying a PivotTable Style

Now that you have set up the summary information the way you want it, you can spend a bit of time on the appearance of the pivot table. Changing the appearance may make the data easier to read, and you may want a color scheme that fits with other documents you're producing.

When you created the pivot table, Excel automatically applied formatting. To quickly change the appearance of the pivot table, you can apply one of the built-in pivot table styles. This may affect the color and font formatting and may add borders and row or column shading.

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. In the PivotTable Styles group, you can see that one of the styles is selected and has a border around it.

4. Point to that style, and its name should appear in a ScreenTip (see Figure 3-18), unless you have turned off the ScreenTip feature.
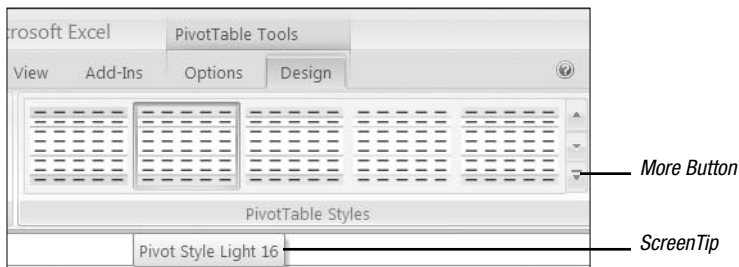
Figure 3-18. *Pivot table styles*

5. Point to one of the other pivot table styles, and the pivot table on the worksheet will show a preview of that style.

6. To see other rows of pivot table styles, click the up or down arrow at the right end of the PivotTable Styles group.

7. To open the full gallery of pivot table styles, click the More button at the right end of the PivotTable Styles group (shown in Figure 3-18).

8. In the gallery, you can drag the scrollbar up and down to see the pivot table styles, which are grouped as Light, Medium, and Dark.

9. Point to any pivot table style to see your pivot table previewed with that style. Some styles, such as Pivot Style Medium 2, include horizontal borders and may make the rows easier to follow in a wide pivot table. Some styles have dramatic or dark colors that may be best suited for presentations or online viewing, rather than printing.

■**Tip** If you change your mind and don't want to apply a style, press Esc on the keyboard, or click outside the Style gallery, and it will close without applying a style.

10. When you find a pivot table style you like, click it to apply that style to your pivot table.

■**Note** The first style, at the top left of the Light styles, is named None. If you click this style or click the Clear button at the bottom left of the PivotTable Style gallery, your pivot table will not have a style. When no style is applied, the preview function won't work when you point to a different style in the gallery.

Deleting a Pivot Table

A workbook can contain one or more pivot tables, all based on the same data or based on different data. In later chapters, you'll create workbooks with multiple pivot tables and will learn how they interact. Although you can have many pivot tables in the workbook, occasionally you may want to remove a pivot table completely. To practice this technique, you'll delete the pivot table from this workbook:

1. Before you delete the pivot table, you can save the workbook to preserve the work you did.

    To delete the pivot table, you'll select the entire pivot table, and then delete it.

2. Select a cell in the pivot table.

3. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

4. In the Actions group, click Select, and click Entire PivotTable.

5. While the pivot table is selected, press the Delete key on the keyboard. Excel deletes the pivot table from the worksheet, and the PivotTable Field List pane disappears from view.

■**Tip** To immediately restore the pivot table, you can press Ctrl+Z or click the Undo button on the Quick Access Toolbar (QAT), which is located above the Ribbon, beside the Microsoft Office Button.

    In some cases, you may want to remove both the pivot table and the worksheet that was inserted when the pivot table was created. If so, you can right-click the worksheet tab, and click Delete in the context menu. When the confirmation message appears, click Delete to permanently remove the worksheet and the pivot table.

■**Caution** You cannot undo the deletion of a worksheet.

6. Close the workbook, and do not save the changes when prompted. In the next chapter, you'll use a different workbook with different data.

Summary

In this chapter, you expanded on your basic pivot table skills. You learned how to clear a pivot table and how to add fields to a specific area of the pivot table.

You added a report filter and used it to view summarized data for a specific business type. You changed the report filter and showed data from multiple items from the filter list. When it was no longer needed, you removed the report filter.

Next, you changed data in the source table and added new data, and then you refreshed the pivot table to update its summarized data. You changed the summary function used in the InsuredValue field to use Count instead of Sum.

You applied a pivot table style to make the data in the pivot table easier to read.

Finally, you learned how to delete the entire pivot table from the workbook if required.

I have now covered the basics of creating a pivot table and modifying it. In the remaining chapters, you'll dig deeper into the pivot table features, and you'll see how you can create more sophisticated pivot table reports.

CHAPTER 4

■ ■ ■

Summarizing Data

In previous chapters, you used a pivot table to summarize insurance policy data and reported on the grand total of insured value by region and by building construction type. In most of the reports, you showed a total sum, and in one report you changed the report so it showed a total count of the policies sold. In this chapter, you'll use different data to create a pivot table, and you'll explore other ways of summarizing the data. You'll work with the grand totals and subtotals in the pivot table and learn how to group the data for a range of numbers or dates.

Exploring a Work Orders Example

To follow the examples in this chapter, download and open the sample file named WorkOrders_01.xlsx, available at www.apress.com. In this workbook, you'll find data about your company's service call work orders, including the costs, labor hours, payment type, whether parts or labor are covered under warranty, and other dates. Figure 4-1 shows a sample of the data.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	WO	District	LeadTech	Service	Rush	ReqDate	WorkDate	Wait	Techs	WtyLbr	WtyParts	LbrHrs	LbrCost	LbrFee	PartsCost	PartsFee	TotalCost	TotalFee	Payment
2	00101	Central	Tremblay	Install		07-Jan-06	08-Jan-06	1	2			3.50	490.00	490.00	19.80	19.80	509.80	509.80	Account
3	00102	Northwest	Michner	Deliver	Yes	07-Jan-06	11-Jan-06	4	1			0.25	20.00	20.00	54.57	54.57	74.57	74.57	C.O.D.
4	00103	North	Ling	Assess		05-Jan-06	18-Jan-06	13	1			0.25	20.00	20.00	98.13	98.13	118.13	118.13	Account
5	00104	North	Ling	Replace		08-Jan-06	18-Jan-06	10	1			2.00	160.00	160.00	238.32	238.32	398.32	398.32	P.O.
6	00105	North	Ling	Repair	Yes	05-Jan-06	18-Jan-06	13	1			1.25	100.00	100.00	316.00	316.00	416.00	416.00	Account
7	00106	South	Khan	Deliver		05-Jan-06	19-Jan-06	14	1			0.25	20.00	20.00	48.49	48.49	68.49	68.49	Account
8	00107	Northwest	Michner	Assess		11-Jan-06	19-Jan-06	8	1			1.00	80.00	80.00	126.27	126.27	206.27	206.27	Account
9	00108	Northwest	Michner	Assess		11-Jan-06	19-Jan-06	8	1	Yes	Yes	1.50	120.00	-	232.72	-	352.72	-	Warranty
10	00109	North	Ling	Replace		06-Jan-06	20-Jan-06	14	1			2.00	160.00	160.00	281.19	281.19	441.19	441.19	Account
11	00110	West	Michner	Deliver		05-Jan-06	21-Jan-06	16	1			0.25	20.00	20.00	12.00	12.00	32.00	32.00	Account
12	00111	Northwest	Tremblay	Deliver		08-Jan-06	21-Jan-06	13	1			0.25	20.00	20.00	52.71	52.71	72.71	72.71	C.O.D.
13	00112	West	Burton	Replace	Yes	14-Jan-06	21-Jan-06	7	1			0.50	40.00	40.00	74.40	74.40	114.40	114.40	Account
14	00113	Northwest	Tremblay	Install		08-Jan-06	21-Jan-06	13	1		Yes	2.00	160.00	160.00	462.32	-	622.32	160.00	Account

Figure 4-1. *Service call work orders data*

You'll use a pivot table to summarize the work order data to see the following:

- Which technicians are working the most
- Which service types require the most rush jobs
- The average time spent on a service call
- One year's results versus the next

■**Note** In the sample file, an Excel table named WorkOrders has been created from the work order data. If you are using your own data to work through the instructions in this chapter, you should create an Excel table from your data and then name the Excel table.

Your first task is to create a report on the average hours that each technician spends on the different types of service calls. This will help your service coordinator schedule the service calls, because you'll know how long each type of job normally takes. To get started, you'll check the source data to see which fields contain the data that you need for your report and then create a pivot table with those fields:

1. In the Excel table named WorkOrders on Sheet1, you can see the technician names in the LeadTech column. In the Service column, you can see the service type, such as Install or Repair. The final field you'll use in this report is LbrHrs, which is the total hours of labor on the service call.

2. From the Excel table, create a pivot table on a new worksheet. In the PivotTable Field List pane, put the LeadTech field in the Row Labels area, Service in the Column Labels area, and LbrHrs in the Values area, where it will become Sum of LbrHrs.

This report gives you an overview of the type of service that each technician is doing, with a sum of labor hours, as shown in Figure 4-2.

	Sum of LbrHrs	Colun ▾					
Row Labels ▾	Assess	Deliver	Install	Repair	Replace	Grand Total
Burton	70.75	16.5	103.5	89.25	160.25	440.25
Khan	98.5	16.25	68.5	98.25	106.25	387.75
Ling	150	36.5	98.75	88.75	158	532
Michner	97.25	15.5	150	96	147.25	506
Mugford	37	11.5	29	10.5	23.5	111.5
Tremblay	67	15	47.5	60.5	85	275
Grand Total	**520.5**	**111.25**	**497.25**	**443.25**	**680.25**	**2252.5**

Figure 4-2. *Sum of labor hours per service type*

■**Note** In this chapter's figures, some column widths have been manually adjusted.

Using the Summary Functions

Because the LbrHrs column in the source data consists of numbers only, it was automatically summarized as Sum of LbrHrs when you added it to the pivot table. If the LbrHrs field had contained cells with text or blank cells, it might have been summarized as Count of LbrHrs.

You'll make a change to the LbrHrs summary function to show the average time that each technician spends on each type of service:
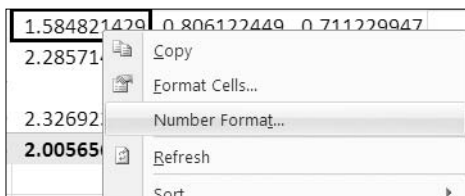
1. Right-click one of the LbrHrs cells in the pivot table, such as cell B5, which contains the total hours that Burton spent doing assessments.

2. From the context menu, choose Summarize Data By, and click Average.

3. The pivot table now shows the average labor hours per technician for each service type, and the label at the top left of the pivot table has changed from Sum of LbrHrs to Average of LbrHrs (see Figure 4-3).

	Average of LbrHrs	Column Lal ▼					
3							
4	Row Labels ▼	Assess	Deliver	Install	Repair	Replace	Grand Total
5	Burton	0.557086614	0.25	2.464285714	2.075581395	1.456818182	1.134664948
6	Khan	0.529569892	0.25	1.756410256	2.090425532	0.892857143	0.850328947
7	Ling	0.493421053	0.25	2.14673913	1.584821429	0.806122449	0.711229947
8	Michner	0.592987805	0.25	3.488372093	2.285714286	1.067028986	1.126948775
9	Mugford	0.451219512	0.25	2.416666667	1.5	0.734375	0.622905028
10	Tremblay	0.496296296	0.25	2.159090909	2.326923077	0.944444444	0.825825826
11	Grand Total	0.521543086	0.25	2.4375	2.005656109	0.993065693	0.882295339

Figure 4-3. *Average labor hours per technician for each service type*

Your report now shows the average hours per technician for each service call type. However, because the number of decimal places vary within the pivot table columns, it's hard to visually compare the results. You'll format the numbers so they are consistent, and the summary will be easier for you and other readers to understand at a glance:

1. Right-click one of the LbrHrs cells in the pivot table, such as cell E7.

2. From the context menu, choose Number Format (see Figure 4-4).

1.584821429	0.806122449	0.711229947
2.28571	📋 Copy	
	📄 Format Cells...	
2.32692	Number Format...	
2.00565	📄 Refresh	
	Sort ▶	

Figure 4-4. *Number Format command on the context menu*

3. The Format Cells dialog box opens, with only the Number tab available.

4. From the Category list, select Number.

   For this data, two decimal places will be sufficient, because 0.01 hour is just 36 seconds, and the service coordinator doesn't require anything beyond that level of precision. In other situations, you may require more decimal places.

5. For Decimal Places, select 2, and then click OK to close the Format Cells dialog box.

With the values all showing the same number of decimal places, it's much easier to compare the data and to see that installations have the highest average time (see Figure 4-5). Thanks to your report, the service coordinator will be able to schedule enough time for those jobs.

Average of LbrHrs Colum ▾						
Row Labels ▾	Assess	Deliver	Install	Repair	Replace	Grand Total
Burton	0.56	0.25	2.46	2.08	1.46	1.13
Khan	0.53	0.25	1.76	2.09	0.89	0.85
Ling	0.49	0.25	2.15	1.58	0.81	0.71
Michner	0.59	0.25	3.49	2.29	1.07	1.13
Mugford	0.45	0.25	2.42	1.50	0.73	0.62
Tremblay	0.50	0.25	2.16	2.33	0.94	0.83
Grand Total	**0.52**	**0.25**	**2.44**	**2.01**	**0.99**	**0.88**

Figure 4-5. *Consistent number formatting makes comparisons easier.*

When you add date and number fields to the Values area, Sum is the default summary function, and when you add text fields to the Values area, Count is the default summary function. Although these are the most commonly used functions, other functions may be required for some of your pivot table analysis. Including Sum and Count, you can use 11 summary functions for the value fields; Table 4-1 shows a brief overview of these functions.

Table 4-1. *Summary Functions*

Function	Description	Similar Worksheet Function
Sum	Totals the source data	SUM
Count	Counts numbers, text. and errors in the source data	COUNTA
Average	Totals the source data and divides by the number of values	AVERAGE
Max	Shows the highest value from the source data	MAX
Min	Shows the lowest value from the source data	MIN
Product	Multiplies all the source data and may result in a very large number	PRODUCT
Count Numbers	Counts the numbers in the source data	COUNT
StdDev	Shows the standard deviation for a sample of the source data	STDDEV
StdDevp	Shows the standard deviation for the entire population for the source data	STDDEVP
Var	Shows the variance for a sample of the source data	VAR
Varp	Shows the variance for the entire population for the source data	VARP

The first six summary functions—Sum, Count, Average, Max, Min, and Product—are available on the context menu when you right-click a value cell in the pivot table. To give the

service coordinator a better idea of the range of times required for a job, you'll create two more reports, using the Min (minimum) and Max (maximum) functions:

1. Right-click a cell in the Values area, and in the context menu, click Summarize Data By and then Max to see the longest time that each technician spent on each service type.

2. Using the context menu, click Summarize Data By and then Min to see the shortest time that each technician spent on each service type.

You can apply the remaining summary functions by using the More Options command, as described next. You'll create one more report for the service coordinator by using the StdDevp (standard deviation) function.

1. Right-click a value cell in the work orders pivot table.

2. In the context menu, click Summarize Data By, and click More Options.

3. In the Value Field Settings dialog box, click the Summarize By tab.

4. In the Summarize Value Field By list, select StdDevp, and click OK. The pivot table now shows the standard deviation of labor hours per service type for each technician.

   This compares the labor hours for each job to the average labor hours for that technician on that type of job. A lower number means that there is less variance in the labor hours. Because all the deliveries are a fixed time of .25 hours, the standard deviation is zero for all the technicians. Assessments ranged from .25 hours to 2 hours, so the standard deviation for all the technicians is low. For installation jobs, the standard deviation is much higher for most of the technicians, and this indicates there is a wide range of times for repair jobs. For example, Michner's labor hours ranged from 1 to 19.5 hours, resulting in a standard deviation of 3.79. The StdDevp function was used instead of StDev because the source data for the pivot table is all the service call data (the entire population) for the company for the past two years. If you had only a sample of the service call data, you could use the StDev function.

5. To complete the analysis, reapply the Average summary function by using the context menu.

The pivot table now shows the average time per service type for each technician.

Showing Multiple Value Fields

Now that you have calculated the average times, the service coordinator has asked you to show a count of jobs where the labor was done under warranty. You check the source data and see a column with the heading WtyLbr. WtyLbr is a text field that contains Yes if the labor is covered by warranty.

Currently, the pivot table shows the Average of LbrHrs values, and you'll add the Count of WtyLbr values to show how many service calls were performed under a labor warranty:

1. Select a cell in the pivot table so the PivotTable Field List pane is visible.

2. In the PivotTable Field List pane, drag the WtyLbr field to the Values area, where it will default to Count of WtyLbr, because it is a text field.

3. In the pivot table, a second column of values, with the heading Count of WtyLbr, appears for each service type (see Figure 4-6).

3		Column Labels ▾		
4		Assess		Deliver
5	Row Labels ▾	Average of LbrHrs	Count of WtyLbr	Average
6	Burton	0.56	5	
7	Khan	0.53	7	
8	Ling	0.49	5	
9	Michner	0.59	13	
10	Mugford	0.45		
11	Tremblay	0.50	5	
12	**Grand Total**	**0.52**	**35**	

Figure 4-6. *Two value fields in the pivot table*

With the two value fields now in the pivot table, you can see that Assessments had the greatest number of jobs done under a labor warranty and that Michner is the technician with the highest average labor hours per assessment call.

Changing the Value Field Headings

When a field is added to the Values area of the pivot table, its heading cells show its summary function and its field name. For example, in your pivot table the value fields have the rather long headings of Average of LbrHrs and Count of WtyLbr. To make the headings easier to read, you can shorten them:

1. Select a cell in the pivot table to activate it.

2. In the PivotTable Field List pane, click the Average of LbrHrs field within the Values area, and click Value Field Settings (see Figure 4-7).
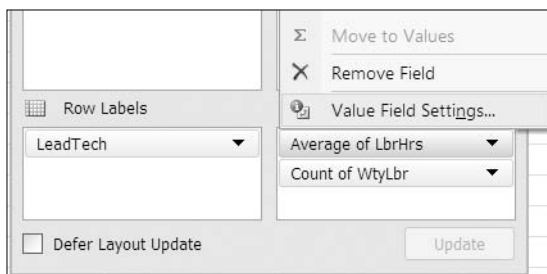
Figure 4-7. *Value Field Settings option in the PivotTable Field List pane*

3. In the Value Field Settings dialog box, type **Avg Hrs** in the Custom Name box.

4. Click OK to close the Value Field Settings dialog box.

A quicker way to change the value field heading is to make the change directly in a pivot table cell:

1. In the pivot table, select one of the cells that contains the heading Count of WtyLbr.

2. In the cell, type **Wty Lbr**, and then press the Enter key to complete the change. All the Count of WtyLbr headings show the revised custom name.

■**Tip** The custom name cannot be the same as the field name in the source data. You can add a space in the text, or at the end of the text, to make the custom name slightly different from the field name.

In the pivot table and in the Values area of the PivotTable Field List pane, the value fields now show the custom names you entered. As a result, the columns can be narrower, and the headings are easier to read.

Showing Multiple Summaries for One Value Field

Now that you've finished your reports for the service coordinator, the accountant wants a report on the total service fees and average fee for each type of service call. You'll change the pivot table fields to focus on the fees collected instead of on the hours.

Before you make any changes to the pivot table, you check the source data to see which fields you'll use to calculate the fees. The TotalFee column includes the labor fees and parts fees for each work order and shows the total amount collected on the work order.

In the labor hour reports, you used two different fields in the Values area. For this report you'll add two copies of the TotalFee field to the Values area and use a different summary function in each copy. You'll clear the pivot table to get a fresh start, and then you'll add the fields you need for the accountant's report:

1. Select a cell in the pivot table to activate it.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Actions group, click Clear, and click Clear All to remove all the fields from the pivot table.

4. In the PivotTable Field List pane, add Service to the Row Labels area, and add TotalFee to the Values area.

5. In the pivot table, change the heading for Sum of TotalFee to Total WO.

6. In the PivotTable Field List pane, drag another copy of TotalFee to the Values area, where it will become Sum of TotalFee.

7. In the PivotTable Field List pane, click the Sum of TotalFee field in the Values area, and choose Value Field Settings.

8. In the Value Field Settings dialog box, select the Average function on the Summarize By tab.

9. Enter **Avg WO** for Custom Name.

10. Click the Number Format button, and change the number format to Currency.

■**Note** The currency symbol in your pivot table will depend on the regional settings in your computer.

---

11. Click the OK button to close the Format Cells dialog box, and then click OK to close the Value Field Settings dialog box.

12. To make the pivot table easier to read, change the number format for the TotalFee field to the Currency format.

The pivot table now shows the total charged for each service type and the average amount charged for each service type (see Figure 4-8). Replacements have the highest total fees collected, and installations have the highest average fee.

3		Values	
4	Row Labels ▾	Total WO	Avg WO
5	Assess	$165,452.23	$165.78
6	Deliver	$41,618.23	$93.52
7	Install	$131,039.42	$642.35
8	Repair	$115,305.62	$521.74
9	Replace	$180,960.78	$264.18
10	**Grand Total**	**$634,376.28**	**$248.48**

Figure 4-8. *Two copies of the same value field in the pivot table*

Changing the Order of the Value Fields

Once you have multiple value fields in the pivot table, you may want to rearrange them. You'll move the Avg WO field so it is to the left of the Total WO field in the pivot table layout:

1. Select a cell in the pivot table to activate it.

2. In the PivotTable Field List pane, in the Values area, drag the Avg WO field so it is above the Total WO field.

■**Tip** Don't drag the field too high, or it will be removed from the pivot table layout. If the pointer has a circle with a bar through it, that indicates the field cannot be dropped in its current location.

---

3. As you drag the field, a light gray bar will appear above the Total WO field, indicating where the field will be dropped (see Figure 4-9).
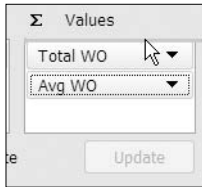
Figure 4-9. *Drag a value to a new position in the PivotTable Field List pane.*

4. Release the mouse button, and the Avg WO button will drop above the Total WO button.

In the pivot table on the worksheet, the value fields switch places, and the Avg WO column is to the left of the Total WO column. Another way to change the value field order is to make the change directly in the pivot table.

1. In the pivot table, select the cell that contains the heading Avg WO.

2. Point to the border of the cell, and when the pointer changes to a four-headed arrow, drag the heading cell to the right of the Total WO cell.

3. As you drag the field, a gray bar will appear to the right of the Total WO field, indicating where the field will be dropped (see Figure 4-10).

Figure 4-10. *Drag a value to a new position in the pivot table.*

4. Release the mouse button, and the Avg WO field will drop to the right of Total WO.

In the PivotTable Field List pane, the value fields switch places, and Avg WO is below Total WO.

Changing the Position of the Value Fields

When you add multiple value fields to a pivot table, their headings appear, by default, in the column area. If you prefer, you can move the headings to the row area, where the value fields will be listed vertically instead of horizontally.

In the PivotTable Field List pane, Excel automatically adds a special field button when multiple value fields are in the layout. You'll use that button to relocate the value fields.

1. Select a cell in the pivot table to activate it.

2. In the PivotTable Field List pane, in the Column Labels area, locate the ∑ Values button that represents the value field labels (see Figure 4-11).

Drag fields between areas below:
▽ Report Filter   ▦ Column Labels
                        ∑ Values   ▼
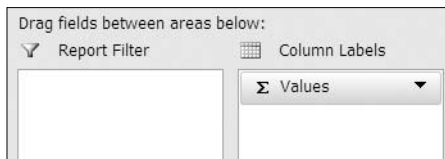
Figure 4-11. *Value field labels in the PivotTable Field List pane*

3. Drag the ∑ Values button to the Row Labels area, below the Service field.

4. Release the mouse button, and the value field labels will move to the Row Labels area.

In the pivot table, the value field labels are listed under each service type. To see the summary differently, you could move the ∑ Values field in the PivotTable Field List pane so it's above the Service field in the Row Labels area. With that layout, the services would be listed under each value field heading.

Showing or Hiding Grand Totals

On some service calls, two technicians are required instead of just one. The service manager wants a report on the labor costs for one-technician and two-technician jobs for each type of service call. You check the source data and see a column with the heading Techs. The number in that column indicates whether one or two technicians were required. You can use the column with the heading LbrCost to show the total labor costs for each work order.

First you'll clear the pivot table layout, and then you'll add different fields so you can analyze the labor cost for each type of service call:

1. Select a cell in the pivot table to activate it.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Actions group, click Clear, and click Clear All to remove all the fields from the pivot table.

4. In the PivotTable Field List pane, add Service to the Row Labels area, and add LbrCost and LbrHrs to the Values area.

5. In the PivotTable Field List pane, drag the ∑ Values button to the Column Labels area so the value fields are arranged horizontally.

The pivot table now shows the total labor cost for each service type, and there is a grand total at the bottom of the pivot table that totals the columns of labor costs and labor hours for all services (see Figure 4-12). These are the grand totals for columns.

3		Values	
4	**Row Labels** ▾	Sum of LbrCost	Sum of LbrHrs
5	Assess	55500	520.5
6	Deliver	9260	111.25
7	Install	57390	497.25
8	Repair	50805	443.25
9	Replace	77025	680.25
10	**Grand Total**	**249980**	**2252.5**

Figure 4-12. *Grand totals for columns*

Because there are no label fields in the Column Labels area, the pivot table has no grand totals for rows. There is nothing in the pivot table that should be totaled across the row—labor cost and labor hours are different fields and shouldn't be totaled.

The service manager wants the summary by one- and two-technician calls, so you'll add the Tech field to the Column Labels area:

1. In the PivotTable Field List pane, remove the check mark from LbrHrs. This will remove it from the pivot table to simplify the layout for now.

2. In the PivotTable Field List pane, drag the Techs field to the Column Labels area.

Now that there is a field in the Column Labels area, there is a grand total for rows at the right of the pivot table, which shows the total labor cost for each service type (see Figure 4-13). There is still a grand total for columns at the bottom of the pivot table, which totals the labor costs and shows the total cost for one-technician calls, the total cost for two-technician calls, and the total for all calls.

2				
3	Sum of LbrCost	Colu ▾		
4	**Row Labels** ▾	1	2	Grand Total
5	Assess	23160	32340	55500
6	Deliver	8420	840	9260
7	Install	16300	41090	57390
8	Repair	15000	35805	50805
9	Replace	24280	52745	77025
10	**Grand Total**	**87160**	**162820**	**249980**

Figure 4-13. *Grand totals for rows and grand totals for columns*

When you add fields to the Row Labels or Column Labels area, Excel automatically adds the grand totals to the pivot table layout. In some cases, you may not want either of the grand totals displayed. You'll hide the row grand total at the right of the pivot table. This will reduce the number of columns in the pivot table and will help focus the reader's attention on the comparison between one-technician and two-technician calls.

1. Select a cell in the pivot table to activate it.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. At the far left, in the PivotTable group, click the Options command (see Figure 4-14) to open the PivotTable Options dialog box.
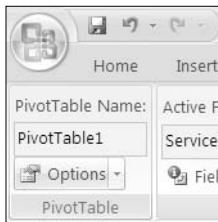
Figure 4-14. *The pivot table Options command*

4. On the Totals & Filters tab, in the Grand Totals section, remove the check mark for Show Grand Totals for Rows (see Figure 4-15).

Figure 4-15. *Set the grand totals options*

5. Click OK to close the PivotTable Options dialog box.

The grand totals for rows, at the right of the pivot table, have been removed, and the grand totals for columns are still visible. The one-technician and two-technician calls can be compared, without the distraction of the grand totals for rows.

When you want to see the grand totals for rows again, you can use a command on the Ribbon to turn them on. You'll show the grand totals for rows in your pivot table again:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. In the Layout group, click the Options command to open the PivotTable Options dialog box.

4. Click On For Rows and Columns.

The grand totals for rows reappear in the pivot table.

Creating Subtotals

The accountant likes the labor cost report you produced and has asked to see the labor costs broken down by rush and nonrush calls for each service type. In the source data, you find a column with the heading Rush. If a rush job was requested, a Yes is entered in that column. You'll add the Rush field to the pivot table layout.

Currently your pivot table has one field in the Row Labels area and one field in the Column Labels area. When you add a second field to the Row Labels area, subtotals will be created.

1. Select a cell in the pivot table to activate it.

2. In the PivotTable Field List pane, add a check mark to the Rush field.

Excels adds the Rush field to the Row Labels area in the pivot table, and each label in the Service field shows a subtotal of the Rush labels below it (see Figure 4-16). The rows with a Yes label are the rush calls, and the rows with a (blank) label are the nonrush calls.

3	Sum of LbrCost	Column Labels		
4	**Row Labels**	1	2	**Grand Total**
5	⊟ **Assess**	23160	32340	55500
6	Yes	3160	2170	5330
7	(blank)	20000	30170	50170
8	⊟ **Deliver**	8420	840	9260
9	Yes	1180	35	1215
10	(blank)	7240	805	8045

Subtotals

Figure 4-16. *Subtotals for Row Labels area*

Excel will also add subtotals to the pivot table if you place more than one field in the Column Labels area. To see a more detailed breakdown of the labor costs, you'll add the LeadTech field to the pivot table layout. That will let you see, for one-technician and two-technician jobs, what each technician's total labor costs are.

1. Select a cell in the pivot table to activate it.

2. In the PivotTable Field List pane, drag the LeadTech field to the Column Labels area, above the Techs field.

The LeadTech field is added to the Column Labels area in the pivot table and subtotals the labor costs for one-technician and two-technician jobs (see Figure 4-17).

Subtotals

	A	B	C	D	E	F	G	H
3	Sum of LbrCost	Column L						
4		⊟ Burton		Burton Total	⊟ Khan		Khan Total	⊟ L
5	**Row Labels**	1	2		1	2		
6	⊟ Assess	2940	4760	7700	5680	3850	9530	38
7	Yes	280	245	525	820	420	1240	7
8	(blank)	2660	4515	7175	4860	3430	8290	3

Figure 4-17. *Subtotals for Column Labels area*

When there are multiple fields in the Row Labels area or the Column Labels area, the last field in the list of fields is called an *inner field* (see Figure 4-18). All the fields above it in the list of fields are called *outer fields*. Only the outer fields automatically display subtotals. The inner field does not.

In Figure 4-18 the District field has been added to the Row Labels area.
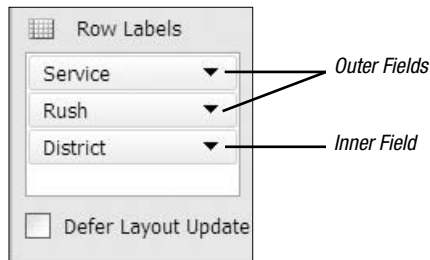
Figure 4-18. *Inner and outer fields in the PivotTable Field List pane*

Because it is the last field in the list of Row Labels, District is the inner field and doesn't display subtotals. Rush, which was previously the inner field, becomes an outer field, and displays subtotals. Remove the District field, and the Rush is once again the inner field.

Showing or Hiding Subtotals

As you have seen, subtotals are automatically added when multiple fields are placed in the Row Labels area or Column Labels area of the pivot table. Although the subtotals can add useful information, you don't always want them in the pivot table. To simplify a pivot table layout, you may want to hide the subtotals for one or more of the pivot fields.

First you'll change the subtotal settings for all the fields in the pivot table, and later you'll adjust the settings for individual fields. Because the pivot table looks a bit crowded, with all the columns of labor costs, you'll turn off all the subtotals in the pivot table to see whether that improves the appearance.

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. At the far left, in the Layout group, click the Subtotals command (see Figure 4-19).

4. Click Do Not Show Subtotals.
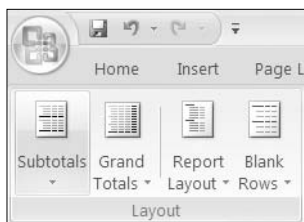
Figure 4-19. *Subtotals command on the Ribbon*

The Service labels remain in the pivot table, but the labor costs have been removed from those rows. The columns with total labor costs for each lead technician have also been removed. The grand totals for rows and grand totals for columns remain in the pivot table.

It was easy to hide the subtotals for all the fields in the pivot table, but now suppose you'd like to show the subtotals for the Service field to see the total cost per service type. You'll change the subtotal setting for just that field:

1. In the pivot table, right-click one of the Service labels, such as cell A6.

2. In the context menu, click the Subtotal "Service" option.

The LeadTech subtotals remain hidden, but the subtotals for the Service field are now visible. The grand totals for rows and columns remain in the pivot table.

Showing Subtotals Above or Below Items

In a pivot table layout, subtotals for the Row fields can appear above or below the items that they subtotal. Currently, the Service field in your pivot table has its subtotals displayed above its items. You'll change one of the pivot table settings to display all the subtotals again and select a position in which to display the row subtotals:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. At the far left, in the Layout group, click the Subtotals command.

4. Click Show All Subtotals at Top of Group.

Note Changing this setting will affect the position of the subtotals in all the row fields in the pivot table.

The subtotals for the Service field appear above the rush items. Because the Rush field is the last field in the Row Labels area, with no items below it, the Rush field is an inner field and does not display subtotals. The LeadTech field, in the Column Labels area, also shows subtotals again, but these come after the LeadTech items. Only the subtotals in the Row Labels area change position.

Next, you'll apply the remaining option for subtotals to display them below the items.

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. At the far left, in the Layout group, click the Subtotals command.

4. Click Show All Subtotals at Bottom of Group.

The outer row field, Service, displays a heading row with only a label at the top of the group and a subtotal row at the end of the group of items (see Figure 4-20). The Column Labels subtotals do not change.

Figure 4-20. *Subtotals at bottom of group*

Changing the Function for a Subtotal

When subtotals appear in the pivot table, they automatically use the Sum function to total the data in the group. You can change the function that is used to summarize the value fields just as you changed the summary function for a value field. You'll change the summary function for the Service subtotals to see a count instead of a sum.

Note If there are multiple value fields in the pivot table, the subtotal functions will be the same for all value fields. You can't apply different summary functions to the individual value fields in a pivot table.

---

1. In the pivot table, right-click one of the Service labels, such as cell A6.

2. In the context menu, click Field Settings to open the Field Settings dialog box.

3. On the Subtotals & Filters tab, in the Subtotals section, select Custom (see Figure 4-21).

4. In the list of functions, click Count, and then click OK to close the Field Settings dialog box.

The subtotals for the Service field now show the count of records for each service type, and the label for the subtotal has changed to end with Count, instead of Total. For example, the first service type is Assess, and its subtotal label has changed from Assess Total to Assess Count.

Note If you point to a custom subtotal value, the pivot table tool tip will show the name of the value field, not the summary function used in the subtotal. For example, if you point to cell B9, its tool tip title is Sum of LbrCost, not Count of LbrCost. The Row information in the tool tip is correct and shows Row: Assess Count.
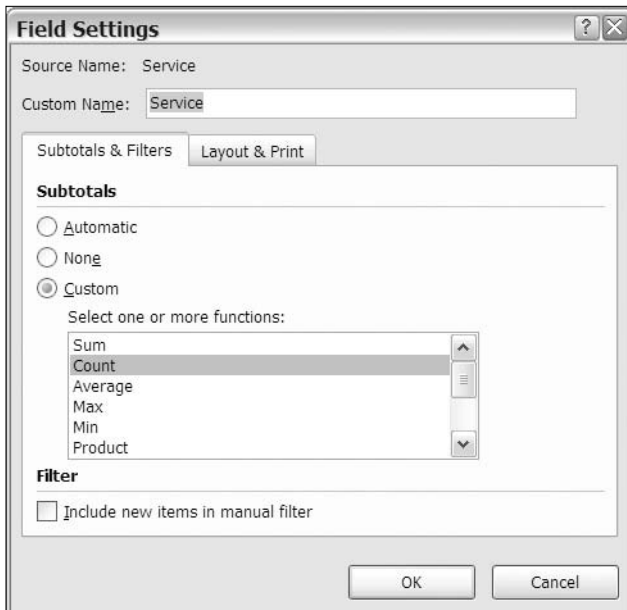
Figure 4-21. *Custom functions for subtotals*

Creating Additional Subtotals

When subtotals are automatically created in the pivot table, there is only one subtotal row per item. You can create additional subtotals to show other summary functions. Your pivot table currently shows the sum of labor cost in the Service field. You can add another subtotal to the field to show the highest labor cost.

■**Note** If you include more than one subtotal for a field, the subtotals for that field are shown at the bottom of the group, even if you have selected Show All Subtotals at Top of Group.

---

1. In the pivot table, right-click one of the Service labels, such as cell A6.

2. In the context menu, click Field Settings to open the Field Settings dialog box.

3. On the Subtotals & Filters tab, in the Subtotals section, select Custom.

4. In the list of functions, click the Sum function and the Max function.

5. Click the OK button to close the Field Settings dialog box.

The accountant's report on labor costs is now completed. The subtotals for the Service field show the sum of labor cost and the highest labor cost, while the label for each subtotal shows its summary function name (see Figure 4-22).

	A	B	C	D
3	Sum of LbrCost	Column ▾		
4		⊟ Burton		Burton Total
5	Row Labels ▾	1	2	
6	⊟ Assess			
7	Yes	280	245	525
8	(blank)	2660	4515	7175
9	Assess Sum	2940	4760	7700
10	Assess Max	120	280	280
11	⊟ Deliver			
12	Yes	160		160

Figure 4-22. *Multiple subtotals*

■**Note** Grand totals may be incorrect for subtotals if the function used is different from the function used in the value field. You may want to hide the grand totals when using subtotals with custom functions.

Grouping Numbers and Dates

Up to this point, you've added fields to the Row Labels area and Column Labels area and then summarized the value fields by the labels that automatically appear. For example, when you added the Service field to the Row Labels area, the labels Assess, Deliver, Install, Repair, and Replace appeared in column A, and you summarized the labor hours or labor costs for each of those labels.

In a pivot table, you can group numbers, dates, or text to create new labels and summarize the data by these groups. For example, if your source data contains dates, you can group the dates by year to show annual totals. If the source data has numeric test scores, you can group the numbers into 1–50 and 51–100 and show a count of results in each range of scores.

Grouping Numbers

The service manager wants to know how long customers are waiting for a service call. In the source data, you can see a column with the heading Wait. This is the number of days between the request date (ReqDate) and the day of the service call (WorkDate). To create a count, you'll use the WO field, which is the work order number. Every row has a work order number, so this will give you a reliable count.

You'll add the Wait field to the pivot table and organize the numbers into groups to create new labels. To start, you'll remove all the fields from the pivot table layout and then add different fields:

1. In the PivotTable Field List pane, remove the check marks from all the fields. The empty pivot table appears on the worksheet.

2. In the PivotTable Field List pane, drag the Wait field to the Row Labels area.

3. Drag the WO field to the Values area, where it will become Count of WO, because the work order numbers are stored as text.

In the Row Labels area, you can see all the wait days listed, and in the next column is the count of work orders for each wait period. For example, 19 work orders had a 2-day wait, and 68 work orders had an 8-day wait (see Figure 4-23).

3	Row Labels ▼	Count of WO
4	0	14
5	1	12
6	2	19
7	3	18
8	4	19
9	5	24
10	6	33
11	7	76
12	8	68

Figure 4-23. *Wait days in the row labels*

This level of detail may be required occasionally, but you could group the wait days, instead of listing each number individually. For example, you could list the days in groups of seven days, which would group the wait days into week lengths. This would give you a shorter list of items and would make it easier to spot which wait lengths are most common.

1. In the pivot table, select a cell in the Wait labels area, such as cell A5.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Group group, click Group Field (see Figure 4-24).
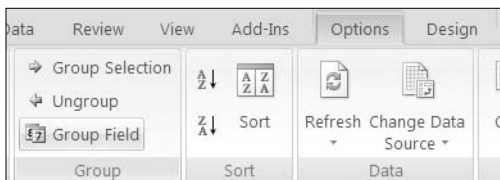
Figure 4-24. *Group Field command*

■**Note** The Group Field command is available only if the currently selected field is a number or date field.

4. In the Grouping dialog box, the lowest and highest number from the Wait field are automatically entered as the Starting At and Ending At numbers. The By box contains a 10, which is the default number for grouping (see Figure 4-25).

5. Leave the Starting At box set at zero, which is the lowest number in the data source.
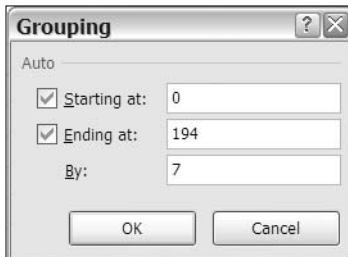
Figure 4-25. *Grouping dialog box*

6. In the By box, type **7**, which is the number of wait days you want in each group.

7. Click the OK button to close the Grouping dialog box.

Instead of individual wait days, the row labels now show number groups in seven-day intervals, such as 0–6 and 28–34 (see Figure 4-26).

3	Row Labels	Count of WO
4	0-6	139
5	7-13	539
6	14-20	487
7	21-27	349
8	28-34	248
9	35-41	201
10	42-48	129

Figure 4-26. *Grouped numbers for Wait labels*

You can send your report to the service manager, showing that most customers had a two- to three-week wait for service.

Ungrouping Items

If your pivot table contains groups, you may want to remove them. You'll remove the grouping from the Wait field to show the individual numbers again.

1. Right-click a cell that contains a Wait label, such as cell A5.

2. In the context menu, click Ungroup.

The grouping is removed from the Wait field, and the individual Wait days are shown.

Grouping Dates

You can also group dates in a pivot table field to display a range of dates under one label. To determine the busiest times of the year, the service manager wants a report that shows a count of service calls for each month. The WorkDate field in your source data contains dates that span almost two years. Instead of summarizing the data by the individual work dates, you can group the dates by year and month. You'll remove the Wait field from the pivot table and move the WorkDate field into the Row Labels area:

1. In the PivotTable Field List, remove the check mark from the Wait field.

2. Add a check mark to the WorkDate field to add it to the Row Labels area.

   In the Row Labels area, you can see all the work dates listed, and in the next column is the count of work orders for each day. However, the list is very long, and you want to see a summary for each month, instead of each day.

3. In the pivot table, right-click a cell that contains a WorkDate label, such as cell A5.

4. In the context menu, click Group.

5. In the Grouping dialog box, the earliest date in your source data appears in the Starting At text box. The latest date in your source data appears in the Ending At text box. You can leave these default entries.

6. In the By list, select Years and Months as the interval for your grouping (see Figure 4-27).
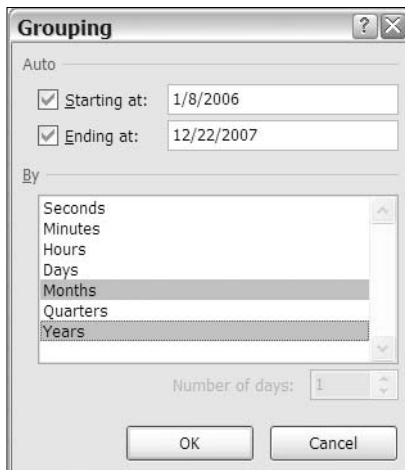
Figure 4-27. *Grouping dialog box*

7. Click the OK button to close the Grouping dialog box.

Instead of individual dates, the row labels now show Years and Months so the service manager can see the number of work orders that were completed in each month.

In the PivotTable Field List pane, Excel adds a Years field to the end of the field list. You grouped by Years and Months so that the data for each year is summarized separately. If you selected only Months, the January data for both years would have been summarized together.

Grouping Selected Items

The service manager has assigned each technician to one of two teams, Team A and Team B. To see how the work orders have been split between the two teams, you'll create a report that counts the work orders for each group.

The Group Field command and Grouping dialog box work only for number and date fields. For text fields, you can select and group labels to display those items together. You'll remove the WorkDate field from the pivot table and move the LeadTech field into the Row Labels area:

1. In the PivotTable Field List pane, remove the check marks from the WorkDate field and from the Years field.

2. Add a check mark to the LeadTech field to add it to the Row Labels area.

In the Row Labels area, you can see all the technician names listed, and in the next column is the count of work orders for each technician. You'll group the lead technicians into the two teams—Burton, Ling, and Tremblay are in Team A, and Khan, Michner, and Mugford are in Team B.

1. In the pivot table, select cell A4, which contains the label for Burton.

2. Hold the Ctrl key, and select cells A6 and A9, the labels for Ling and Tremblay.

3. With the three labels selected, on the Ribbon, under the PivotTable Tools tab, click the Options tab.

4. In the Group group, click Group Selection.

This creates a new field named LeadTech2, which you can see in the PivotTable Field List pane, and a new set of labels in the pivot table. The group you created for the selected technicians is labeled Group1, and each of the remaining technicians has a separate label (see Figure 4-28).

3	Row Labels ▾	Count of WO
4	⊟Group1	
5	Burton	388
6	Ling	748
7	Tremblay	333
8	⊟Khan	
9	Khan	456
10	⊟Michner	
11	Michner	449
12	⊟Mugford	
13	Mugford	179
14	**Grand Total**	**2553**

Figure 4-28. *Group selected labels*

Next, you'll group the remaining technicians:

1. In the pivot table, select cell A9, which contains the label for Khan. You can select either the outer label or the inner label, and the result will be the same.

2. Hold the Ctrl key, and select the labels for Michner and Mugford. If you selected an outer label in Step 1, continue to select outer labels. If you selected an inner label in Step 1, continue to select inner labels.

3. With the technician labels selected, on the Ribbon, under the PivotTable Tools tab, click the Options tab.

4. In the Group group, click Group Selection.

This creates another item, named Group2, in the LeadTech2 field.

When you create groups by using the Group Selection command, they are automatically given a numbered name, such as Group1. You can change these names, so they are more meaningful as headings in the pivot table. You'll change the group labels so they show the team names:

1. Select cell A4 that contains the Group1 group label.

2. Type **Team A** as a new name for the group.

3. Press the Enter key to complete the name change.

4. Rename the Group2 group label as **Team B** (see Figure 4-29).

3	Row Labels ▼	Count of WO
4	⊟ Team A	
5	Burton	388
6	Ling	748
7	Tremblay	333
8	⊟ Team B	
9	Khan	456
10	Michner	449
11	Mugford	179
12	Grand Total	2553

Figure 4-29. *Group labels renamed*

The pivot table now shows the lead technicians grouped into their teams. If you want to see the total for each team, you can turn on subtotals, above or below the group items. To see the team totals without the technician names, remove the check mark from LeadTech in the PivotTable Field List pane.

■**Note** If you want to ungroup items that you grouped by selecting them, you will have to ungroup each group separately. Click a group's label cell, and then click the Ungroup command in the Ribbon. When the groups have all been ungrouped, the field's name will be removed from the PivotTable Field List pane.

You can save your file now as WorkOrders_02.xlsx. That will leave the original file unchanged since its last save, and you can use the new file for your work in the next chapter.

Summary

In this chapter, you learned different ways to summarize the data in the pivot table. First, you changed the function that was used for a value field and tested the result of using different functions. You added multiple value fields and summarized the same value field using different functions.

Next, you hid and showed the grand totals for rows and columns, added subtotals to the outer fields in the pivot table, and positioned the subtotals above or below the items.

Finally, you grouped the items in the row fields to summarize by a range of numbers or a date range. For the text field, you manually selected and grouped the items.

I have now covered the basics of summarizing the pivot table data, and next you'll apply formatting to enhance the presentation of the data.

■ ■ ■

Formatting a Pivot Table

In this chapter, you'll continue to work with the WorkOrders pivot table. First, download and open the sample file `WorkOrders_02.xlsx`. You'll add formatting to the pivot table to enhance the data presentation. With suitable formatting, you can make the pivot table easier to read, and you can highlight specific data. You'll also apply, modify, and create pivot table styles and themes in order to make formatting consistent throughout your workbook.

Controlling the Report Layout

First you'll experiment with the overall layout options for the pivot table. Three layouts are available for pivot tables: Compact Form, Outline Form, and Tabular Form. When you create a new pivot table, it is automatically formatted with the Compact Form layout. You'll apply the other two layouts to your pivot table and then reapply the Compact Form layout so you can see the differences.

Applying Outline Form Layout

The first layout you'll apply is the Outline Form layout to see how it differs from the Compact Form layout. Before changing the report layout, you'll turn on the subtotals so you can also see how they are affected by the layout changes:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. At the far left, in the Layout group, click the Subtotals command, and click Show All Subtotals at Top of Group.

4. In the Layout group, click the Report Layout command, and click Show in Outline Form (see Figure 5-1).
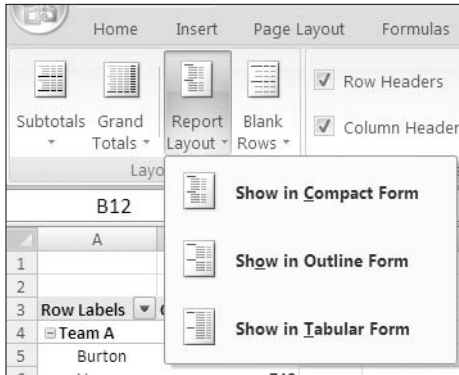
Figure 5-1. *Report Layout menu options*

After you've applied the Outline Form layout, the row labels change from using one column for all the labels to using a separate column for each field (see Figure 5-2). In the Compact Form layout, the labels are all shown in column A, under the heading Row Labels. In Outline Form layout, there are two headings—LeadTech2 is in cell A3, and LeadTech is in cell B3. Below each heading are the labels for the field that is named in the heading cell.

Figure 5-2. *Compact Form (on the left) and Outline Form (on the right) layouts*

The Outline Form layout may be useful when you want to show all the field names as heading labels and aren't concerned about the width of the pivot table.

Applying Tabular Form Layout

Next, you'll apply the Tabular Form layout to the pivot table to see how it differs from the Outline Form layout:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. At the far left, in the Layout group, click the Report Layout command.

4. Click Show in Tabular Form.

After the Tabular Form layout is applied, the first item for each field starts in the first available row (see Figure 5-3). As in Outline Form layout, there are two headings—LeadTech2 is in cell A3, and LeadTech is in cell B3. Below each heading are the labels for the field that is named in the heading cell.

	A	B	C			A	B	C
1					1			
2					2			
3	LeadTech2 ▾	LeadTech ▾	Count of WO		3	LeadTech2 ▾	LeadTech ▾	Count of WO
4	⊟Team A		1469		4	⊟Team A	Burton	388
5		Burton	388		5		Ling	748
6		Ling	748		6		Tremblay	333
7		Tremblay	333		7	Team A Total		1469
8	⊟Team B		1084		8	⊟Team B	Khan	456
9		Khan	456		9		Michner	449
10		Michner	449		10		Mugford	179
11		Mugford	179		11	Team B Total		1084
12	Grand Total		2553		12	Grand Total		2553

Figure 5-3. *Outline Form (on the left) and Tabular Form (on the right) layouts*

Note In the Tabular Form layout, the subtotals are at the bottom of the group, even though you selected the option to show the subtotals above the group.

If you remove the subtotals, the Tabular Form layout will require fewer rows than the Outline Form layout, because it doesn't add an extra row for each group heading, such as Team A and Team B. The Tabular Form layout may be useful when you want to show all the field names as heading labels and aren't concerned about the width of the pivot table but want to reduce the number of rows.

Applying Compact Form Layout

Next, you'll apply the Compact Form layout to the pivot table to return the pivot table to its original layout:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. At the far left, in the Layout group, click the Report Layout command.

4. Click Show in Compact Form.

After the Compact Form layout is applied, the headings for LeadTech2 and LeadTech disappear. The row labels are all shown in column A, under the heading Row Labels, as they were originally (see the Compact Form layout in Figure 5-2). The indentation differentiates the sets of items. Also, because you've removed the Tabular Form layout, the subtotals are now visible at the top of each group.

Adding Blank Rows in the Layout

To add some whitespace to a pivot table and make it easier to distinguish where items end, you can change a setting to add blank rows to the layout. You'll add blank rows to your pivot table to see the effect:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. At the far left, in the Layout group, click the Blank Rows command.

4. Click Insert Blank Line After Each Item (see Figure 5-4).
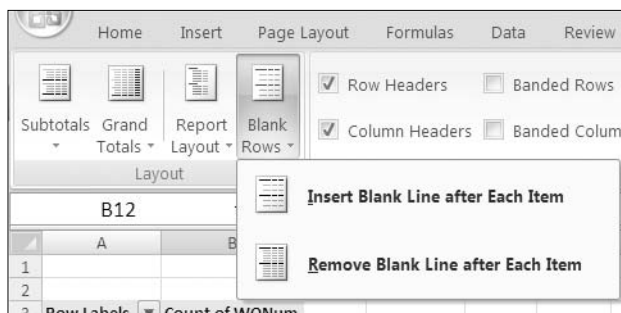
Figure 5-4. *Blank Rows options*

The pivot table now has a blank row after each item in the outer fields in the Row Labels area. Adding this whitespace may make the pivot table easier to read, especially if it is large or is crowded with large numbers.

If you've added blank rows to the pivot table, later you can remove the rows by using the Blank Rows command on the Ribbon. You'll remove the blank rows that you added:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. At the far left, in the Layout group, click the Blank Rows command.

4. Click Remove Blank Line After Each Item.

This removes the blank row after each item and reduces the number of rows in the pivot table.

Using a Pivot Table Style

To quickly and easily format a pivot table, you can apply a pivot table style. If you change the pivot table layout, the pivot table style formatting will adjust to the revised layout, so formatting such as alternating shaded rows will display correctly when rows are added or removed from the pivot table layout.

In Chapter 3 you applied a pivot table style. In this chapter, you'll modify and create pivot table styles and see how the styles work in conjunction with other formatting features in Excel. To get started, you'll apply one of the existing styles:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. Click the More arrow at the bottom right of the PivotTable Styles group.

4. In the Medium section of the PivotTable Style gallery, click Pivot Style Medium 8.

■**Tip** As you point to the styles in the Pivot Table Style gallery, the style will be previewed in the active pivot table.

The style you applied has medium gray fill in the column headings, light gray fill in the row headings, and borders on the grand total row. Next, you'll use other commands on the Ribbon to modify the selected style.

Adding Row and Column Shading

In a large pivot table it may be difficult to visually connect a label at the far left or top of the pivot table to a number in the center of the Values area. To help users follow a wide row or long column of data, you can use the Banded Rows and Banded Columns commands on the PivotTable Design tab.

Applying Banded Rows to the Pivot Table

In your pivot table, you'll add Banded Rows to make it easier to follow the data across the row for each technician:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. In the PivotTable Style Options group, click the Banded Rows command to add a check mark to the option (see Figure 5-5).
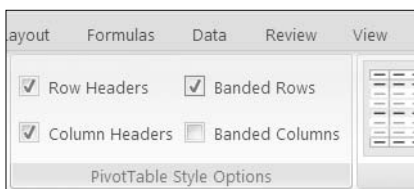
Figure 5-5. *Banded Rows command*

In the pivot table, the formatting changes to include light gray borders between the rows. In the PivotTable Styles group, the style samples have changed to include banded rows.

Tip For some pivot table styles, such as PivotStyle Medium 15, applying the Banded Rows command will create alternating shaded rows, instead of row borders.

---

4. To see the benefit of the row banding, in the PivotTable Field List pane, drag the District field to the Column Labels area.

In the wider pivot table, the gray borders help you read across the rows, connecting the technician names to the data in all the columns.

Applying Banded Columns to the Pivot Table

If a pivot table has long columns, the Banded Columns feature may make it easier to read. Before applying this feature, you'll add another field to the Row Labels area to add more rows:

1. To increase the number of rows in the pivot table, in the PivotTable Field List pane, add a check mark to the Service field. It is added to the Row Labels area, below the LeadTech field.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. In the PivotTable Style Options group, click the Banded Columns command to add a check mark to the option.

In pivot table, the formatting changes to include gray borders between the columns. In the PivotTable Styles group, the style samples have changed to include banded columns.

Tip For some pivot table styles, such as PivotStyle Medium 15, applying the Banded Columns command will create alternating shaded columns, instead of column borders.

Formatting the Row and Column Headers

Another option you can turn on or off in a pivot table style is special formatting for the row headers and column headers. When you create a pivot table, formatting for row headers and column headers is turned on by default.

Removing Row Header Formatting

You'll turn off the row header formatting in your pivot table to see the effect, and then you'll turn it back on:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. In the Options group, click the Row Headers command to remove the check mark from the option (see Figure 5-6).
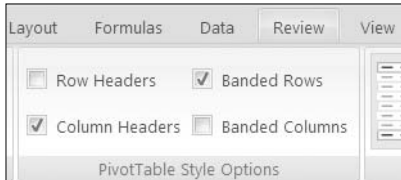
Figure 5-6. *Row Headers command*

In your pivot table, the formatting for the row label headers is removed, and the cells are formatted like the other cells in the body of the pivot table. On the Ribbon, in the PivotTable Styles group, some of the style samples have changed to remove the row header formatting.

4. To turn the row header formatting on again, click the Row Headers command to add a check mark.

Removing Column Header Formatting

You'll turn off the column header formatting in your pivot table to see the effect, and then you'll turn it back on:

1. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

2. In the Options group, click the Column Headers command to remove the check mark from the option.

In the pivot table, the formatting is removed from the column labels, and in the PivotTable Styles group, some of the style samples have changed to remove the column header formatting.

3. To turn the column header formatting on again, click the Column Headers command to add a check mark.

Removing a Pivot Table Style

After applying a pivot table style to a pivot table, you may want to clear the style and start over, or you simply might want to work with an unformatted pivot table. You'll remove the pivot table style from your pivot table to prepare for creating your own pivot table style:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. Click the More arrow at the bottom right of the PivotTable Styles group.

4. At the bottom left of the gallery, click Clear to remove the pivot table style (see Figure 5-7).
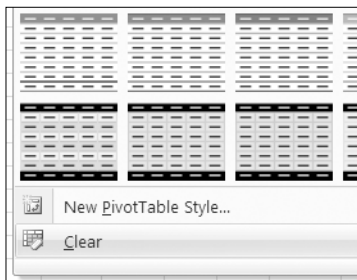
Figure 5-7. *Clearing the pivot table style*

This removes the pivot table style from the pivot table, and the cells have no fill color, bold font, or colored borders; they have only the formatting that was manually applied to the cells. Checking the options in the PivotTable Style Options group on the Ribbon has no effect on the pivot table, because no style is applied.

■**Tip** A pivot table style, None, appears at the top left in the PivotTable Styles group on the Ribbon. You can use it to clear the pivot table style, just as you would use the Clear command.

Creating a Pivot Table Style

In addition to using the built-in pivot table styles, you can create and apply your own pivot table styles, either from scratch or based on an existing pivot table style. You'll create a pivot table style from scratch and apply it to your pivot table:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. Click the More arrow at the bottom right of the PivotTable Styles group.

4. Click New PivotTable Style (shown earlier in Figure 5-7).

5. In the New PivotTable Quick Style dialog box, type **WorkOrders** in the Name box as the name for your new style (see Figure 5-8).

■**Tip** In the Preview section of the New PivotTable Quick Style dialog box, you can see a sample of the formatting as you create it.
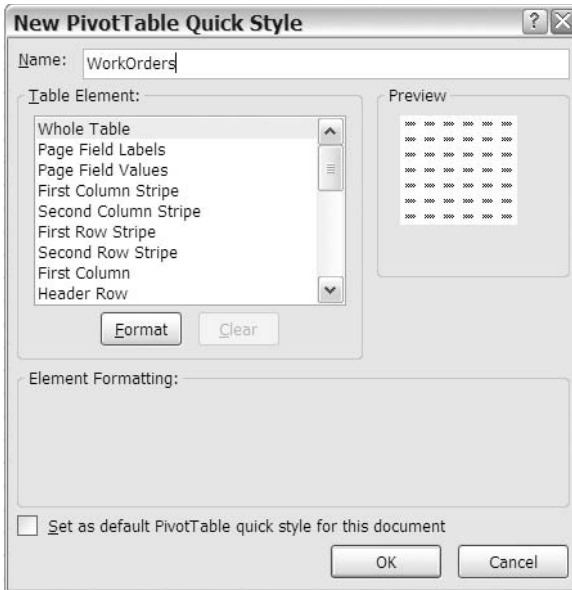
Figure 5-8. *The New PivotTable Quick Style dialog box*

6. In the Table Element list, scroll down to Grand Total Row, click to select it, and then click the Format button.

■**Note** The Grand Total Row element is the row at the bottom of the pivot table. It is different from the Grand Totals for Rows element in the column at the far right of the pivot table.

---

7. In the Format Cells dialog box, click the Fill tab, and select a background color for the grand total row.

8. Click the Border tab, select a line style and line color, and then select borders for the grand total row.

9. Click the Font tab, and select Bold as the font style.

10. Click the OK button to return to the New PivotTable Quick Style dialog box, where the formatted grand total row is listed with a bold font.

■**Tip** Click a formatted table element, and you can view a description of its formatting in the Element Formatting section of the New PivotTable Quick Style dialog box.

---

11. Repeat steps 6 to 10 to format the Header Row and Row Subheading 1 table elements.

12. Click the OK button to close the New PivotTable Quick Style dialog box.

■**Note** The new pivot table style is not automatically applied to the active pivot table.

The pivot table style you created may be visible on the Ribbon, under the PivotTable Tools tab, in the PivotTable Styles group on the Design tab. It is also added to a Custom section of the PivotTable Styles gallery (see Figure 5-9).
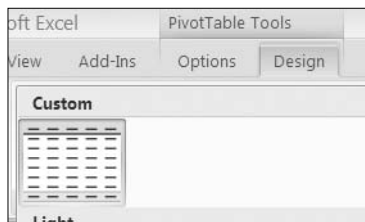
Figure 5-9. *The Custom pivot table styles on the Ribbon*

Applying a Custom Pivot Table Style

After you have created a custom pivot table style, you can apply it to your pivot table. You'll apply the WorkOrders pivot table style to your pivot table:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. Click the WorkOrders style in the PivotTable Styles group (see Figure 5-10).
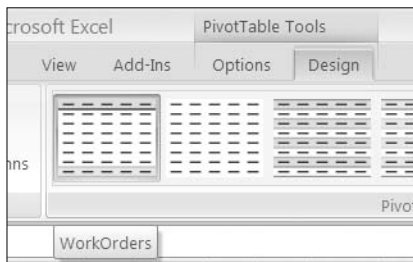
Figure 5-10. *The new pivot table style on the Ribbon*

The WorkOrders custom pivot table style is applied to your pivot table, with the formatting you selected when creating the style.

Modifying a Custom PivotTable Style

After you have created a custom pivot table style, you can modify it. You'll modify the WorkOrders custom pivot table style to remove formatting from one table element and to add formatting to another table element:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. Right-click the WorkOrders custom style in the PivotTable Styles group, and click Modify (see Figure 5-11).
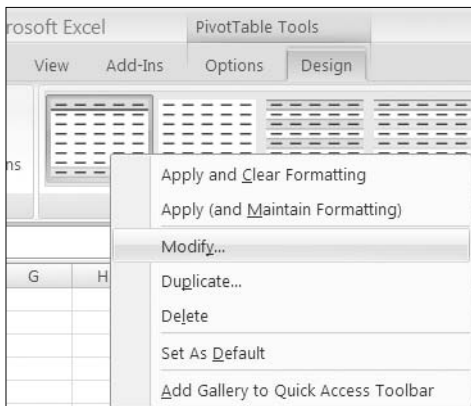
Figure 5-11. *Modifying the custom pivot table style*

4. In the Modify PivotTable Quick Style dialog box, select Row Subheading 1 in the Table Element list, and click Clear to clear its formatting.

5. Select First Row Stripe in the Table Element list, and in the Stripe Size drop-down list, choose 2.

6. Click the Format button, and on the Fill tab, select a background color.

7. Click OK to close the Format Cells dialog box, and you'll see the stripe in the preview section of the Modify PivotTable Quick Style dialog box. Because you set the stripe size to 2, there are two shaded rows and then a row with no fill color.

8. Click OK to close the Modify PivotTable Quick Style dialog box.

Because the WorkOrders style is applied to the active pivot table, you'll automatically see the custom style's changes displayed in the pivot table.

Duplicating a Pivot Table Style

You can duplicate a built-in or custom pivot table style and modify the duplicate copy to create a new pivot table style. Earlier, you created the WorkOrders custom pivot table style from scratch. Now you'll duplicate one of the built-in pivot table styles and then modify it to create a new style:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. In the PivotTable Styles gallery, in the Dark section, right-click Pivot Style Dark 11, and click Duplicate (see Figure 5-12).
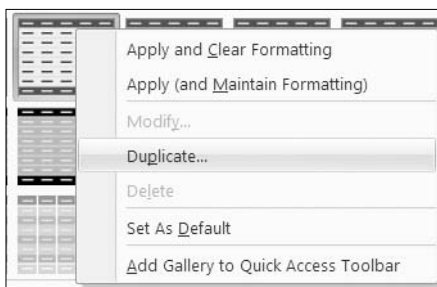
Figure 5-12. *Duplicating a pivot table style*

4. Type **Dark Green Header** as a name for the new pivot table style.

5. In the Table Element list, select Header Row, and format it with dark green background color instead of black.

6. When finished, click the OK button, and then apply the Dark Green Header style to your pivot table.

The new style is applied to the pivot table, with the formatting changes you made.

Deleting a Custom Pivot Table Style

If you no longer need a custom pivot table style, you can delete it. You'll delete the Dark Green Header style you just created:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Design tab.

3. In the PivotTable Styles gallery, right-click the Dark Green Header custom style, and click Delete.

4. In the alert message, click the OK button to confirm the deletion (see Figure 5-13).
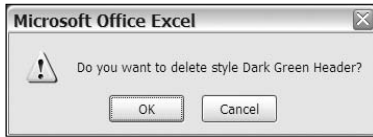
Figure 5-13. *Deleting the custom pivot table style*

Because your pivot table had the Dark Green Header custom style applied, when you deleted that style, the style was automatically removed from your pivot table. You can apply a different style from the PivotTable Style gallery.

5. On the Ribbon, in the PivotTable Styles gallery, click the WorkOrders custom style to apply it to your pivot table.

Using Themes

Another feature in Excel 2007 that affects the formatting is document themes. Each theme is a collection of colors, fonts, and visual effects you can share between Excel and other Microsoft Office applications. You can use the existing themes, create new themes, or modify the built-in themes. In the following sections, you'll experiment with document themes to help you understand their impact on pivot table formatting.

Viewing the Current Theme

First, you'll check the theme information for your workbook to see what theme is currently applied and what its settings are. Later, you'll apply a different theme to see what changes occur.

1. On the Ribbon, click the Page Layout tab.

2. In the Themes group, point to the Themes command, and the tool tip will show Office Theme as the name of the current theme (see Figure 5-14).
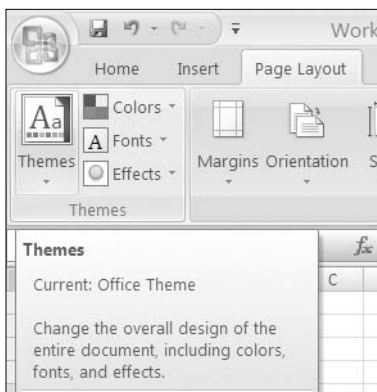
Figure 5-14. *Current theme*

Viewing the Theme Colors

Next, you'll see the colors that are associated with each theme and view the color palette for the current theme:

1. In the Themes group, click Colors to open the color list, where the Office colors are shown as selected (see Figure 5-15). To close the list, click the Colors command again.
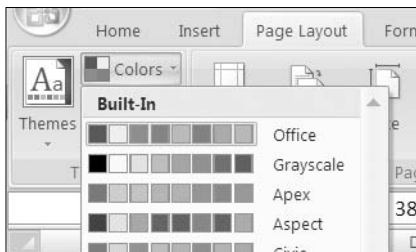
Figure 5-15. *Current colors*

2. To see more of the Office Theme color palette, on the Ribbon, click the Home tab, and then click the arrow on the Fill Color command. The Fill Color palette shows the theme colors in the first row of colors (see Figure 5-16). The colors in the rows below are lighter and darker versions of the theme colors.
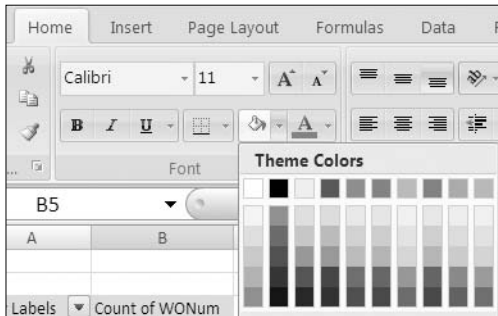
Figure 5-16. *Theme colors in the Fill Color palette*

The first four theme colors are used for text and backgrounds. The next six colors are the accent colors and are also used for the pivot table styles.

Viewing the Theme Fonts

Next, you'll view the fonts associated with the current theme. A theme has two fonts, one for headings and one for the body text.

1. On the Ribbon, click the Page Layout tab.

2. In the Themes group, click the Fonts command to open the list of fonts (see Figure 5-17).
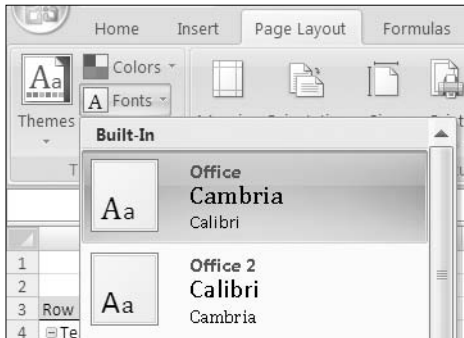
Figure 5-17. *Current theme fonts*

The Office fonts are selected and show that Cambria is the Headings font and Calibri is the Body font. These fonts are also visible in the Font drop-down list on the Home tab on the Ribbon (see Figure 5-18). In your pivot table, Calibri, the Body font from the Office theme, is used.
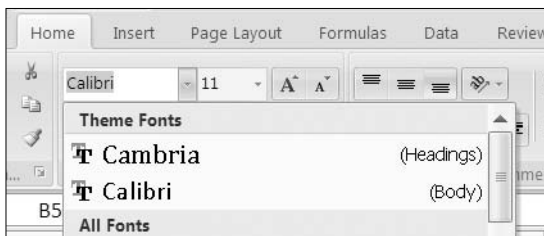
Figure 5-18. *Theme fonts in the Font drop-down list on the Home tab*

Viewing the Theme Effects

Finally, you'll view the effects associated with the current theme. The effects are used in charts and shapes, so if you create a pivot chart, its appearance will be affected by the current theme's effects.

1. On the Ribbon, click the Page Layout tab.

2. In the Themes group, click the Effects command to open the list of effects (see Figure 5-19).
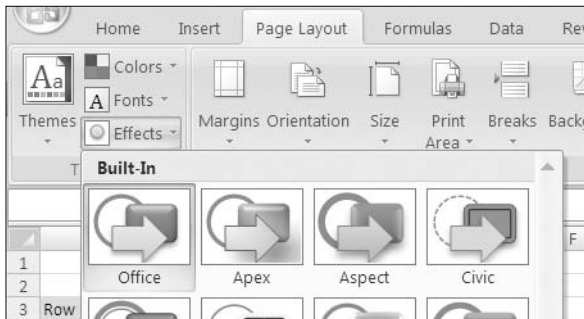
Figure 5-19. *Current theme effects*

The Office theme effects are selected and show the line thickness, fill type, and beveling that would be used for charts and shapes.

Applying a Theme

To change the look of your pivot table, you'll apply a different theme to see what changes occur:

1. On the Ribbon, click the Page Layout tab.

2. In the Themes group, click Themes, and in the Themes gallery, point to the Aspect theme (see Figure 5-20).
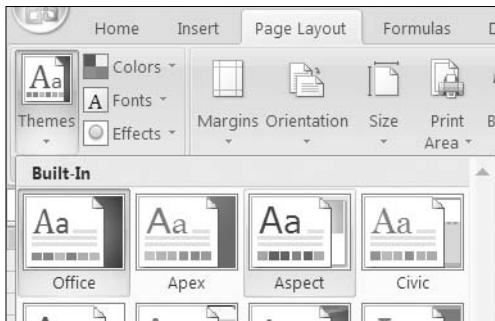
Figure 5-20. *Themes gallery*

3. In your pivot table, the colors and fonts change to match the colors and fonts in the Aspect theme, as shown in the Aspect sample.

4. Click the Aspect theme to select it, and your pivot table now has that theme's fonts and colors applied.

The Aspect theme uses the Verdana font for headings and body and darker colors. Because the Verdana font is wider than the Calibri font, your pivot table is wider. In the Themes group on the Page Layout tab, the icons have changed to reflect the colors, fonts, and effects of the current theme. In the PivotTable Styles gallery, the styles use the colors from the new theme.

Other features are also affected by the change in themes. The font in the row and column buttons changes to the Body font for the current theme. On Sheet1, where your data is stored, the table has changed, using the colors and fonts of the current theme. The Table style gallery also shows styles in the current theme.

5. To reapply the Office theme, return to the Themes gallery, and click the Office theme.

Saving the File

You can save your file now as `WorkOrders_03.xlsx`. That will leave the original file unchanged since its last save, and you can use the new file for your work in the next chapter.

Summary

In this chapter, you added formatting to a pivot table to enhance the data presentation. With suitable formatting you can make pivot tables easier to read and highlight specific data. You also applied, modified, and created pivot table styles to make formatting consistent throughout your workbook. Finally, you examined themes and saw that they have an overriding impact on your pivot table formatting and on other features in the workbook.

Sorting and Filtering in a Pivot Table

Instead of viewing a summary of all the pivot table data, you may want to focus on a specific district's data or one technician's results. In this chapter, you'll filter the pivot table to show only the data from one district or for selected service types and to show the work orders for a specific date range. You'll also sort the data in your pivot table to arrange the summarized data from the highest to lowest values and from the lowest to highest values.

By sorting and filtering the data in a pivot table, you can focus on areas where perform-ance could be improved or pinpoint the activities that are consuming the most resources. With these pivot table tools you can go from the big picture, comparing all aspects of your business, to the small details, homing in on problems for closer analysis.

You'll start by creating a new pivot table and adding report filters by using the WorkOrders_ 03.xlsx file that you can download from the Apress web site.

Adding Report Filters

The service manager has asked you to report on the work that the lead technician named Michner has been doing. The report should show the total hours Michner has worked in each district, and it should indicate which jobs were rush and which were nonrush. For these jobs, what payment type was received?

In the previous chapter, you arranged and formatted a pivot table to count the work orders by teams of technicians. You'll leave that pivot table unchanged so you can refer to it later, if required, and you'll create a new pivot table to analyze the rush jobs and payments.

■**Note** In a workbook, you can create multiple pivot tables from the same source data.

In the WorkOrders_03.xlsx file, you'll review the WorkOrders Excel table, on Sheet1, to see which fields you'll need in the report. The LeadTech field contains the technician name, the District field shows the district name, the LbrHrs field contains the number of hours worked on each job, the Rush field indicates whether the job was a rush, and the Payment field shows the type of payment that was received.

Now that you've determined which fields you need, you'll create a new pivot table with all the data summarized:

1. On Sheet1, select a cell in the Excel table named WorkOrders, and create a pivot table on a new worksheet.

2. On Sheet 5, in the new pivot table, add the LbrHrs field to the Values area, add the Rush field and the District field to the Row Labels area, and then add the Payment field to the Column Labels area.

   The Rush field creates two subheadings in the Row Labels area: Yes and (blank). The (blank) label represents the blank cells in the source data. In the source data, a blank cell means No, so you'll change the label in the pivot table to make it easier to understand.

3. In the pivot table, select cell A15, which contains the (blank) label for the Rush field.

4. Type **No**, and press the Enter key to change the label.

■**Note**   Changing the label in the pivot table does not affect the source data.

---

5. Format the pivot table with a pivot table style. In the example shown in this chapter, PivotTable Style Light 1 was applied.

To make the pivot table easier to read, format the Sum of LbrHrs value field as a number with zero decimal places and a thousands separator. With the values all showing whole numbers, it will be easier to compare the sorted data (see Figure 6-1).

The pivot table summarizes all the data in the WorkOrders Excel table on which it is based. In row 5 (Rush=Yes) on the pivot table worksheet, you can see that only 184 labor hours were spent on rush jobs. In row 15, you can see that nonrush jobs (Rush=No) had 2,069 labor hours.

	A	B	C	D	E	F	G
1							
2							
3	Sum of LbrHrs	Column Labels ▾					
4	Row Labels ▾	Account	C.O.D.	Credit	P.O.	Warranty	Grand Total
5	⊟ Yes		76	88		18	3	184
6	Central		8	24		2	2	35
7	East		7	2			0	9
8	North		20	11		1		31
9	Northeast		8	4				12
10	Northwest		17	19		10	0	46
11	South		2	0			0	2
12	Southeast		5	4		4	0	13
13	Southwest		1	24				25
14	West		10	1		2		12
15	⊟ No		789	980	6	167	128	2,069
16	Central		118	294		23	55	489
17	East		63	44	2	2	6	117
18	North		218	60	3	11	6	298
19	Northeast		36	59	1	3	2	100
20	Northwest		128	161		43	29	360
21	South		104	39		41	5	188
22	Southeast		50	152		10	25	236
23	Southwest		5	88				93
24	West		68	85		35	1	189
25	Grand Total		865	1,068	6	184	131	2,253

Figure 6-1. *Summary of labor hours per payment type*

Adding a Report Filter

Viewing all the data gives you the big picture and lets you compare district totals or payment types. However, the service manager wants the report to show information about the lead technician named Michner. Labor hours for all the technicians are included in the summarized data, but the details for each technician aren't shown. Currently, there's no way to tell who did one hour of labor on credit in the Northeast (cell D19) or who did one hour of labor on a rush job in the Southwest (cell B13).

You could add the LeadTech field to the Row Labels area, and that would show Michner's totals, along with those of all the other technicians. Instead, you'll add the LeadTech field to the Report Filter area to limit the information that's shown.

■**Tip** To show details, add a field to the Row Labels or Column Labels area. To limit the data, add a field to the Report Filter area, and filter the data.

---

1. Select a cell in the pivot table.

2. In the PivotTable Field List pane, right-click the LeadTech field, and in the context menu, click Add to Report Filter (see Figure 6-2).
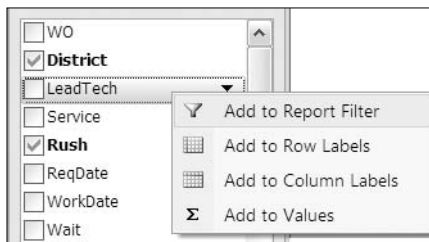
Figure 6-2. *Adding a field to the Report Filter area*

3. The LeadTech field appears in cell A1 on the worksheet, above the body of the pivot table, and its drop-down list shows (All), indicating no filter has been applied.

4. To view the work order summary for only one technician, click the arrow on the LeadTech Report Filter field button, select Michner, and then click OK.

The Grand Total field is reduced to 506 labor hours, which is the total for Michner. You can send your report to the service manager to show the number of hours that Michner spent in each district, to show the number of hours he spent on rush and nonrush jobs, and to show which payment types were used.

Adding Multiple Report Filters

Now that you have filtered the pivot table so only Michner's data is showing, the service manager wants to focus on Michner's installation work. How much time is Michner working on installations in each district? What payment type was most common for the installations?

The type of work is stored in the Service field, so you'll add that field to the pivot table. Since you're interested in only one of the service types, you'll add the field to the Report Filter area, where you can use it to limit the data that's shown:

1. In the PivotTable Field List pane, add the Service field to the Report Filter section, below the LeadTech field.

2. The Service field appears in cell A2 on the worksheet, above the body of the pivot table, and its drop-down list shows (All), indicating that no filter has been applied. The body of the pivot table is automatically moved down one row to make room for the additional report filter (see Figure 6-3).

	A	B		C	D
1	LeadTech	Michner	⬛▾		
2	Service	(All)	▾		
3					
4	Sum of LbrHrs	Column Labels	▾		
5	Row Labels ▾	Account		C.O.D.	P.O.
6	⊟Yes		12	16	6
7	Central		4	6	
8	Northeast			0	
9	Northwest		5	8	5

Figure 6-3. *Two report filters in the pivot table layout*

The pivot table shows only Michner's labor hours but includes all types of work done by Michner. You'll apply a filter to the Service field, so only one type of work is shown.

3. To view the work order summary for only Michner's installations, click the arrow on the Service Report Filter field button, select Install, and then click OK.

■**Note** If there are multiple report filters, the filters are independent of one another. Selecting an item in one report filter does not limit the items that are available in other report filters. Even if Michner had no Install work orders, that item would still be available in the Service report filter.

The pivot table now summarizes only the work orders in which the lead technician was Michner and the service type was an Install. The Grand Total cell (F18) shows that Michner spent 150 hours on this type of service.

Changing the Order of Report Filters

When there are multiple report filters, you can change the order in which they appear on the worksheet. Changing the order of the report filters does not affect the pivot table results, but in some situations it may make the report appear more logical. For example, if you have State, City, and Country in the Report Filter area, you can arrange the filters in order of geographical scope—Country, State, City.

In this report, the service manager is concerned with installation work, so you'll move the Service field so it's above the LeadTech field. This will make it appear at the top of the page if the report is printed.

1. Select a cell in the pivot table.

2. In the PivotTable Field List pane, in the Report Filter area, drag the Service field above the LeadTech field.

On the worksheet, the report filters change position to reflect the change made in the PivotTable Field List pane.

Arranging Report Filters

You currently have two fields in the Report Filters area, and you'll add two more fields so the service manager can see how many jobs were one-technician jobs and which jobs were done in 2007:

1. Select a cell in the pivot table.

2. In the PivotTable Field List pane, add the Techs and Years fields to the Report Filter area, below the LeadTech field.

   The four report filters appear above the body of the pivot table, in cells A1 to B4 (see Figure 6-4).

	A	B	
1	Service	Install	⬚
2	LeadTech	Michner	⬚
3	Techs	(All)	▾
4	Years	(All)	▾
5			
6	**Sum of LbrHrs**	**Column Labels**	▾
7	**Row Labels**	▾ Account	C

Figure 6-4. *Four fields in the Report Filters area*

3. To view the jobs that were done by one technician, click the arrow on the Techs Report Filter field button, select 1, and then click OK.

4. To view the jobs that were done in 2007, click the arrow on the Years Report Filter field button, select 2007, and then click OK.

The grand total shows that Michner spent 59 hours on installation jobs in 2007, where there was one technician.

Arranging the Report Filters Horizontally

When a pivot table has multiple report filters, you can arrange them vertically above the pivot table body or horizontally. Each arrangement has some benefits, and you can decide what best suits the pivot table on which you're working.

First, you'll arrange the report filters horizontally to see how that affects the pivot table layout. You'll specify how many report filters should be in each row above the pivot table.

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. At the far left, in the PivotTable group, click the Options command to open the PivotTable Options dialog box.

4. On the Layout & Format tab, in the Layout section, select Over, Then Down from the Display Fields in Report Filter Area drop-down (see Figure 6-5). The Report Filter Fields per Column option changes to Report Filter Fields per Row.
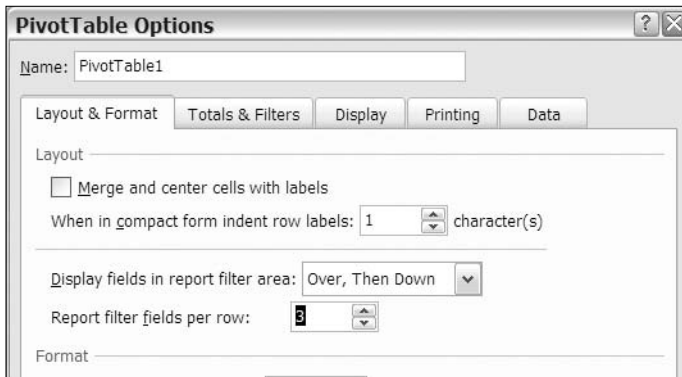
Figure 6-5. *Report filter field settings in PivotTable Options*

5. In the Report Filter Fields per Row setting, enter **3**, and then click OK.

The report filters are now arranged horizontally above the pivot table. The first three report filters are in row 3, and the last report filter is in row 4 (see Figure 6-6). You specified that there should be three filters per row and the filters should go down to start another row of filters, if required.

Figure 6-6. *Report filters arranged over and then down*

Arranging the Report Filters Vertically

Next, you'll arrange the report filters vertically to see how that affects the pivot table layout. This time, instead of using a Ribbon command, you'll use a context menu to open the PivotTable Options dialog box:

1. Right-click cell E7, which is the Grand Total column heading, to open a context menu and mini-toolbar (see Figure 6-7).

■**Note** As the name implies, context menu commands will vary, based on the type of cell on which you right-click. For example, the commands for a value cell will be different from the commands for a row label cell.

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2. In the context menu, click PivotTable Options.
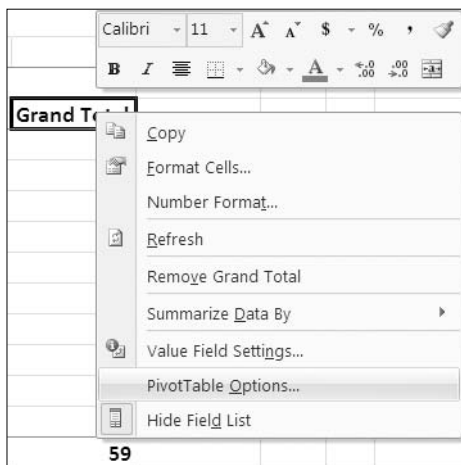
Figure 6-7. *PivotTable Options command on the context menu*

3. In the PivotTable Options dialog box, on the Layout & Format tab, in the Layout section, select Down, Then Over from the Display Fields in Report Filter Area drop-down. The Report Filter Fields per Row option changes to Report Filter Fields per Column.

4. In the Report Filter Fields per Column setting, enter **3**, and then click the OK button.

The report filters are now arranged vertically above the pivot table. The first three report filters are in column A, and the last report filter is in column D (see Figure 6-8). You specified that there should be three filters down per column and that the filters should go over to start another column of filters, if required.

	A	B		C	D	E	
1							
2	Service	Install	☑		Years	2007	☑
3	LeadTech	Michner	☑				
4	Techs	1	☑				
5							
6	Sum of LbrHrs	Column Labels	▼				
7	Row Labels ▼	Account		C.O.D.	Warranty	Grand Total	
8	⊟ Yes			1	3	4	
9	Central			1		1	

Figure 6-8. *Report filters arranged down and then over*

If your pivot table has many report filters, you can adjust the arrangement of the filters to make the most efficient use of the worksheet space. You'll want the report filters easily accessible, not spread out too far across the worksheet. You'll also want to avoid a long column of filters above the pivot table, pushing the pivot table body far down the worksheet. By using the Display Fields in Report Filter Area option, you can find the best balance of height and width for the report filter layout.

Clearing All Filters

You have finished your reports for the service manager and want to show all the data in the pivot table again. Instead of resetting each filter individually, you can change them all at once. This will clear all the report filters and any label filters or value filters.

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Actions group, click Clear, and then click Clear Filters (see Figure 6-9).
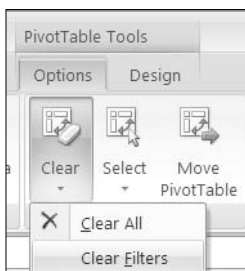
Figure 6-9. *Clear Filters command*

All report filters are reset to show (All), and the pivot table summarizes data from all the work orders.

Moving Labels

With report filters, you changed the way that data was summarized in the pivot table, limiting the data that was included. Another way you can change how data is presented in a pivot table is to move the labels. When you add a field to the Row Label or Column Label area of the pivot table, its labels are usually sorted alphabetically. In some reports, you may want to see the labels in a nonalphabetical order, and you can accomplish this by manually moving the labels.

In your pivot table, the district labels are arranged alphabetically, with Central at the top of the list and West at the bottom. The manager of the South district has asked for a copy of the pivot table, so you'll manually rearrange the labels to create a nonalphabetical order, with South at the top of the list. This will make that district's information stand out in the report.

Dragging Labels to a New Position

In the list of districts, you'll move the South district higher in the list by dragging its label:

1. In the pivot table, select cell A14, which contains the South item label.

2. Point to the border of the cell, and when the pointer changes to a four-headed arrow, drag the cell up to above the Central label. An insertion bar indicates where the label will be dropped (see Figure 6-10).

	Sum of LbrHrs	Column Labels					
6							
7	Row Labels	Account	C.O.D.	Credit	P.O.	Warranty	Grand Total
8	⊟ Yes		76	88	18	3	184
9	Central		8	24	2	2	35
10	East		7	2		0	9
11	North		20	11	1		31
12	Northeast		8	4			12
13	Northwest		17	19	10	0	46
14	South		2	0		0	2
15	Southeast		5	4	4	0	13
16	Southwest		1	24			25

Figure 6-10. *Dragging label to a new position*

3. Release the mouse button, and the South item label moves, along with its row of data. Although you moved only the South label in the Rush Yes group, the South label in the Rush No group has also moved, from A24 to A19.

You can now send the report to the South district, with its data at the top of the list of districts. Manually moving a label allows you to override the default alphabetical sorting in the field and gives you great flexibility in the item order.

Using Commands to Move Labels

Your next report will be sent to the West district, so you'd like that district's information at the top of the list of districts. Another way to manually move the labels is to use a context menu. You'll use a context menu to move the West label to the top of the list:

1. In the pivot table, right-click cell A17, which contains a label for the West district.

2. In the context menu, click Move, and then click Move "West" to Beginning (see Figure 6-11).

Figure 6-11. *Moving a label with a context menu command*

3. The West label moves, along with its row of data. The West label in the Rush No group has also moved, from A27 to A19.

You may prefer to use this method for moving a label if you find it easier than positioning the pointer over the cell border and using the four-headed arrow to drag the label.

Moving Labels by Typing

The next report is for the East district. A third way to manually move the labels is by typing. You'll use this method to move the East item to the top of the list:

1. In the pivot table, click cell A9, which contains the West label. This is the position in which you'd like the East label, which is currently in cell A12.

2. Type **East** in cell A9, replacing the West label (see Figure 6-12), and then press the Enter key.

Figure 6-12. *Typing over an existing label*

3. The East label moves up to row 9, along with its row of data. The labels that were above East have moved down, with the West label now in cell A10.

You may prefer to use this method for quickly moving an item label if it has a short, easy-to-spell label.

■**Caution** If you misspell the label, Excel will rename the label you overtyped, and the labels will not move.

Sorting Labels

When you add a field to the Column Labels or Row Labels area of the pivot table, the labels are usually sorted alphabetically in ascending order. For some fields, you may prefer the labels in descending order. After making changes to the pivot table, such as manually moving the labels, the sort order may have changed, and you may want to restore the alphabetical order to the labels. You'll sort the labels in your pivot table to see labels in descending or ascending order.

Sorting the Labels with a Ribbon Command

When you added the Rush field to the Row Labels area, Yes was added at the top of the list, and the No item (blank) was added at the bottom. You changed the (blank) label to No, and now you want the rush labels in alphabetical order.

To sort the labels in a pivot table field, you can use the Ribbon commands. You'll sort the labels in the Rush field, so the No label is at the top of the list, instead of the Yes label:

1. In the pivot table, select cell A8, which contains the Yes label for the Rush field.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Sort group, click Sort A to Z to sort the rush items in ascending order (see Figure 6-13).
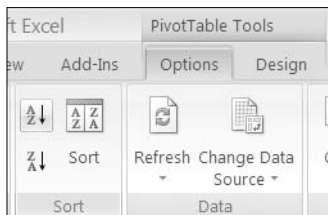
Figure 6-13. *Sorting A to Z*

The Yes rush label moves down in the pivot table, and the No label moves to the top of the pivot table.

After reviewing the revised order, you decide to sort the field again, so the Yes label is at the top. To return the labels to their original positions, you'll sort the labels in descending order:

1. In the pivot table, select cell A8, which contains the No label for the Rush field.

2. In the Sort group, click Sort Z to A to sort the rush items in descending order.

■**Note** The Sort commands are also available on the Data tab of the Ribbon.

Sorting Labels with a Context Menu

In the pivot table, the Payment field is in the Column Labels area, with labels arranged alphabetically, from Account on the left to Warranty on the right. You want to sort these labels in descending order so Warranty is on the left.

You'll use a context menu to sort the payment labels in descending order:

1. In the pivot table, right-click one of the payment labels. For example, right-click cell F7, which contains the Warranty label.

2. In the context menu, click Sort, and then click Sort Z to A to sort the items in descending order (see Figure 6-14).

Figure 6-14. *Sorting labels in descending order*

3. The payment items are sorted in descending order, from left to right, starting with Warranty in cell B7.

You may prefer to use this method for sorting labels if the Sort group on the Ribbon is not visible.

Sorting Labels with the Heading Drop-Down List

While preparing your reports earlier, you manually moved a few of the district labels. You'd like to sort the list of districts in ascending order so they're back to the original list order. Another method for sorting the labels is to use the drop-down arrows on the Row Label and Column Label headings. You'll use this method to sort the district labels in ascending order:

1. In the pivot table, click the arrow on the Row Labels heading, in cell A7.

2. In the Select Field drop-down list, Rush is the field that is currently showing. Click the drop-down arrow, and choose District, which is the field you want to sort (see Figure 6-15).
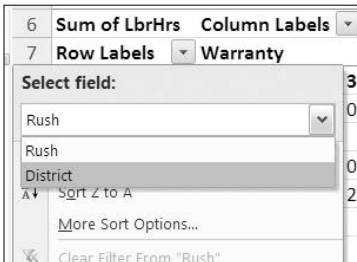
Figure 6-15. *Selecting the field to sort*

3. In the list of sort options, click Sort A to Z to sort the labels in ascending order.

The district labels are sorted in ascending order, as they were originally. You can use this method of sorting if you don't want to select a label before sorting.

Sorting Values

In addition to sorting the labels by their text, you can sort the pivot table by the values. This will move the largest or smallest numbers to the top of the list so you can focus your attention on those items. You'll sort the Grand Total column to arrange the values in ascending order.

Sorting from Smallest to Largest

Under each rush item in the row labels, the pivot table has an alphabetical list of districts. For each rush item, you want to see which districts have the smallest number of labor hours (LbrHrs), so you'll sort by the values:

1. In the Grand Total column, right-click one of the district totals in column G. For example, right-click cell G9, which contains the total of labor hours for the Central district for Yes rush work orders.

2. In the context menu, click Sort, and then click Sort Smallest to Largest to sort the labor hours in ascending order.

Values within each rush group are sorted in ascending order, showing that the South district has the lowest number of labor hours for rush work orders (Yes) and the Southwest district has the lowest number of labor hours for nonrush work orders (No).

Sorting from Largest to Smallest

The next report you have been asked to create will focus on the payment type. In your pivot table there is a column for each payment type, with labels in cells B7 to F7. In the Account column (F), you can see the number of labor hours for each district. Currently, the districts are listed under the rush labels, so there are two numbers for each district in the Account column—one in the Yes section and one in the No section.

You want to see which districts have the highest number of labor hours (LbrHrs) with an Account payment type, so you'll modify the pivot table to create one number for each district in the payment columns. After you make that change to the layout, you'll sort on the values in the Account column.

To create one number for each district, you'll remove the Rush field from the pivot table layout:

1. In the PivotTable Field List pane, remove the check mark from the Rush field. The Rush headings are removed from the pivot table layout, and the pivot table shows the total labor hours for each district. Even though you changed the layout, the Grand Total column is still sorted in ascending order.

2. Right-click one of the district values in column F. For example, right-click cell F8, which contains the Account labor hours for the Northeast district.

3. In the context menu, click Sort, and then click Sort Largest to Smallest to sort the labor hours in the Account column in descending order.

Values in the Account column are sorted in descending order, showing that the North district has the largest number of labor hours (238) paid on account (see Figure 6-16). The Southwest district has the smallest number (6).

	A	B	C	D	E	F	G
1							
2	Service	(All) ▾		Years	(All) ▾		
3	LeadTech	(All) ▾					
4	Techs	(All) ▾					
5							
6	Sum of LbrHrs	Column Labels ▾					
7	Row Labels ▾	Warranty	P.O.	Credit	C.O.D.	Account	Grand Total
8	North	6	12	3	71	238	329
9	Northwest	29	53		180	145	406
10	Central	57	24		317	125	523
11	South	5	41		39	106	190
12	West	1	37		86	78	201
13	East	6	2	2	45	69	125
14	Southeast	25	14		156	55	249
15	Northeast	2	3	1	63	43	111
16	Southwest				112	6	118
17	Grand Total	131	184	6	1,068	865	2,253

Figure 6-16. *Account column values in descending order*

Sorting a Grand Total Row

Besides sorting a column's values in ascending or descending order, you can also sort a row's values. Currently, the payment labels in row 7 are sorted in descending alphabetical order, with Warranty at the left and Account at the right. You'll sort the payment grand totals so the payment type with the largest number of labor hours is at the left. In the Grand Total row, you can see that the C.O.D. payment type has the highest number, so it should move to the left when you sort by the Grand Total values.

1. Right-click one of the payment grand totals in row 17. For example, right-click cell B17, which contains the grand total for the Warranty column.

2. In the context menu, click Sort, and then click Sort Largest to Smallest to sort the labor hours in descending order, left to right.

The Grand Total values in row 17 are sorted in descending order. In row 7, the payment labels have been sorted with the grand totals. At the left is the C.O.D payment type, which has the largest number of labor hours, and at the right is the Credit payment type, which has the smallest number of labor hours. The Grand Total column (G) is not affected by the sort and remains at the far right of the pivot table.

Sorting from Left to Right

You're preparing a report for the North district, and instead of sorting by the Grand Total row, you'd like to sort the values in the North district row. Although the Grand Total row can be sorted easily, sorting other rows requires a few more steps.

Currently, the grand total amounts are sorted in descending order, with C.O.D. at the left and Credit at the right. You'll sort the North district, in row 8, by its labor hour amounts so the column with the largest number of labor hours in the North district is at the left. In that row, cell C8 has the largest number, so after the sort, the Account column should be at the far left.

1. In the pivot table, select a cell in the North district row. For example, select cell B8, which contains the C.O.D. total for the North district.

   You can't use the Sort Largest to Smallest command on the context menu to sort any row of values, except the grand total. To sort the North district row, you'll open the Sort By Value dialog box.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Sort group, click the Sort button to open the Sort By Value dialog box.

4. Under Sort options, select Largest to Smallest.

5. Under Sort direction, select Left to Right. In the Summary section, you'll see a summary of the sort settings (see Figure 6-17). The Summary section indicates you will sort using values in the North row.

6. Click the OK button.

The labor hours for the North district are sorted largest to smallest, from left to right. The Account column is now at the far left, because it has the largest number of labor hours for the North district. Labor hours for other districts, such as Central, may not be in descending order, since the column order has been set by the North district.
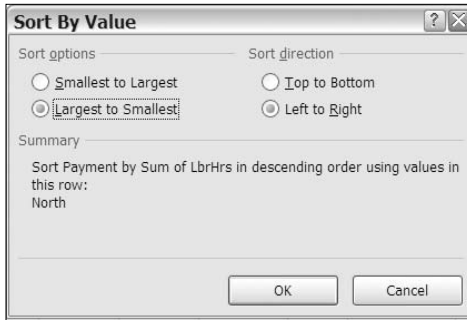
Figure 6-17. *Sort By Value dialog box*

Sorting Automatically When the Pivot Table Changes

When you sorted the pivot table values, you didn't apply any report filters, so all the work orders were summarized. You want to see the data for Michner only, so you'll choose that name from the LeadTech report filter and see the effect of applying a filter when the values are sorted.

Currently, the Account column is sorted in descending order, and the North district row is sorted in descending order.

1. In the LeadTech report filter, select Michner.

2. Click OK to filter the pivot table data for that technician's data.

The Account column remains sorted in descending order, and the Central district now appears at the top of the list of districts. That is the district in which Michner has the largest number of labor hours that were paid on account.

The values in the North district row have also changed, and this affected the column order. The P.O. column has moved to the left because, in the North district, it is the payment type with the largest number of labor hours (four) for Michner (see Figure 6-18).

	A	B	C	D	E	F
1						
2	Service	(All)		Years	(All)	
3	LeadTech	Michner				
4	Techs	(All)				
5						
6	Sum of LbrHrs	Column Labels				
7	Row Labels	P.O.	Account	Warranty	C.O.D.	Grand Total
8	Central	1	40	20	116	177
9	Northwest	11	33	6	81	130
10	South	1	18	2	9	29
11	Southeast	5	11	15	39	70
12	West	7	5		11	23
13	Northeast		3		12	15
14	Southwest		3		46	48
15	North	4	2	2		8
16	East		1	3	5	8
17	**Grand Total**	28	113	47	318	506

Figure 6-18. *Row and column sorted with report filter applied*

Preventing Automatic Sorting

In some cases, you may prefer that the sort order not change when the pivot table changes. You'll change a setting so the districts will remain in their current order, even if the report is filtered. First you'll remove the filter to restore the previous order, and then you'll change the sort setting for districts:

1. In the LeadTech report filter, select (All), and then click OK. The filter is removed, and the columns and rows are returned to their previous orders.

2. In the pivot table, right-click a district label cell. For example, right-click cell A8, which contains the North district label.

3. In the context menu, click Sort, and then click More Sort Options.

4. The Sort dialog box opens, showing the name of the current field, District, in the title bar of the dialog box (see Figure 6-19).

   In the Sort options section, Descending (Z to A) By, is selected and shows that the districts are sorted by Sum of LbrHrs.

   In the lower half of the dialog box, the Summary section shows that the Account column values are used for the sort order.
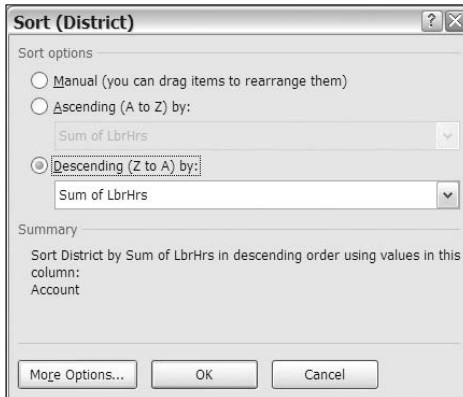
Figure 6-19. *Sort dialog box*

5. At the bottom of the dialog box, click the More Options button.

6. The More Sort Options dialog box opens, showing the name of the current field, District, in the title bar of the dialog box (see Figure 6-20).
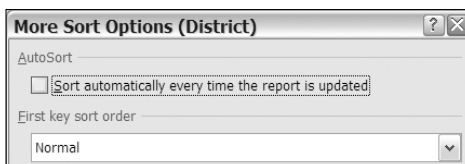
Figure 6-20. *More Sort Options dialog box*

7. In the AutoSort section, remove the check mark from Sort Automatically Every Time the Report Is Updated (see Figure 6-20).

8. Click OK to close the More Sort Options dialog box, and then click OK to close the Sort dialog box.

■**Note** The sort for the Payment labels changes when the District AutoSort is turned off. You could reapply this filter later, if desired.

You'll choose a technician name from the LeadTech report filter to see the effect of changing the sort update setting:

1. In the LeadTech Report Filter, select Michner.

2. Click OK to filter the pivot table data for that technician's data.

The districts remain in the previous order, with North at the top, even though the North district does not have the largest amount in the Account column.

Restoring Automatic Sorting

You'll open the Sort dialog box to see how the sort settings have been changed and to restore the previous settings:

1. In the pivot table, right-click a cell that contains a district label.

2. In the context menu, click Sort, and then click More Sort Options.

   The Sort dialog box opens, and in the Sort options section, Manual is selected, instead of Descending (Z to A). This setting was changed automatically to prevent the district labels from sorting when you filtered the report.

3. Select Descending (Z to A), and from the drop-down list, choose Sum of LbrHrs. This will sort the districts by their values in the LbrHrs field.

4. At the bottom of the dialog box, click the More Options button.

   This opens the More Sort Options dialog box, where you'll turn the AutoSort option on again and select a column in which the values should be sorted.

5. In the AutoSort section, add a check mark to Sort Automatically Every Time the Report Is Updated.

   In the Sort By section, Grand Total is currently selected. You'll change this so it sorts on the values in the Account column, which is column C.

6. In the Sort By section, select Values in Selected Column, and type **$C$8** in the column box so the Account column will be used for sorting (see Figure 6-21). Instead of $C$8, you could type the address of any cell in the Account column.

Tip Instead of typing the address, you can click a cell in the pivot table's Account column on the worksheet.
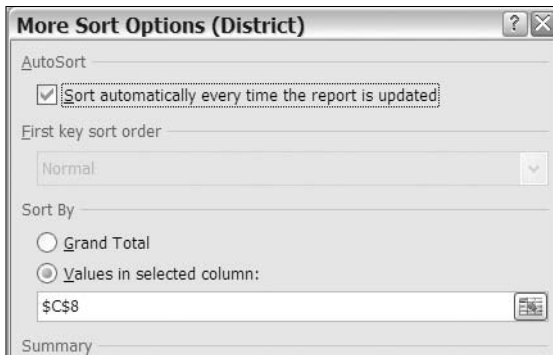
Figure 6-21. *Restoring the AutoSort settings*

7. Click OK to close the More Sort Options dialog box, and then click OK to close the Sort dialog box.

The pivot table is sorted by the values in the Account column, and the Central region is at the top, since that is the largest amount for Michner (see Figure 6-22).

	A	B	C	D	E	F
1						
2	Service	(All)	▾	Years	(All) ▾	
3	LeadTech	Michner	▾			
4	Techs	(All)	▾			
5						
6	**Sum of LbrHrs**	**Column Labels**	▾			
7	**Row Labels** ▾	**C.O.D.**	**Account**	**Warranty**	**P.O.**	**Grand Total**
8	Central	116	40	20	1	177
9	Northwest	81	33	6	11	130
10	South	9	18	2	1	29
11	Southeast	39	11	15	5	70
12	West	11	5		7	23
13	Northeast	12	3			15
14	Southwest	46	3			48
15	North		2	2	4	8
16	East	5	1	3		8
17	**Grand Total**	**318**	**113**	**47**	**28**	**506**

Figure 6-22. *Pivot table sorted by amounts in the Account column*

Now that you have restored the sort settings, the sort order for the district labels will update automatically when the pivot table changes.

Sorting Labels in a Custom Order

In some situations you may want labels sorted in a custom order that is not alphabetical or numerical. For example, when including the service types in a pivot table, you may need to list them in the following order to match other reports produced in your company:

- Install

- Replace

- Repair

- Assess

- Deliver

You could manually rearrange the service type labels after you add them to the pivot table, but it would be easier to have the labels automatically sorted in this custom order. You'll move the Service field to the Row area of the pivot table and sort them alphabetically. Later, you'll sort them in a custom sort order.

1. Select a cell in the pivot table.

2. In the PivotTable Field List pane, move the Service field from the Report Filter section to the Row Labels section, below the District field.

3. Right-click a cell in the service labels, and in the context menu, click Sort. Then click Sort A to Z.

The service types are listed under each district in ascending alphabetical order.

Creating a Custom List

You'll create a custom list of service types in the order in which you want them sorted automatically:

1. Click the Microsoft Office Button on the Ribbon.

2. At the bottom right, click the Excel Options button.

3. In the Excel Options dialog box, click Popular.

4. In the Top Options for Working with Excel section, click Edit Custom Lists. The Custom Lists dialog box opens and shows all the existing custom lists. You can add your own lists by typing them or by importing lists from a worksheet.

5. In the Custom Lists dialog box, under Custom lists, select NEW LIST.

6. Click in the List Entries section, and type a list of the service types, pressing the Enter key after each service type: Install, Replace, Repair, Assess, Deliver (see Figure 6-23).
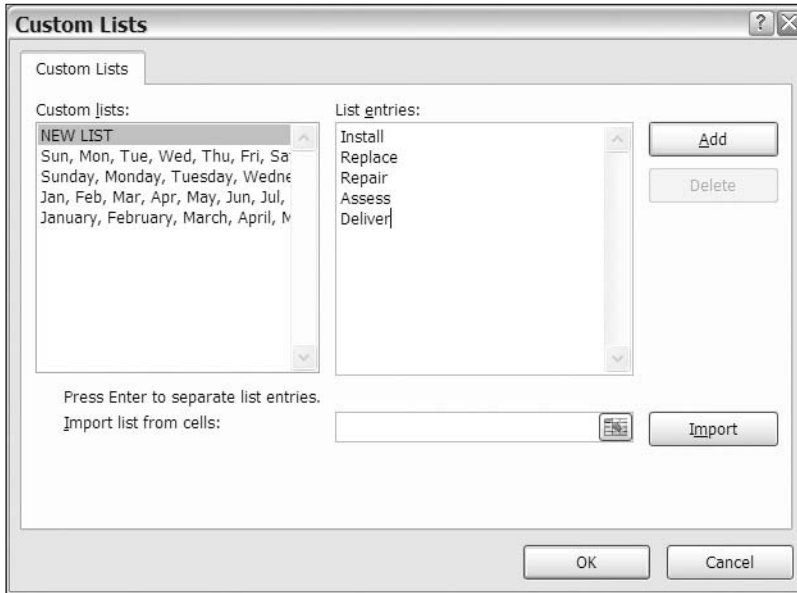
Figure 6-23. *Creating a custom list*

7. Click the Add button to add your list to the Custom Lists area.

8. Click the OK button to close the Custom Lists dialog box, and then click the OK button to close the Excel Options dialog box.

Sorting with a Custom List

After creating a custom list, the custom sort order isn't automatically applied to fields that are already in the pivot table layout. You'll refresh the pivot table to apply the custom list sort order:

1. Right-click any cell in the pivot table, and click Refresh.

The service types are listed under each district in the custom list order.

Sorting Without Using a Custom List

If you don't want to use custom lists when sorting in a pivot table, you can change a pivot table setting to block their use:

1. Right-click any cell in the pivot table, and click PivotTable Options.

2. In the PivotTable Options dialog box, click the Totals & Filters tab.

3. In the Sorting section, remove the check mark from Use Custom Lists When Sorting (see Figure 6-24), and then click OK.
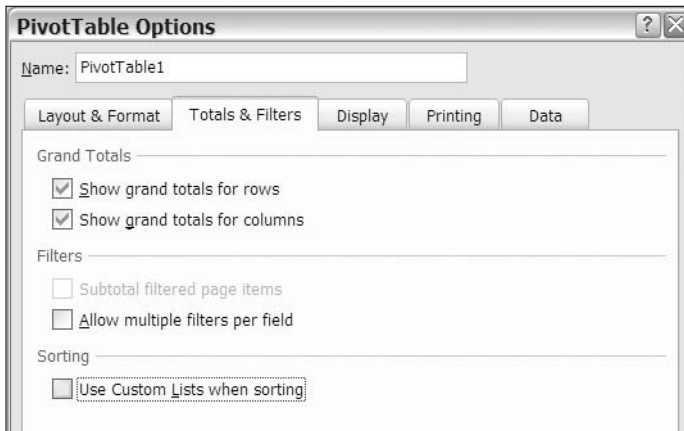
Figure 6-24. *Using custom lists when sorting*

The custom sort order is removed, and the service types are sorted in ascending alphabetical order.

■**Note** Changing the Use Custom Lists When Sorting setting will affect all fields in the active pivot table.

Filtering Row and Column Labels

Another feature that will help as you focus on specific data in the pivot table is filtering the row and column labels. You don't have to move a field to the Report Filter area to filter it; you can keep the pivot table layout as it is and filter the labels to reduce the amount of data that's shown in the pivot table.

Filtering for Begins With

Currently, all the districts are visible in the pivot table. You have been asked to create a report that shows only the districts in the north—North, Northeast and Northwest—so you'll use a label filter to hide the other districts.

The names of all the districts in the north begin with *North*, so you'll filter for that text string:

1. Click the drop-down arrow in the Row Labels heading.

2. In the Select Field drop-down list, choose District.

3. Click Label Filters, and then click Begins With (see Figure 6-25).

Figure 6-25. *Label filters for Begins With*

4. In the Label Filter dialog box, the drop-down box at the left shows *begins with*. Where the cursor is flashing, type **North** (see Figure 6-26), which is the text string you want to filter, and then click OK.

Figure 6-26. *Label Filter dialog box*

■**Note** The filter is not case sensitive, so items that begin with *north* or *NORTH* would also be visible after the filter is applied.

In the district labels, only the labels that begin with *North* are still visible. All other districts are hidden, and the grand totals show the amounts for the filtered districts only. The LeadTech report filter is still applied, so the results are for Michner only. You can see that more than half of the labor hours for Michner in the three northern districts were paid by C.O.D.

The drop-down arrow on the row labels shows a filter icon to indicate that a filter is currently applied to the labels. In the PivotTable Field List pane, a filter icon is visible to the right of the District field.

Filtering for Contains

For your next report, you need to list all the districts that are in the east or west. These districts have the text *east* or *west* in their names. When you filtered the district labels to show only the labels that begin with *North*, you may have noticed the long list of options for filtering. You'll use a different option in your next filter to filter for districts in the east and west.

1. Click the drop-down arrow in the Row Labels heading.

2. In the Select Field drop-down list, choose District.

3. Click Label Filters, and then click Contains.

4. In the Label Filter dialog box, the drop-down box shows *contains*. Where the cursor is flashing, type **e*st** (see Figure 6-27). The asterisk is a wildcard that represents any series of characters or no characters.

Because you used the * wildcard, the filter will return district names that contain *East*, because those names have an *e* and then one character and then *st*. The filter will also return district names that contain *West*, because those names have an *e* and then no character and then *st*.
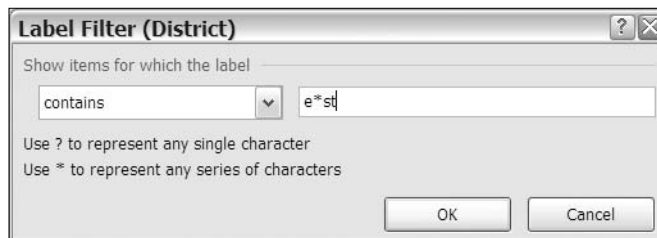
Figure 6-27. *Label Filter dialog box*

5. Click the OK button.

All the districts that contain *east* or *west* in their names are visible in the pivot table, and the other districts, such as North and Central, are hidden.

Viewing Filter and Sort Information

After applying a filter or sort to the row or column labels, you can quickly view a summary of the current status. You'll view the current filter and sort information:

1. Point to the drop-down arrow in the Row Labels heading.

2. In the tool tip that appears, the current filter and sort information is listed for the fields in the Row Labels area (see Figure 6-28).
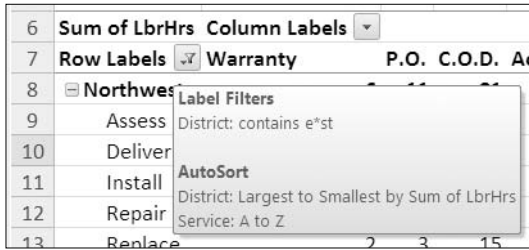
Figure 6-28. *Filter and sort information in tool tip*

Removing Filters

After applying a filter to the row labels, you can remove it to show all the labels again. You'll remove the filter that you applied to the district labels:

1. Click the drop-down arrow in the Row Labels heading.

2. In the Select Field drop-down list, choose District.

3. Click Clear Filter from "District" (see Figure 6-29).
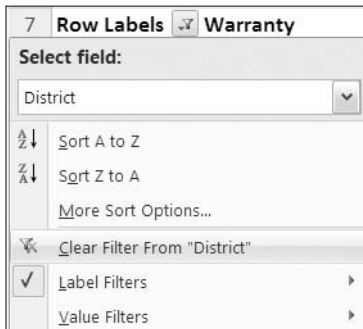
Figure 6-29. *Clearing the filter*

The filter is removed from the district labels, and all the districts are visible again.

Filtering Values

In addition to filtering the row and column labels, you can filter the values in the pivot table. You may want to view only the values that are within a certain range or exceed a specific amount. By filtering the values, you can limit what's shown in the pivot table and focus on only the values that are of current interest.

Filtering Values for Row Fields

Currently, the pivot table is showing Michner's labor hours. In the Grand Total column, you can see the number of hours that Michner spent on each service type in each district. You want to focus on the service types and districts where Michner spent most of his time, so you'll filter the grand totals for the service rows.

By reviewing the grand totals, you can see that most of the totals are less than 30 hours, so you decide to use that as your cutoff point. You'll apply a filter so only the amounts greater than 30 hours are visible for any service in a district:

1. In the pivot table, click the arrow on the Row Labels heading, in cell A7.

2. In the drop-down list, in the Select Field list, choose Service.

3. Click Value Filters, and then click Greater Than.

4. In the Value Filter dialog box, the title bar shows the name of the current field, Service.

5. The first drop-down box shows Sum of LbrHrs, and the second drop-down box shows *is greater than*. Leave those settings unchanged (see Figure 6-30).
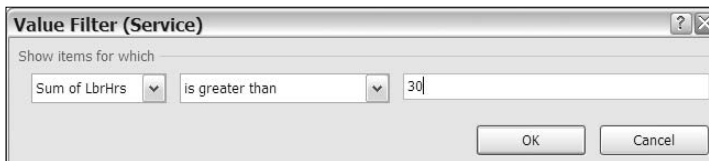
Figure 6-30. *Value Filter dialog box*

6. In the third box, enter **30** as the number of hours you want to exceed, and then click OK.

The filter is applied, and only four service labels remain visible, three in the Central district and one in the Northwest district (see Figure 6-31). The total for Assess in the Central district shows as 30, but if you select the cell and look in the Formula Bar, you'll see that it's actually 30.25. Therefore, it meets the filter criteria and is displayed in the filtered pivot table.

Figure 6-31. *Pivot table with value filter applied*

Filtering Values for Column Fields

At the bottom of the pivot table, the grand totals for the Column fields can also be filtered. To focus on the payment types with the highest number of labor hours, you'll filter the grand totals for the Payment columns, so only the amounts between 100 and 200 hours are visible.

1. In the pivot table, click the arrow on the Column Labels heading, in cell B6.

2. Click Value Filters, and then click Between.

3. In the Value Filter dialog box, the title bar shows the name of the current field, Payment.

4. The first drop-down box show Sum of LbrHrs, and the second drop-down box shows *is between*. Leave those settings as is (see Figure 6-32).

Figure 6-32. *Value Filter dialog box*

5. In the third box, enter **100** as the minimum number of hours.

6. In the fourth box, enter **200** as the maximum number of hours.

7. Click the OK button to apply the filter.

Only the C.O.D. column remains visible, because its grand total is between 100 and 200 hours.

■**Note** The values entered in the minimum and maximum boxes are included in the filter results.

Filtering for a Date Range

The accounting manager has asked you to create a report that shows the fees that were collected for work done in April 2007, with totals for one- and two-technician jobs. To analyze the data for a specific date range, you can use date filters.

To start the report, you'll change the pivot table by adding a date field to the Row Labels area and then filtering for a date range. Using the date range filters will let you focus on the results for a specific time period to see whether the results are what you expected.

Clearing the Filters

You've finished analyzing the work done by one of the lead technicians, so before working with the date filters, you'll clear the pivot table and rebuild it with different fields:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Actions group, click Clear, and then click Clear All.

   Because another pivot table in the workbook is based on the same data as the pivot table you're clearing, you'll see a message warning you that Grouping, Calculated Items, Calculated Fields, and Custom Items will be removed from all the pivot table reports.

4. Click Clear PivotTable to continue with the Clear, because you don't need to save the grouped items in the other pivot table.

5. To rebuild the pivot table, add the TotalFee field to the Values area, add the WorkDate field to the Row Labels area, and add the Techs field to the Column Labels area. The Techs field shows whether one or two technicians were assigned to the job.

6. To make the pivot table easier to read, format the Sum of TotalFee value field as a number with two decimal places and a thousands separator.

7. Although the dates are in dd-mmm-yy format in the Excel table, in the pivot table they appear in short date format. To format them, right-click a date cell, and in the context menu, click Field Settings.

8. Click Number Format, and in the Format Cells dialog box, select the Date category and the dd-mmm-yy format. Then click OK twice.

The pivot table now shows results for all the dates in the source data, from January 2006 to December 2007 (see Figure 6-33).

	Sum of TotalFee	Column Labels		
	Row Labels		1	2 Grand Total
8	08-Jan-06		509.80	509.80
9	11-Jan-06	74.57		74.57
10	18-Jan-06	932.45		932.45
11	19-Jan-06	274.76		274.76
12	20-Jan-06	441.19		441.19
13	21-Jan-06	379.11		379.11
14	22-Jan-06	254.81		254.81
15	25-Jan-06	989.21		989.21
16	26-Jan-06	534.12		534.12

Figure 6-33. *Formatted dates in the Row Labels area*

Filtering for a Specific Date Range

To create a report for the date range that the accounting manager requested, you'll apply a filter to view only the data for the first two weeks of April 2007:

1. In the pivot table, click the arrow on the Row Labels heading, in cell A7.

2. Click Date Filters, and then click Between to open the Date Filter dialog box.

3. In the first drop-down, *is between* is selected. Leave that setting unchanged.

4. To the right of the second box, click the calendar icon to open the date selector (see Figure 6-34).
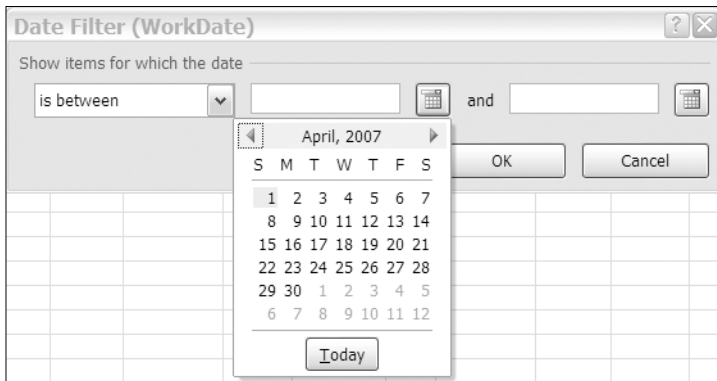
Figure 6-34. *Date filter for specific date range*

5. Use the arrows at the top of the date selector to move to April 2007, and then click April 1 to select it.

6. To the right of the third box, click the calendar icon to open the date selector.

7. Use the arrows at the top of the date selector to move to April 2007, and then click April 14 to select it.

8. Click OK to close the Date Filter dialog box.

The pivot table now shows results for work done from April 1, 2007, to April 14, 2007.

Filtering for a Dynamic Date Range

The accounting manager likes the report you created for the April 2007 fees and asks whether you can create a report each Monday to show fees collected during the previous week. To make this task easier, you can use a date filter with a dynamic date range. Instead of specific dates, these are time periods relative to the current date. For example, you can filter for last month, next week, or tomorrow.

You'll apply a dynamic filter to show the data from the previous week. The pivot table filter can do this dynamically, so you don't have to enter specific dates each week to see the updated summary.

1. In the pivot table, click the arrow on the Row Labels heading, in cell A7.

2. Click Date Filters, and then click Last Week (see Figure 6-35).
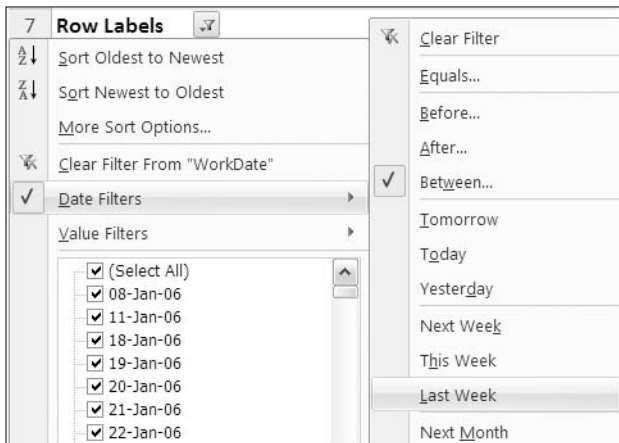
Figure 6-35. *Date filters for last week*

The pivot table now shows results for work done in the previous week (assuming that some of the records in the source data are from the week previous to you applying the filter).

■**Note** When the filter criteria can change automatically, such as with Last Week or Next Month, it is called a *dynamic filter*.

Applying a Manual Filter

Instead of using the filter options, you can manually select or deselect the items in a field drop-down list. You can use this option if you want to filter for specific items that can't be filtered by using a common or dynamic filter. For example, you may want to see the data from three specific dates when the service department was short staffed. You'll apply a manual filter to see those dates:

1. In the pivot table, click the arrow on the Row Labels heading, in cell A7.

   Because you're interested in only three dates, you'll remove all the check marks so no dates are selected, and then you'll select the three dates for the filter.

2. In the list of dates, remove the check mark from (Select All) to remove all the check marks from the list.

3. Add check marks to the three dates you want to see: 01-Feb-06, 02-Feb-06, and 10-Feb-06 (see Figure 6-36), and then click OK.
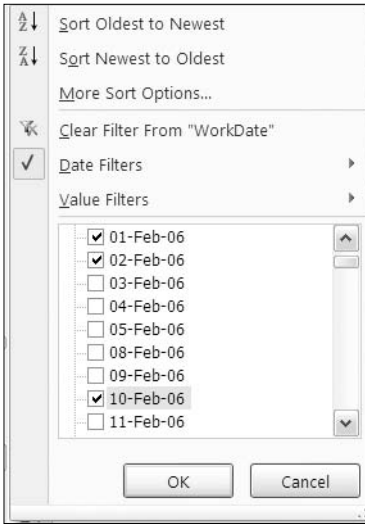
Figure 6-36. *Manual filter for specific dates*

The pivot table now shows results for work done on the three selected dates, and you can focus on that data only. The Techs field in the Column Labels area now shows only a label for 1. The column for 2 is not visible, because no two-technician work was done on those short-staffed days.

Including New Items in a Manual Filter

If you manually apply a filter to a field and then update the pivot table, some new items may appear in the pivot table and not be affected by the filter. For example, if you manually filter for specific dates and then add new records to the source data, the filter may include the new items, even if they are not records for the date selected in the manual filter. You can change a setting in the field to specify whether new items are included.

You'll change one of the records in the source data to create a new work date. Then you'll refresh the pivot table to see how the revised record is handled.

1. On Sheet1, in the source data in cell G2, change the date from 08-Jan-06 to 09-Jan-06. This date did not previously exist in the pivot table's WorkDate field.

2. On Sheet5, right-click a cell in the pivot table, and click Refresh.

The revised record's data does not appear in the pivot table. Now you'll change a pivot table setting to show new data even if it doesn't meet the filter criteria.

1. In the pivot table, right-click a cell in the WorkDate Row labels, such as cell A8.

2. Click Field Settings.

3. On the Subtotals & Filters tab, in the Filter section, add a check mark to Include New Items in Manual Filter, and then click OK (see Figure 6-37).
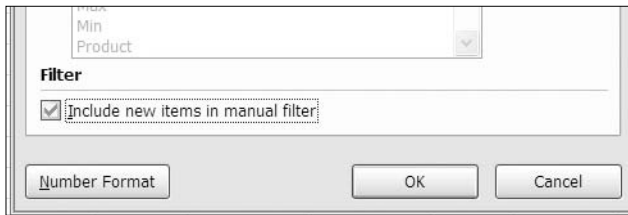
Figure 6-37. *Including new items in manual filter*

You'll change another record in the source data to create another new work date. Then you'll refresh the pivot table to see how the revised record is handled with the new setting in effect.

1. In the source data on Sheet 1, in cell G3, change the date from 11-Jan-06 to 12-Jan-06. This is another date that did not previously exist in the pivot table's WorkDate field.

2. On Sheet5, right-click a cell in the pivot table, and click Refresh.

The revised record's data appears in the pivot table, below the existing records, even though it doesn't meet the filter criteria. You can turn this setting on if you want to ensure that you notice new records when they're added, and then you can manually deselect them after they appear. If you don't want new records to appear in the filtered pivot table, remove the check mark from the Include New Items in Manual Filter option.

Filtering by Selection

To quickly filter the items in a pivot table, you can select one or more labels and then use the selected labels to filter the pivot table. You'll select a few dates in the WorkDate field and then hide all the other dates.

First you'll clear the filter, and then you'll apply a filter by selection.

1. Right-click a cell in the WorkDate labels, click Filter, and then click Clear Filter from "WorkDate." All the dates are visible in the Row Labels area.

2. In the Row Labels for WorkDate, click 19-Jan-06 to select that label.

3. Hold the Ctrl key on the keyboard, and click three other dates to select them.

■**Tip** The selected items can be in adjacent cells or any location in the list.

---

4. Right-click one of the selected labels.

5. In the context menu, click Filter, and then click Keep Only Selected Items (see Figure 6-38).

Figure 6-38. *Filter to keep only selected items*

Only the four selected dates are visible, and all the other data is hidden. This is like manual filtering. If you look at the list of dates in the Row Labels drop-down, the four selected dates have check marks, and all the other dates have their check marks cleared.

Showing Top and Bottom Items

The final filtering method you'll test is the filter to show the highest or lowest values in a value field. You'll filter the pivot table to show the five days with the highest total fees. The filter option you'll use is called Top 10, but you can use this feature to filter for top or bottom values and use numbers other than 10.

Filtering for the Top Items

The accounting manager wants to know which days you collected the largest amount in fees. You'll use the Top 10 feature to view the five work dates with the highest total fees.

■**Note** The current filter does not have to be cleared, because you are applying a new filter to the Work-Date field, and it will automatically override the previous filter applied to that field. By default, multiple filters per field are not allowed. You can change this setting on the Totals & Filters tab in the PivotTable Options dialog box.

---

1. Click the drop-down arrow in the Row Labels heading.

2. Click Value Filters, and then click Top 10.

3. In the Top 10 Filter dialog box, select Top from the first drop-down list.

4. In the second box, enter **5**.

5. Select Items in the third box, select Sum of TotalFee in the last box, and then click the OK button.

The pivot table shows only the five days that have the highest grand totals for the TotalFee field.

■**Note** If there are ties in the Grand Total values, more than the specified number of items may be returned in the filter. For example, if six dates had total fees of 20,000, all six would be listed.

Filtering for the Bottom Percent

In the previous filter, you viewed top items. Now that you have seen the top five days, you'll focus on days with the lowest amount of fees collected. You could filter for a specific number of days, as you did for the top days. Instead, you'll filter the pivot table to show the days that comprise the bottom 10 percent of the total fees.

First you'll clear the filter to see the grand total when all records are visible:

1. Right-click a cell in the WorkDate labels, click Filter, and then click Clear Filter from "WorkDate."

    With all the records visible, the pivot table shows a grand total of $634,376.28 for the sum of TotalFee. You'll filter the pivot table to see the days with the lowest totals for TotalFee that combine to total 10 percent of that overall grand total, or approximately $63,437.

2. Click the drop-down arrow in the Row Labels heading.

3. Click Value Filters, and then click Top 10.

4. In the Top 10 Filter dialog box, select Bottom from the first drop-down list.

5. In the second box, enter **10**.

6. Select Percent in the third box, and select Sum of TotalFee in the last box.

7. Click the OK button.

The pivot table shows a long list of days with the lowest totals for TotalFee that combine to total $63,474.24, which is just over 10 percent of the overall grand total.

You could use this type of filter to determine where to focus your improvement efforts. There may be only a few clients or products that contribute to the top 10 or 20 percent of your sales and several hundred that comprise the remaining percent of sales. Using a top or bottom filter can help you identify those clients or products.

Filtering for the Top Sum

The final option for the Top 10 filter is to specify a sum. You'll filter to find the top days that combine for a total of at least $50,000:

1. Click the drop-down arrow in the Row Labels heading.

2. Click Value Filters, and then click Top 10.

3. In the Top 10 Filter dialog box, select Top from the first drop-down list.

4. In the second box, enter **50000**.

5. Select Sum in the third box, and select Sum of TotalFee in the last box.

6. Click the OK button.

The pivot table shows only the eight days with the highest totals for TotalFee that combine to total at least $50,000 (see Figure 6-39).

	Sum of TotalFee	Column Labels		
6				
7	Row Labels	1	2	Grand Total
8	22-Apr-06	462.51	5,251.81	5,714.32
9	09-Sep-06	69.37	5,312.30	5,381.68
10	25-Jan-07	1,170.59	8,500.00	9,670.59
11	02-Jun-07	3,708.72	1,394.71	5,103.43
12	06-Jun-07	1,152.96	3,679.24	4,832.21
13	12-Jul-07	140.00	4,782.60	4,922.60
14	12-Sep-07	51.03	5,094.80	5,145.83
15	01-Nov-07	9,871.79	2,524.81	12,396.60
16	Grand Total	16,626.97	36,540.27	53,167.23

Figure 6-39. *Filtering for the top sum*

Summary

In this chapter, you learned how to add multiple filters to the pivot table and arrange multiple report filters at the top of the pivot table. You manually arranged field items by dragging, using commands, and typing. You sorted the field items automatically by using Ribbon commands, using context menus, and using field heading drop-downs. Value items were sorted by column or by row, from largest to smallest or smallest to largest. By creating a custom list, you were able to automatically sort items in a custom order.

You filtered the row and column labels for specific text and viewed the sort and filter information in a tool tip. You filtered the values for the row and column grand totals, and you filtered for dates in a specific range or in a dynamic range. You manually filtered the pivot table by checking items in the field drop-down list and filtered by selecting items in the row labels. Finally, you filtered for top and bottom items in the pivot table, by items, by percent, and by sum.

By creating a pivot table, you can quickly and easily summarize all the data in an Excel table. Filtering and sorting in the pivot table allow you to focus on specific items or highlight the high and low results. These tools add to the value of a pivot table and can help you identify problem areas that should be addressed.

Creating a Pivot Table from External Data

So far, you've created pivot tables from data that is stored in Excel tables. You can also create a pivot table in Excel from many kinds of external data sources. In this chapter, you'll connect to data that is outside Excel, and you'll create pivot tables from that data. You can download and work with a text file, an OLAP cube, and a Microsoft Access query to see how the pivot table creation process is slightly different depending on the source data. You'll also see some differences in pivot tables that are created from external data sources compared to pivot tables based on Excel data.

To create a pivot table from data that is outside Excel, you can import the data to a worksheet and create the pivot table from the imported data, or you can create a connection to the external data, telling Excel where the file is and how to connect to it, and then create a pivot table from the data.

You'll use both techniques to create pivot tables in the examples in this chapter:
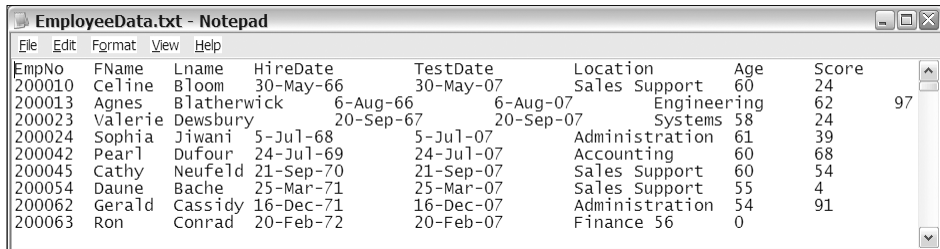
1. First, you'll import data from a text file onto a worksheet. Instead of creating an Excel table from the data and using that as the source for your pivot table, you'll create a pivot table from the unformatted external data to show employee test results.

2. Next, you'll connect to a query in an Access database and create a pivot table to show shipment information.

3. Finally, you'll connect to an OLAP cube to summarize sales information from another database.

Creating a Pivot Table from a Text File

You have been sent a text file from the human resources (HR) department, and the HR manager has asked you to create a report from this file to summarize the employee test scores by location. Each month a new version of the text file will be created and sent to you so you can create an updated report. To make the updates easier, you'll connect to the text file and create a pivot table from the external data.

The first time you use a text file as the source for a pivot table, you should check it to make sure it's set up correctly. If necessary, you can make changes to the file so it's ready to use as the source for your pivot table. You'll download and check the sample file that contains the employee test scores.

1. Download the text file named `EmployeeData.txt`, and save it in one of your folders. In this example, the file was saved in the `c:\Data` folder.

2. Using Notepad or another text editor program, open the `EmployeeData.txt` file to see the data it contains (see Figure 7-1).


```
EmployeeData.txt - Notepad
File  Edit  Format  View  Help
EmpNo    FName    Lname    HireDate       TestDate       Location    Age    Score
200010   Celine   Bloom    30-May-66      30-May-07      Sales Support  60   24
200013   Agnes    Blatherwick   6-Aug-66     6-Aug-07     Engineering  62    97
200023   Valerie  Dewsbury     20-Sep-67     20-Sep-07    Systems 58   24
200024   Sophia   Jiwani   5-Jul-68       5-Jul-07       Administration 61   39
200042   Pearl    Dufour   24-Jul-69      24-Jul-07      Accounting   60   68
200045   Cathy    Neufeld 21-Sep-70      21-Sep-07      Sales Support  60   54
200054   Daune    Bache    25-Mar-71      25-Mar-07      Sales Support  55   4
200062   Gerald   Cassidy 16-Dec-71      16-Dec-07      Administration 54   91
200063   Ron      Conrad  20-Feb-72      20-Feb-07      Finance 56   0
```

Figure 7-1. *Text file opened in Notepad*

3. Identify the type of text file you have opened—delimited or fixed width. This is a delimited text file in which the field data in each row is separated by an identified character, or *delimiter*. In this file, the delimiter is the tab character, and in other files a comma or other character may be used. In a fixed-width text file, each field is a set number of characters, and there is no separator between the fields.

4. Field headings are required in the first row of the text file if you plan to use it to create a pivot table. If the headings are missing, you should add them before using the file as the source for your pivot table. This file contains a heading row that identifies the fields in each record—EmpNo (employee number), FName, LName, HireDate, TestDate, Location, Age, and Score.

5. Ensure that there is a line break at the end of each record to separate the records. In this file, each record starts on a new line.

6. The text file looks fine, so close the text file without making any changes.

Importing the Text File

After you have examined the text file, the next step is to open the workbook in which you want the pivot table or create a new workbook where you will create the pivot table. To create the report for the HR manager, you'll create a new workbook and build the pivot table there using the `EmployeeData.txt` file.

As a first step, you'll import the text file onto a worksheet, and later you'll create the pivot table from the imported data:

1. In Excel, create a new blank workbook.

2. On the Ribbon, click the Data tab, and in the Get External Data group, click From Text (see Figure 7-2).

■**Note** You may see a single Get External button instead of several buttons. Click the Get External Data button, and then click From Text.
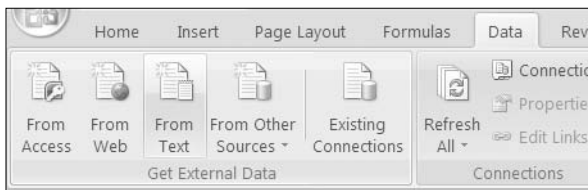
Figure 7-2. *From Text command on the Ribbon*

3. In the Import Text File dialog box, select the folder in which you stored the EmployeeData.txt file, select the file, and click Import (see Figure 7-3).
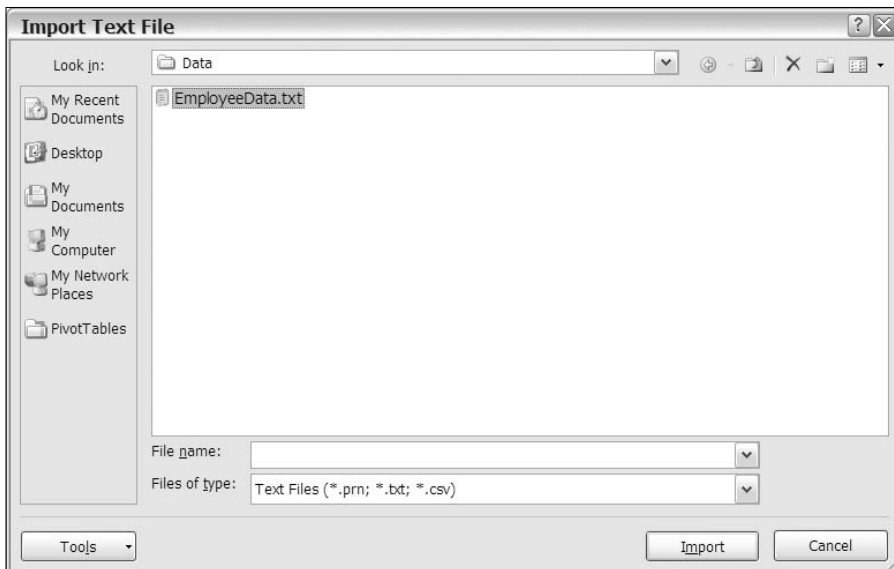
Figure 7-3. *Import Text File dialog box*

4. On the Step 1 of 3 page of the Text Import Wizard, the wizard examines the file to determine which type of text file you are importing and shows a preview of the data. If it is incorrect, you can change the original data type. For the `EmployeeData.txt` file, select Delimited (see Figure 7-4).
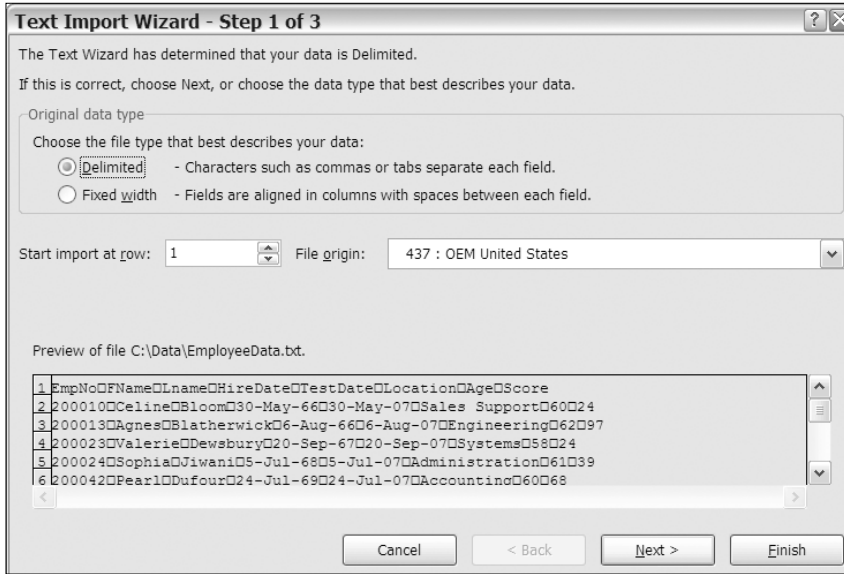
Figure 7-4. *Text Import Wizard's Step 1 of 3 page*

In the preview section at the bottom of the dialog box, you can see the first few rows of data from the text file with small squares between the fields. These represent the tab characters that separate the fields in the text file.

5. The import is set to start at row 1, which is correct for this file. If a text file had a few rows at the start that you did not want to import, you could change the start row.

6. The file origin shown in Figure 7-4 is 437: OEM United States, but this may be different on your screen depending on your regional settings in the Windows Control Panel. In most cases, you can leave this option at the default setting. However, if a text file is known to be from a different location and uses a character set, you can change the file origin.

7. Click Next to go to Step 2.

8. On the Step 2 of 3 page of the Text Import Wizard, the wizard has applied a tab delimiter to the text and shows a preview of the separated data. If the file uses a different delimiter, such as a comma, you can change the delimiter. For the `EmployeeData.txt` file, select Tab (see Figure 7-5).

Figure 7-5. *Text Import Wizard's Step 2 of 3 page*

9. Click Next to go to the next step.

10. On the Step 3 of 3 page of the Text Import Wizard, you can adjust the data type for each column. In this example, General will be used for each column, and for other text files you can change the data type for one or more columns if required. To change a data type, click a column heading in the Data Preview area, and select a column data format for that column (see Figure 7-6).
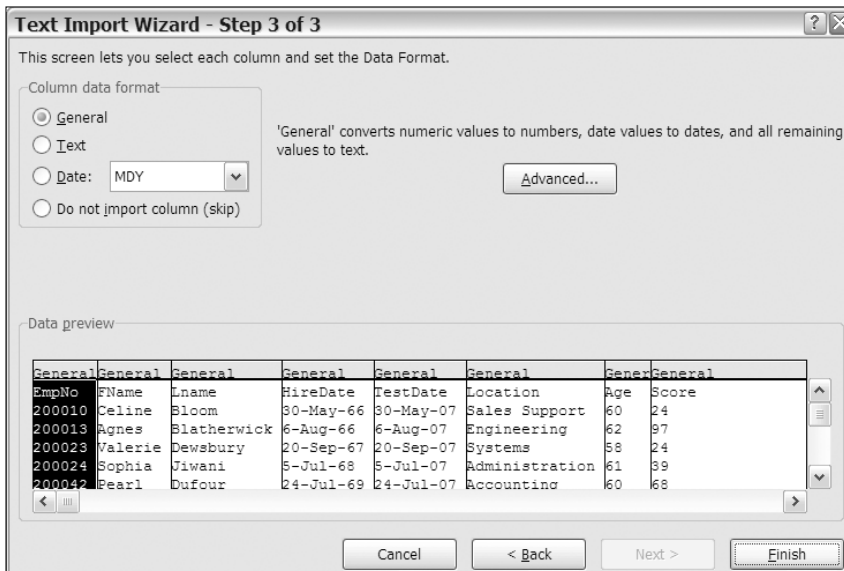
Figure 7-6. *Text Import Wizard's Step 3 of 3 page*

11. Click Finish to close the Text Import Wizard.

12. In the Import Data dialog box, leave the default setting for Existing Worksheet and the formula (=$A$1) that references cell A1, and click OK (see Figure 7-7).
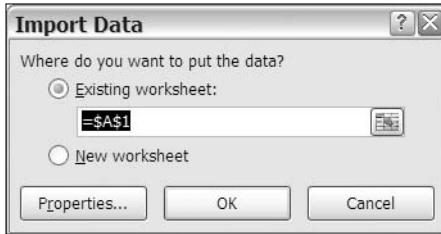
Figure 7-7. *Import Data dialog box*

13. The data from the EmployeeData.txt file appears on the worksheet, and you can create a pivot table from this imported data.

14. Save the Excel file. In this example, the file was named EmpDataPivot.xlsx and saved in the c:\Data folder.

Modifying the Connection

By importing the EmployeeData.txt file, you created a connection in the workbook. This is a link to the EmployeeData.txt file outside Excel, and you can change some settings for this connection to control how it works. For example, you can specify how often the data should be refreshed and what should happen to the formatting when the data is refreshed.

You'll view and test the current connection settings and then change some of the settings for the connection to the EmployeeData.txt file:

1. Select a cell in the imported data.

2. On the Ribbon, click the Data tab, and in the Connections group, click Properties (see Figure 7-8).
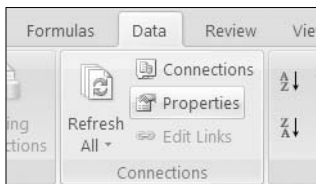
Figure 7-8. *Properties command on the Ribbon*

3. The External Data Range Properties dialog box opens and shows the current settings for this connection, with the name of the external data range, EmployeeData, shown at the top of the dialog box (see Figure 7-9).
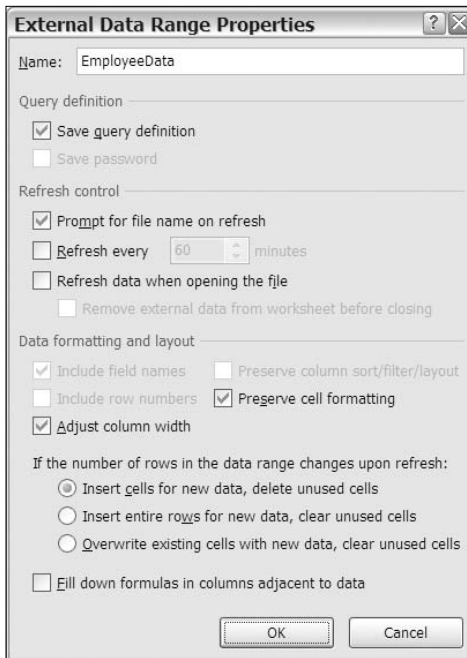
**Figure 7-9.** *External Data Range Properties dialog box*

4. In the Refresh Control section of the dialog box, remove the check mark from Prompt for File Name on Refresh. With this setting turned on, you would have to select the EmployeeData.txt file each time you refreshed the data. This setting may be useful if the file name changes each day, for example, if there is a daily text file download. In this case, the text file will remain the same, so you won't want to be prompted during each refresh.

5. In the Refresh Control section of the dialog box, add a check mark to Refresh Data When Opening the File. With this setting turned on, you will ensure that the data is current in the Excel file. If there have been changes to the EmployeeData.txt file, the revised data will be available in the Excel file.

6. Click OK to close the External Data Range Properties dialog box.

You'll leave the Excel file open while you make a change in the EmployeeData.txt file, and then you'll refresh the external data in Excel to test the settings you changed. The first name in the text file was typed incorrectly, so you'll change it.

1. Using Notepad or another text editor program, open the EmployeeData.txt file, and in the first record, change the name from Celine to Celina.

2. Save and close the EmployeeData.txt file.

3. In Excel, right-click a cell in the imported data.

4. In the context menu, click Refresh.

5. The external data is refreshed, and you were not prompted to select the `EmployeeData.txt` file. The name in the first record has changed to Celina.

Next, you'll close the Excel file and then make another change to the `EmployeeData.txt` file. When you reopen the Excel file, the external data should automatically refresh, because you changed that setting for the external data connection. The first employee's name needs further correction, so you'll make the additional change.

1. In Excel, save and close the `EmpDataPivot.xlsx` file.

2. Using Notepad or another text editor program, open the `EmployeeData.txt` file, and in the first record, change the last name from Bloom to Blume.

3. Save and close the `EmployeeData.txt` file.

4. In Excel, open the `EmpDataPivot.xlsx` file, and check the name in the first record to verify that it was changed from Bloom to Blume.

Changing the Security Settings

If the name in the first record was not changed to Blume, your security settings may have prevented the update. You may be able to adjust these settings, as described in this section, or temporarily allow updates each time you open the file.

If the name in the first record was successfully changed, your security settings are allowing data connections and won't need to be changed. You can skip this section and proceed to the next section to create the pivot table.

1. Below the Ribbon, you may see a security warning that tells you the data connections have been disabled (see Figure 7-10).
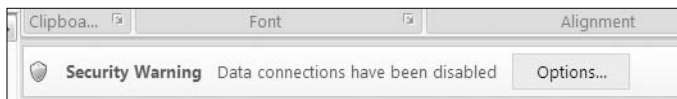
Figure 7-10. *Security warning for data connections*

2. If the Security Warning bar is visible, click the Options button.

3. In the Microsoft Office Security Options dialog box, read the information about the data connection and the file path for the Excel file. Because you know and trust the source data, select the Enable This Content option, and click OK (see Figure 7-11).
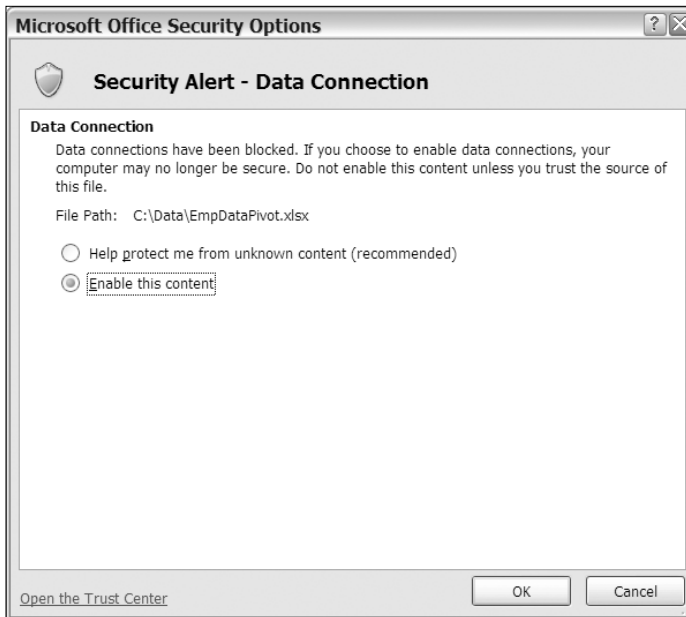
Figure 7-11. *Microsoft Office Security Options dialog box*

4. The external data is refreshed, and the name in the first record has changed to Blume. The Security Warning bar disappeared from below the Ribbon. You have enabled the content temporarily, and the Security Warning bar may reappear if you close and reopen the Excel file.

If the Security Warning bar was not visible but the file did not refresh, your security settings may have the message bar turned off. The content from the external data file has been blocked, but you do not see the warning. You can manually refresh the external data:

1. Right-click a cell in the Excel table, and in the context menu, click Refresh.

2. If a Microsoft Office Excel Security Notice dialog box appears, read the information about the external data source. Because you know that this source can be trusted, click OK (see Figure 7-12).

Figure 7-12. *Microsoft Office Excel Security Notice dialog box*

3. The external data is refreshed, and the name in the first record has changed to Blume. You have enabled the connection temporarily, and the Security Notice dialog box may reappear if you close and reopen the Excel file and try to refresh the data.

To permanently allow the connection each time you open the Excel file, you can add the source data file to a trusted location. These are folders that you or your system administrator has designated as safe locations, and all files in these folders can be opened without a security warning. To view or change these locations or to change other security settings, you can use the Trust Center, accessible through the Microsoft Office Button (click Excel Options, and then click Trust Center). If you're not sure about these settings, check with your system administrator.

Creating the Pivot Table

Now that the text file has been imported to a worksheet, you can create a pivot table from the external data. The HR manager has asked for a summary of employee test scores by location, so you will show a list of locations with a count of employees and the average test score for each location.

Usually you would create an Excel table from the data on a worksheet and then use the Excel table as the source for the pivot table. However, this data is in an external range that has the name EmployeeData, which you saw in the External Data Range Properties dialog box. If you try to create an Excel table from this data, it will override the external data range, and you will lose your connection to the text file.

1. Select a cell in the imported data.

2. On the Ribbon, click the Insert tab, and in the Tables group, click PivotTable (see Figure 7-13).

■**Caution** Use the PivotTable command. Do not click the Table command and create an Excel table, or you will remove your connection to the text file.
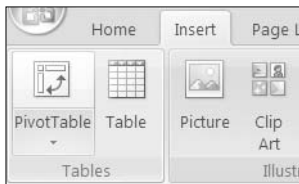
Figure 7-13. *PivotTable command on the Ribbon*

The Create PivotTable dialog box opens and shows the address of the external data range, Sheet1!$A$1:$H$501, in the Table/Range box. You can use the external data range address as the source range, and the pivot table will automatically adjust if rows are added or removed in the source data. However, using the name of the external data range may make the data source easier to identify when working with the pivot table.

3. In the Table/Range box, type **EmployeeData**, which is the name of the external data range, and then click OK (see Figure 7-14).
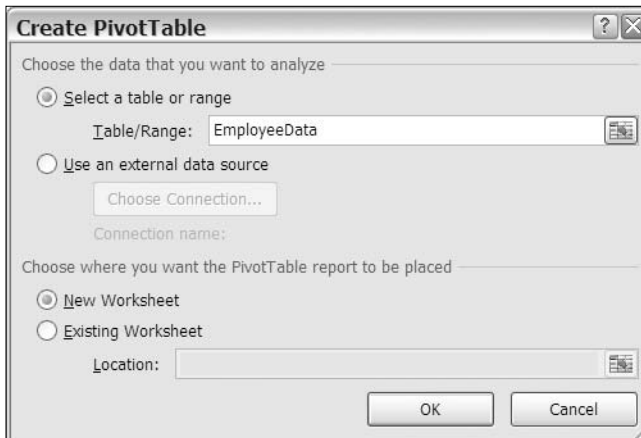
Figure 7-14. *Entering the external data range name*

4. A new worksheet, Sheet4, is inserted with an empty pivot table. In the PivotTable Field List pane, you can see the field names from the EmployeeData.txt file.

5. In the PivotTable Field List pane, add a check mark to Location to add that field to the Row Labels area.

6. In the PivotTable Field List pane, add a check mark to EmpNo to add that field to the Values area and then change the field so it is summarized by Count.

7. In the PivotTable Field List pane, add a check mark to Score to add that field to the Values area and then change the field so it is summarized by Average. Change the number format for the score so it has no decimal places.

8. To complete the pivot table, change the heading for Count of EmpNo to **Emps**, change Average of Score to **Avg Score**, and make the columns narrower (see Figure 7-15). These changes will make the report more visually appealing and easier for the HR manager to read. You can now send the report, showing the number of employees who were tested at each location and the average scores.

■**Note** If the external data has changed, that will not be reflected in the pivot table until the imported data is refreshed and then the pivot table is refreshed. Refreshing the pivot table does not refresh the imported data.

Row Labels ▼	Values Emps	Avg Score
Accounting	40	48
Administration	36	53
Communications	41	58
Customer Service	29	51
Distribution	27	55
Engineering	29	50
Finance	31	50
Human Resources	32	49
Maintenance	33	52
Marketing	17	63
Research	39	42
Sales	76	51
Sales Support	34	48
Systems	36	52
Grand Total	**500**	**51**

Figure 7-15. *Pivot table from text file*

9. Now that you have completed the pivot table, save and close the `EmpDataPivot.xlsx` file.

Creating a Pivot Table from an Access Query

Another source that you can use for pivot tables is a query in a Microsoft Access file. In this example, you'll download a small database in which shipments are recorded. You do not need a copy of Microsoft Access on your computer in order to connect to an Access database from Excel.

Connecting to the Access Query

Impressed by the report you created for the HR manager, the shipping manager has sent you a copy of the shipments database and has asked you to summarize the freight charges for each county. In the database is a query that combines data from three tables: Shipments, Contracts, and Counties. You'll connect to this query and create a pivot table to summarize the freight charges by county. When you create this report in Excel, employees who don't have Access installed will be able to view and manipulate the shipments report.

1. Download the Access database file named `Shipments.accdb`, and save it in one of your folders. In this example, the file was saved in the `c:\Data` folder.

2. The shipping manager has sent you a screen shot of the Access query named ShipmentsByDate, which is the query that you'll connect to when creating the pivot table (see Figure 7-16).

County	DelDate	DelTime	OrderDate	PrepDays	Truck	FreightAmt	Tax	TotalAmt
Mendocino	26-Feb-07	Morn	05-Jan-07	52	2	$1,227.00	$88.96	$1,315.96
Lake	07-Mar-07	Eve	08-Feb-07	27	2	$1,164.00	$84.39	$1,248.39
Mendocino	11-Mar-07	Eve	23-Feb-07	16	3	$850.00	$61.62	$911.62
Trinity	20-Mar-07	Eve	05-Mar-07	15	3	$2,696.00	$195.46	$2,891.46
Humboldt	25-Mar-07	Aft	07-Mar-07	18	1	$539.00	$39.08	$578.08
Napa	28-Mar-07	Aft	06-Mar-07	22	2	$738.00	$57.20	$795.20
Sonoma	31-Mar-07	Aft	06-Mar-07	25	1	$3,431.00	$265.90	$3,696.90
Humboldt	01-Apr-07	Aft	04-Mar-07	28	2	$2,197.00	$159.28	$2,356.28
Humboldt	04-Apr-07	Aft	20-Feb-07	43	3	$4,328.00	$313.78	$4,641.78

Figure 7-16. *ShipmentsByDate query in Access database*

3. Before using this query for the first time, you'll confirm it contains all the fields you'll need for the pivot table. If anything is missing, you'll ask the shipping manager to make changes to the Access query. In the pivot table, you want to summarize the freight charges by county, and you can see that the County and FreightAmt columns are in the query results.

4. You will also need the freight tax amounts in the pivot table totals, and that has been calculated in the query based on the county tax rate. The query also calculates the total amount, which is freight plus tax.

Tip It is best to include these line calculations in the Access query to ensure that the results are accurate, because the pivot table cannot calculate the line details.

---

5. Now that you have verified that the query is set up correctly, you're ready to create the pivot table.

In the following steps, you'll create a new workbook and build the pivot table there using the query in the Shipments.accdb Access database. You'll connect to the query and create the pivot table directly from the data. Unlike the text file you used for the Employee test scores pivot table, you won't import the Access data onto a worksheet.

1. In Excel, create a new blank workbook.

2. On the Ribbon, click the Data tab, and in the Get External Data group, click From Access.

3. In the Select Data Source dialog box, locate and select the Shipments.accdb file, and then click Open.

4. In the Select Table dialog box, select ShipmentsByDate, which is the query you want to use, and then click OK (see Figure 7-17).
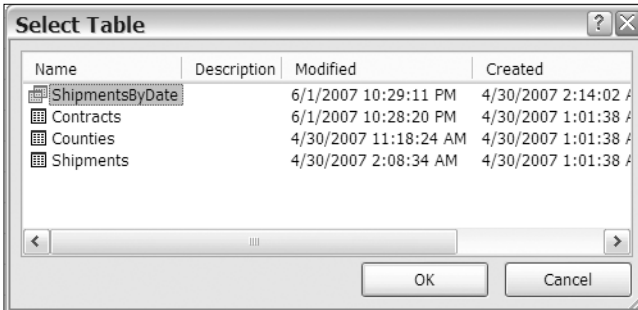
Figure 7-17. *Select Table dialog box*

5. The Import Data dialog box opens, with a list of options for viewing the data. Select PivotTable Report from the list of view options, and select cell A1 on the existing worksheet as the location for the data (see Figure 7-18).
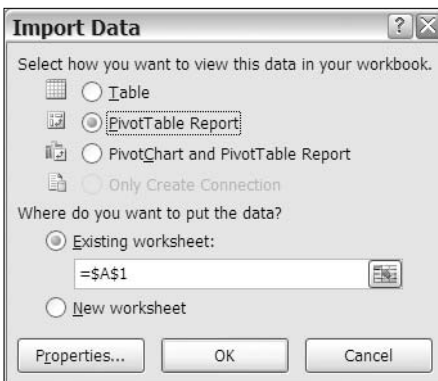
Figure 7-18. *Import Data dialog box*

6. Click OK to close the Import Data dialog box.

An empty pivot table is created on Sheet1. In the PivotTable Field List pane, you can see the field names from the ShipmentsByDate query. You created a connection to the query in the Access database, and you can use its data in your pivot table.

You'll add fields to the pivot table layout to show a list of counties, with a count of shipments and the average total freight for each county:

1. In the PivotTable Field List pane, add a check mark to County to add that field to the Row Labels area.

   To count the shipments, you'll add the delivery date field, DelDate, to the Values area. Since each record has a delivery date, this will be a reliable field to use for the count.

2. In the PivotTable Field List pane, add a check mark to DelDate, and then move that field to the Values area, where it will be summarized by count.

   To calculate the average shipping cost, you'll add the total amount field, TotalAmt, to the Values area.

3. In the PivotTable Field List pane, add a check mark to TotalAmt to add that field to the Values area, and then change the field so it is summarized by Average. Change the number format to Currency.

4. To complete the pivot table, change the heading for Count of DelDate to **Shipments**, change Average of TotalAmt to **Avg Total**, and make the columns narrower (see Figure 7-19).

	A	B	C
1		Values	
2	Row Labels ▾	Shipments	Avg Total
3	Humboldt	17	$1,600.29
4	Lake	3	$850.13
5	Mendocino	15	$1,446.23
6	Napa	5	$871.05
7	Sonoma	6	$1,515.50
8	Trinity	6	$1,501.50
9	**Grand Total**	**52**	**$1,421.27**

Figure 7-19. *Pivot table from Access query*

5. Now that you have completed the pivot table for the shipping manager, save the file as `ShipmentPivot.xlsx`. In this example, the file was saved in the `c:\Data` folder.

Modifying the Connection to the Access Query

By creating a pivot table from the Access query, you created a connection in the workbook. This is a link to the Access file outside Excel, and just as you did for the text file connection earlier, you can change some settings for this connection to control how it works.

You'll view the current connection settings and then change the settings for the connection to the ShipmentsByDate query to ensure that the data is refreshed frequently while the Excel file is open. Then, if the shipping manager opens your workbook first thing in the morning, the data will be refreshed throughout the day if the workbook is left open.

1. On the Ribbon, click the Data tab, and in the Connections group, click Connections (see Figure 7-20).
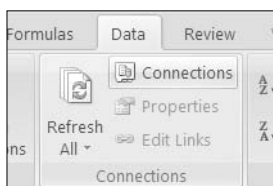
Figure 7-20. *Connections command on the Ribbon*

2. The Workbook Connections dialog box opens and shows the connections in the active workbook. The Shipments connection is listed, and you can scroll to the right in the list to see the date and time that the connection was last refreshed (see Figure 7-21).
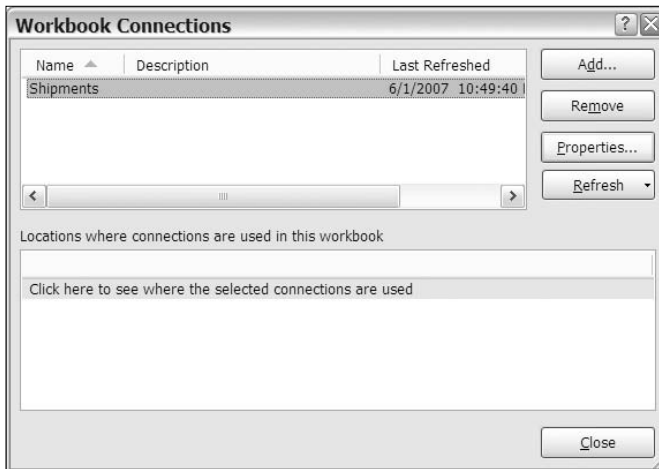
Figure 7-21. *Workbook Connections dialog box*

In the lower half of the Workbook Connections dialog box, you can view a list of locations where a connection is used in the workbook. You'll select the Shipments connection and see where it is used.

3. Select the Shipments connection in the list at the top of the dialog box.

4. In the lower section of the dialog box, point to the text that says Click Here to See Where the Selected Connections Are Used.

5. When the text becomes underlined, click the underlined text, and you'll see the sheet, name, and location of the pivot table listed (see Figure 7-22).
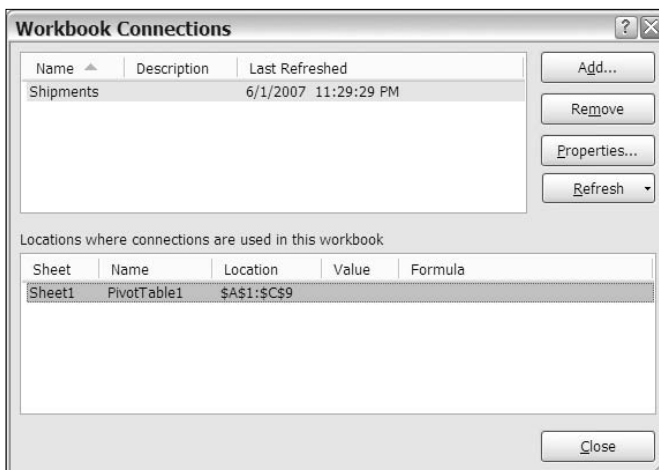
Figure 7-22. *List of locations where the selected connection is used*

When the list of locations is visible, you can use it to select any location that is listed. This feature is especially helpful if you have multiple connections and pivot tables in a workbook and want to understand how things were set up.

6. Click the location information, and the pivot table on Sheet1 is selected.

From the Workbook Connections dialog box, you can access the Connection Properties dialog box to view or change the properties for the selected connection. You want to change the refresh settings for the connection, so you'll open the Connection Properties dialog box.

7. With the Shipments connection selected in the list, click the Properties button. In the Connection Properties dialog box, on the Usage tab, you can see the date and time of the last refresh and the current settings for the connection. At the top of the dialog box are the connection name and description (see Figure 7-23).

■**Tip** You can type a description to explain what data the connection contains, why the connection is used, or other notes that will help you when using the file.
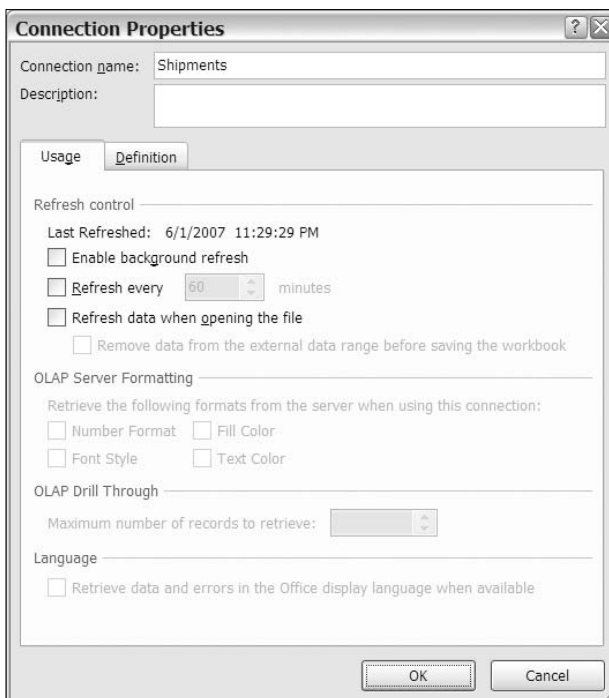
Figure 7-23. *Connection Properties dialog box*

8. In the Refresh Control section, add a check mark to Refresh Every 60 Minutes, and change the time to 30 minutes. This will ensure that the external data is refreshed frequently, so if the data changes in the Access database, the revised information will be available in the Excel file.

■Note This option is available only when using external data.

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9. Also add a check mark to Refresh Data When Opening the File. This will ensure that the external data is automatically refreshed as soon as the file opens.

10. To see the settings that were stored when you created the connection, click the Definition tab (see Figure 7-24). You can see the connection type and the location of the connection file. The Connection String box contains information that tells Excel how to connect to the external data, and the Command Text box contains information about the Access query.
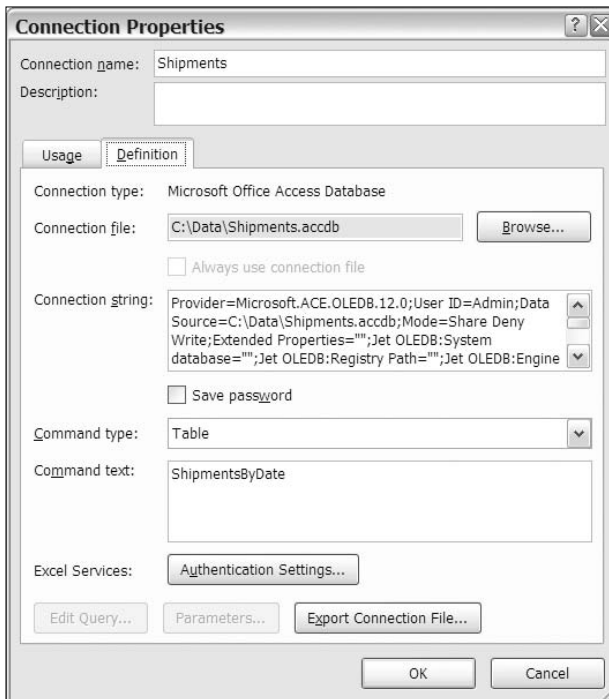
Figure 7-24. *Definition tab in the Connection Properties dialog box*

11. Leave these settings untouched, and click OK to close the Connection Properties dialog box. Then click Close to close the Workbook Connections dialog box.

The Security Warning bar may appear, alerting you that the data connections have been disabled. Just as you did for the EmployeeData.txt file connection, you can click the Options

button and enable the content. You can also add the source file to a Trusted Location to prevent the Security Warning bar from reappearing.

Using an Existing Connection to Create a Pivot Table

The shipping manager likes the pivot table you created to show the shipments per county and asks whether you can create another report in the same workbook. In this report, the number of shipments per delivery truck should be listed to see whether the loads are evenly distributed among the drivers.

After you have created a connection in a workbook, you can use it again to create a pivot table or to import data to a worksheet. You'll reuse the Shipments connection to create another pivot table. On Sheet2, you'll create a pivot table to summarize the data by truck to count the shipments per county for each delivery truck:

1. Select Sheet2, where you'll create the new pivot table.

2. On the Ribbon, click the Data tab, and in the Get External Data group, click Existing Connections (see Figure 7-25).
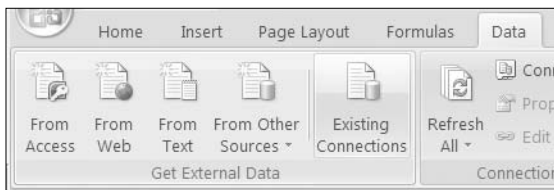
Figure 7-25. *Existing Connections command on the Ribbon*

■**Note** If the active cell is in a pivot table, the Existing Connections command won't be available.

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3. In the Existing Connections dialog box, from the Show drop-down list, select Connections in this Workbook.

4. In the list of connections, select Shipments, and click Open (see Figure 7-26).
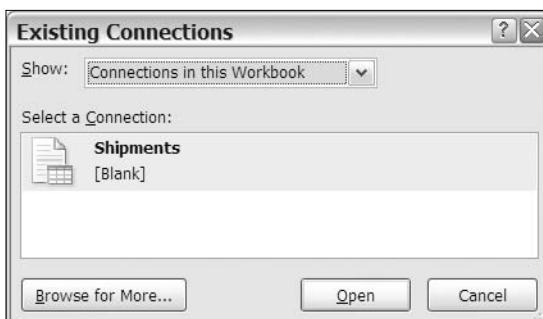
Figure 7-26. *Existing Connections dialog box*

5. In the Import Data dialog box, select PivotTable Report as the way you want to view the data in your workbook. Leave the default settings for the Where Do You Want to Put the Data? option, and click OK.

6. An empty pivot table is created on Sheet2. In the PivotTable Field List pane, you can see the field names from the ShipmentsByDate query.

   Now you can create a different pivot table from the external data. You'll show a list of delivery trucks, with a count of shipments for each truck.

7. In the PivotTable Field List pane, add a check mark to Truck, and then move that field to the Row Labels area.

8. In the PivotTable Field List pane, add a check mark to DelDate, and then move that field to the Values area, where it will be summarized by Count.

9. To complete the pivot table, change the heading for Count of DelDate to **Shipments**, change Row Labels to **Truck**, and make the columns narrower (see Figure 7-27).

	A	B
1	**Truck** ▾	**Shipments**
2	1	26
3	2	19
4	3	7
5	**Grand Total**	**52**

Figure 7-27. *Reusing a connection to create another pivot table*

10. Now that you have completed the second pivot table, save the ShipmentPivot.xlsx file, and then close it.

Creating a Pivot Table from an OLAP Cube

Another source that you can use for pivot tables is an *OLAP cube*. This is aggregated data from an Online Analytic Processing (OLAP) database and can provide an efficient way for you to analyze data from SQL Server or another large database. In this example, you'll use a small OLAP cube, created from a hardware sales database. It will give you an opportunity to connect to the OLAP cube and see the differences in a pivot table that is created from this type of data source.

Understanding OLAP Cubes

Using a pivot table, you can easily connect to thousands of rows of data in an Excel table or in a data source outside Excel. However, for some applications, there may be hundreds of thousands or millions of rows of data, which could be more than a pivot table is able to process with acceptable speed or could exceed the memory limits of your computer. For example, a national hardware chain might have hundreds of thousands of purchases each month. To efficiently process and store that much data, large and powerful databases are required.

The vice president of sales has asked you to create a couple of reports from transaction data that has been collected by a hardware chain. Figure 7-28 shows a small sample of the data. For each transaction, information about the product, the selling location, the date, the quantity sold, and the price is entered.

SaleDate	ProductGroup	ProdName	Region	City	StoreNo	Qty	OrderPrice
05-Jan-07	Hand Tools	Pliers	Central	Toronto	0011	31	$465.00
07-Jan-07	Hand Tools	Wrench	East	Boston	0007	38	$152.00
09-Jan-07	Electric	Drill	East	Boston	0007	16	$1,040.00
11-Jan-07	Hand Tools	Hammer	Central	Toronto	0011	57	$1,539.00
11-Jan-07	Hand Tools	Hammer	Central	Chicago	0009	13	$351.00
13-Jan-07	Hand Tools	Hammer	East	Boston	0007	46	$1,242.00

Figure 7-28. *Hardware sales records*

You won't be permitted to connect your pivot table directly to the transaction database. Instead, the database administrator will create a subset of the data for you in an OLAP cube. In the OLAP cube, instead of raw data, the data will be aggregated based on the information you need to analyze. In Excel, you can connect to the OLAP cube by creating a pivot table.

You send your report requirements to the database administrator so the OLAP cube can be created. The first report you'll create will show the total dollar amounts for each product group per region. The second report will show the quantity of each product sold, per year, for the East region.

To create the OLAP cube, the database administrator might use a product such as Microsoft SQL Server 2005 Analysis Services, Hyperion Essbase, Cognos PowerPlay, or Business Objects. In the OLAP cube, there are two types of data: measures and dimensions. The measures are numerical fields, such as quantity and price, that will be used in the Values area of a pivot table. The dimensions are the categories in which the data will be summarized, such as Region and ProductGroup. The dimensions are arranged in hierarchies of related fields. In the hardware sales data, Region, City, and StoreNo are in a hierarchy, as are ProductGroup and ProdName (see Figure 7-29). When the SaleDate field is added to the OLAP cube, a time hierarchy is automatically created, with Year, Quarter, Month, Week, and Day.
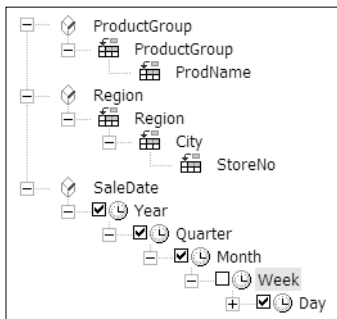
Figure 7-29. *Dimensions in hierarchies*

When you create a pivot table based on the OLAP cube, you'll see these hierarchies in the PivotTable Field List pane and in the pivot table layout. A pivot table that is based on an OLAP cube has some differences from a pivot table that is based on other data sources, and you'll see those as you create your hardware sales pivot table.

Connecting to an OLAP Cube

The database administrator e-mails to let you know that the OLAP cube is ready for you to use. The only way that the OLAP cube data is available in Excel is through a pivot table. You'll take advantage of that limitation and create a pivot table simply by opening the cube file in Excel. From the empty pivot table, you'll create your first report, showing the sales by product group and by region:

1. Download the OLAP cube file named `HardwareSales.cub`, and save it in one of your folders. In this example, the file was saved in the `c:\Data` folder.

2. In Excel, click the Microsoft Office Button, and click Open.

3. In the Open dialog box, in the Files of type drop-down list, choose All Files (*.*).

4. In the `c:\Data` folder, select the `HardwareSales.cub` file, and click Open.

5. If the Microsoft Office Excel Security Notice dialog box appears, click Enable to allow the data connection.

6. The connection to the OLAP cube is created, an empty pivot table appears on the active worksheet, and the PivotTable Field List pane shows the fields from the OLAP cube (see Figure 7-30).
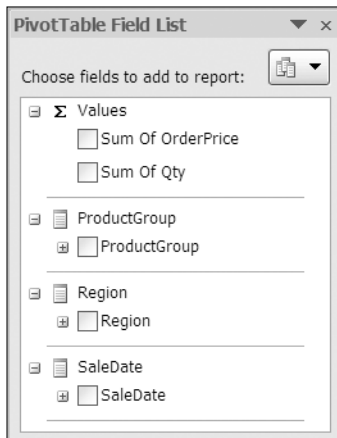
Figure 7-30. *PivotTable Field List pane for OLAP cube fields*

When the data source is an OLAP cube, the PivotTable Field List pane looks different than it does for other data sources. At the top is a list of Values, and these are the only fields that can be placed in the Values area. These are the measures, which are the numeric fields from the

source data, and they can be placed only in the Values area. In the transaction database, OrderPrice is the total price for each order, and Qty is the quantity sold in each order.

Below Values in the PivotTable Field List pane are the remaining fields, and these can be placed in the Row Labels, Column Labels, or Report Filter area. These are the dimensions, and they look different than fields from other data sources because they have plus and minus buttons that show the fields in a hierarchy. For example, click the plus sign beside SaleDate, and the field expands to show Year, Quarter, Month, and Day.

The vice president of sales has asked for a report on the total sales for each product group in each region, so you'll add the ProductGroup, Region, and Sum Of OrderPrice fields to the pivot table layout:

1. In the PivotTable Field List pane, add a check mark to ProductGroup, and then move that field to the Column Labels area.

2. In the PivotTable Field List pane, add a check mark to Region, which will appear in the Row Labels area.

3. In the PivotTable Field List pane, add a check mark to Sum Of OrderPrice, which will be added to the Values area, where it will be summarized by Sum.

■**Note** The summary function cannot be changed for Values in a pivot table that is based on an OLAP cube.

---

4. To complete the pivot table, format the values as currency with zero decimal places (see Figure 7-31).

	A	B	C	D
1	Sum Of OrderPrice	Column Labels ▾		
2	Row Labels ▾	⊞ Electric	⊞ Hand Tools	Grand Total
3	⊞ Central	$196,753	$67,281	$264,034
4	⊞ East	$211,231	$74,232	$285,463
5	⊞ South	$55,316	$17,357	$72,673
6	⊞ West	$180,125	$49,959	$230,084
7	**Grand Total**	**$643,425**	**$208,829**	**$852,254**

Figure 7-31. *Pivot table based on an OLAP cube*

5. Now that you have completed the first report, save the file as `HardwarePivot.xlsx`. In this example, the file was saved in the `c:\Data` folder.

Modifying the Connection to the OLAP Cube

By opening the OLAP cube file in Excel, you created a pivot table and a connection in the workbook. You'll view the current connection settings to see the settings that are available when an OLAP data source is used:

1. On the Ribbon, click the Data tab, and in the Connections group, click Connections.

2. In the Workbook Connections dialog box, select the HardwareSales connection, and click Properties.

3. In the Connection Properties dialog box, you can see the date and time of the last refresh and the current settings for the connection. The Enable Background Refresh setting is not available, but the OLAP Server Formatting, OLAP Drill Through, and Language settings are available (see Figure 7-32).
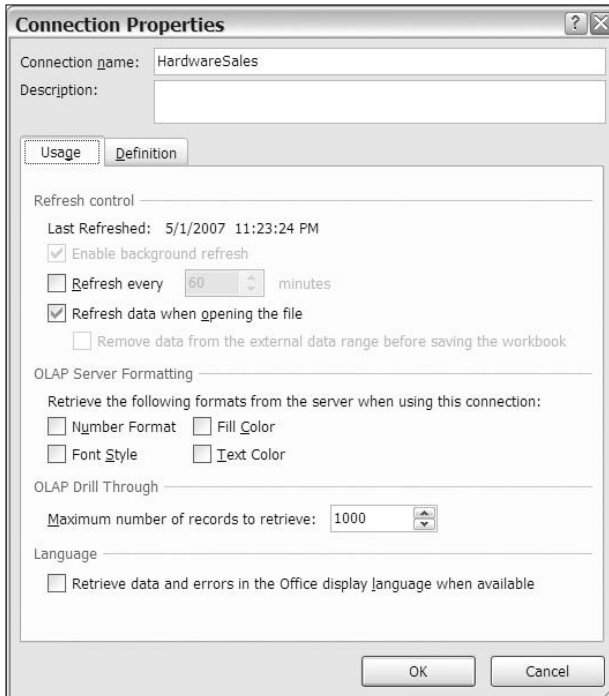
Figure 7-32. *Connection Properties dialog box for OLAP-based pivot table*

4. Add a check mark to Refresh Data When Opening the File. This will ensure that the external data is refreshed as soon as the file opens. If the OLAP cube has been updated, you'll automatically be connected to the new data.

5. Click OK to close the Connection Properties dialog box, and click Close in the Workbook Connections dialog box.

Next, you'll create your second report to show the quantity of each product sold, per year, for the East region. You want to limit the data to show only one region, so you'll move that field to the Report Filter area:

1. Select a cell in the pivot table, and in the PivotTable Field List pane, move the Region field to the Report Filter area.

2. Click the Region drop-down list in cell B1, and then click the + sign beside All to open the list of regions.

3. Select East, which is the region you want in your report, and then click OK (see Figure 7-33).
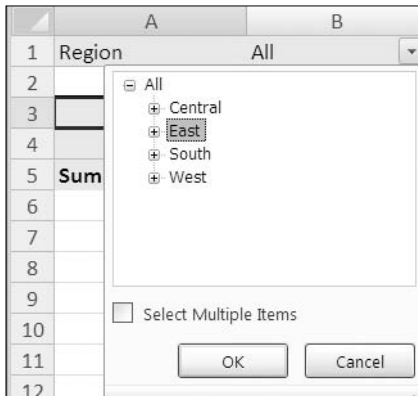
Figure 7-33. *Report filter for East region*

4. In this report, you want to see the quantities sold, so in the PivotTable Field List pane, remove the check mark from Sum Of OrderPrice, and add a check mark to Sum of Qty.

■**Note** For a pivot table based on an OLAP cube, the measures (numeric fields) can be added only to the Values area of the PivotTable Field List pane.

---

5. In the PivotTable Field List pane, move the ProductGroup field to the Row Labels area.

   For this report, you're interested in the individual products, so you'll expand the field so all the product names are visible.

6. Select a cell that contains a ProductGroup label. For example, select cell A4, which contains the Electric label.

7. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

8. In the Active Field group, click Expand Entire Field (see Figure 7-34).
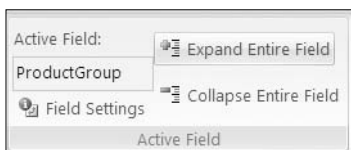
Figure 7-34. *Expand Entire Field command*

■**Tip** Later, to hide the product names, you could select a ProductGroup label and then click the Collapse Entire Field command on the Ribbon.

The product names under each product group become visible, and you can see the total quantity for each product. Next, you'll add the SaleDate field to see the totals per year. Because the pivot table is based on an OLAP cube, you won't have to group the date field in order to see the totals per year. You'll examine the SaleDate field in the PivotTable Field List pane and then add it to the pivot table layout.

9. In the PivotTable Field List pane, click the + sign to the left of the SaleDate field's check box. This will expand the hierarchy for SaleDate (see Figure 7-35).
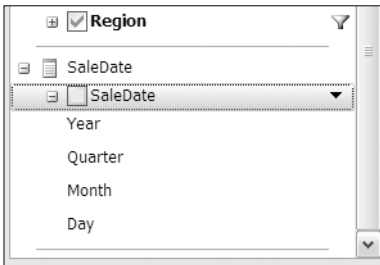
Figure 7-35. *The expanded SaleDate hierarchy*

10. Add the SaleDate field to the Column Labels area. Because Year is the highest level in the SaleDate hierarchy, the Year labels, 2007 and 2008, appear in the Column Labels area (see Figure 7-36). The report now shows the total quantity sold per year for each product in the East region.

	A	B	C	D
1	Region	East		
2				
3	Sum Of Qty	Column Labels		
4	Row Labels	⊞ 2007	⊞ 2008	Grand Total
5	⊟ Electric	2521	2927	5448
6	Drill	717	333	1050
7	Saw	584	923	1507
8	Screwdriver	1220	1671	2891
9	⊟ Hand Tools	2409	2492	4901
10	Hammer	1036	649	1685
11	Pliers	606	837	1443
12	Wrench	767	1006	1773
13	Grand Total	4930	5419	10349

Figure 7-36. *The completed pivot table*

■**Tip** To see the quantities sold per quarter, select one of the Year labels, and click the Expand Entire Field command on the Ribbon. To hide the quarters, click the Collapse Entire Field command.

11. Now that you have completed the pivot table, save and close the `HardwarePivot.xlsx` file.

Summary

In this chapter, you created connections to data outside Excel, and you created pivot tables from that data. With this capability, you can reach beyond your Excel data and report on data that is stored in other formats.

To work with a text file, you imported the data to a worksheet and created a pivot table from the imported data. You changed the data in the text file and refreshed the pivot table to show the updated data. If necessary, you changed the security settings to allow the connection to the external data.

Next, you connected to a query in an Access database and built a pivot table from that data. Then you modified the connection to ensure that the data was refreshed frequently. You used the features in the Workbook Connections dialog box to list the locations where the selected connection was used and to go to that location. In the same workbook, you created a second pivot table, based on the existing connection.

Finally, you connected to an OLAP cube by simply opening the cube in Excel. This automatically created a connection to the OLAP cube and an empty pivot table. While working on this pivot table, you saw differences in the fields in the PivotTable Field List pane and collapsed and expanded the fields in the pivot table.

■ ■ ■

Updating a Pivot Table

In this chapter, you'll learn how to maintain a pivot table after you've created it to ensure that it shows the correct data and stores the data in the way that works best for you. For example:

- If your pivot table is based on an Excel table, what will happen if someone edits the sales data or adds new records? How will you ensure that your pivot table is updated and shows the correct results?

- If a product name is changed in all the records in the database, do you want to see the old name in the pivot table's filter drop-down lists, or should the old name be removed?

- If your pivot table is based on a query in a Microsoft Access database, how can you make it easy to get the updated data into your pivot table throughout the business day?

- If someone moves or renames the Access database, how can you reconnect to it so your pivot table will continue to work correctly?

- When you close the Excel workbook, should the pivot table data be stored in memory so it's ready to use as soon as you open the workbook?

Updating an Excel Table

In this chapter, you'll work with a sample workbook that contains two Excel tables with food sales data for the East and North regions. It also contains a pivot table that uses one of the Excel tables as its data source. The sales manager has asked you to make some corrections to the data and to update the pivot table.

You haven't worked with the file before, so to start, you'll examine the Excel tables that contain the data and determine which Excel table is the source for the pivot table. Next, you'll make the corrections and refresh the pivot table so it includes the updated data.

1. Download and open the sample file named RegionSales.xlsx, available on the Apress website.

2. On the Pivot_East worksheet, you can see the pivot table that shows sales totals for Boston, New York, and Philadelphia (see Figure 8-1). The grand total for these cities is $344,461.

	A	B	C	D	E	F
1						
2						
3	Sum of TotalPrice	Column Labels ▾				
4	Row Labels ▾	Bars	Cookies	Crackers	Snacks	Grand Total
5	Boston	$33,728	$58,757	$23,666	$10,528	$126,679
6	New York	$43,501	$51,435	$13,713	$5,173	$113,823
7	Philadelphia	$36,416	$47,244	$13,981	$6,317	$103,959
8	**Grand Total**	**$113,646**	**$157,437**	**$51,360**	**$22,018**	**$344,461**

Figure 8-1. *Pivot table on Pivot_East worksheet*

3. On the Sales_East worksheet, you can see the sales data for Boston, New York, and Philadelphia, so you assume the pivot table uses that Excel table as its source. On the Design tab on the Ribbon, you can see that the table name is Sales_East.

4. On the Sales_North worksheet, you can see the sales data for Chicago, Detroit, and Seattle. On the Design tab on the Ribbon, you can see that the table name is Sales_North.

Before you change the data, you want to confirm that the pivot table is based on the Sales_East Excel table. To determine the source of the pivot table, you can use the Change Data Source command on the Ribbon:

1. On the Pivot_East sheet, select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab, and in the Data group, click the top section of Change Data Source (see Figure 8-2).
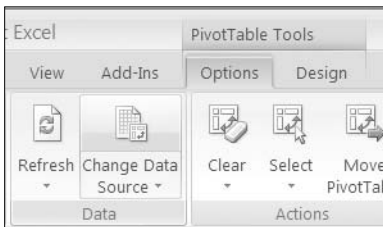
Figure 8-2. *Change Data Source command*

The Change PivotTable Data Source dialog box opens and shows that Sales_East is the Excel table on which the pivot table is based. In the background, the Sales_East sheet has been activated, and the Sales_East Excel table is selected. Now that you have confirmed the data source, you'll make the changes to the data in the Sales_East Excel table.

3. Click Cancel to close the Change PivotTable Data Source dialog box.

   The final entry on the Sales_East worksheet is incorrect, so you'll change it and then update the pivot table.

4. On the Sales_East worksheet, change the numbers in the last record, as shown in Table 8-1.

Table 8-1. *Sales_East Excel Table Data Changes*

Qty	TotalCost	SellPrice	TotalPrice	Profit
521	651.25	1641.15	1641.15	989.9

5. Return to the Pivot_East worksheet, where the grand total remains unchanged, at $344,461.

When the source data changes, the pivot table has to be refreshed before it shows the summary of the revised data. In previous chapters, you manually refreshed the pivot table by using the Refresh command. In this pivot table, you'll change the settings so the pivot table will refresh automatically when you open the workbook. This will ensure that the pivot table is up-to-date when you start working with it.

1. Right-click a cell in the pivot table, and click PivotTable Options to open the PivotTable Options dialog box.

2. On the Data tab, add a check mark to Refresh Data When Opening the File (see Figure 8-3).
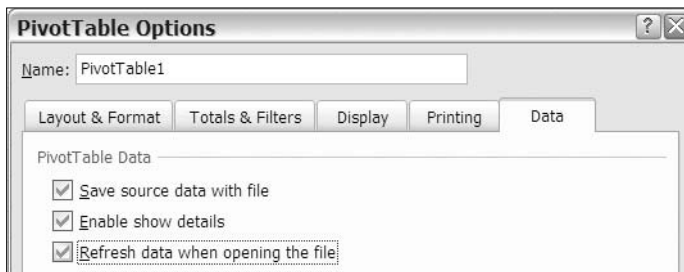
Figure 8-3. *Refreshing data when opening the file*

3. Click OK to close the PivotTable Options dialog box.

■**Note** Whether this setting is on or off, after the workbook is opened, you can manually refresh the pivot table at any time.

---

4. To test the setting, save and close the file, and then reopen it. The pivot table was auto-matically refreshed, and the grand total has increased to $345,406 (see Figure 8-4).

	Sum of TotalPrice	Column				
3						
4	Row Labels	Bars	Cookies	Crackers	Snacks	Grand Total
5	Boston	$33,728	$58,757	$23,666	$10,528	$126,679
6	New York	$43,501	$51,435	$13,713	$5,173	$113,823
7	Philadelphia	$36,416	$47,244	$13,981	$7,262	$104,904
8	Grand Total	$113,646	$157,437	$51,360	$22,963	$345,406

Figure 8-4. *The pivot table was automatically refreshed.*

Using this setting to refresh a pivot table when the file opens may make it slower to open a file, especially if the Excel table is large. However, you'll ensure that the pivot table contains the latest data and reduce the chance that you're working with outdated information in your report.

Changing an Excel Data Source

When you create a pivot table from data in Excel, you select a table or range as its data source. In the RegionSales.xlsx workbook, there is one pivot table, and its data source is the Sales_East Excel table. Occasionally, after you have created a pivot table, you may need to select a different data source for the pivot table. For example, this could happen if you used a range of cells as the pivot table's data source instead of a formatted Excel table. If you add new rows to an Excel table, they are automatically included in the source data range for the pivot table. However, in an unformatted range of cells, new rows would not be automatically included in the data source range, and you would have to change the range to include them.

Another reason to change the data source is if you make a copy of a pivot table and want the copy to use a different data source than the original pivot table. The sales manager likes the layout of the East region's pivot table and has asked you to create a pivot table for the North region with the same layout and formatting.

Instead of starting from scratch and trying to duplicate the layout and formatting, you'll make a copy of the East region's pivot table and then change its data source so it is based on the data on the Sales_North worksheet. To copy the pivot table, you'll make a copy of the worksheet that it's on:

1. To make a copy of the existing pivot table, right-click the sheet tab for the Pivot_East worksheet, and in the context menu, click Move or Copy (see Figure 8-5).
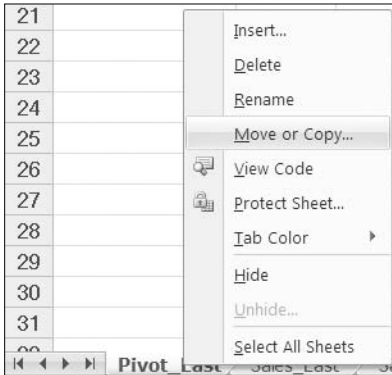
Figure 8-5. *Right-click a sheet tab to open the context menu.*

2. In the Move or Copy dialog box, in the Before Sheet list, select Sales_North, because you want the new worksheet positioned between the Sales_East and Sales_North sheets (see Figure 8-6).
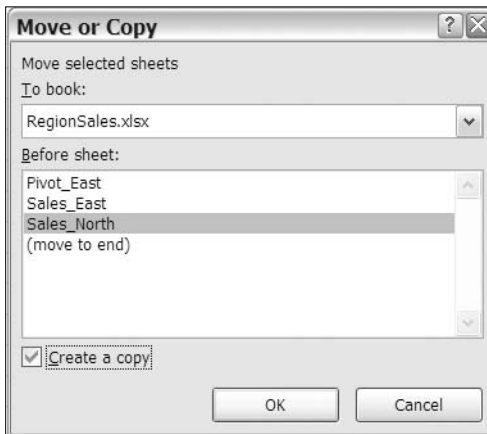
Figure 8-6. *Move or Copy dialog box*

3. Add a check mark to Create a Copy, and then click OK.

4. Double-click the sheet tab for the new sheet, and change the sheet name from Pivot_East (2) to **Pivot_North**.

■**Tip** To quickly copy the active sheet, press the Ctrl key, point to the sheet tab, and drag it to the left or right, beside an existing sheet. A small black triangle indicates where the sheet will be placed. Release the mouse button and then the Ctrl key, and the sheet will be copied.

By copying the Pivot_East worksheet, you've created a copy of the East region's pivot table. The layout and formatting are the same, just as the sales manager wanted. The new pivot table still shows the summarized data for the East region, because it is based on the Sales_East Excel table. You'll change the data source so the new pivot table summarizes the data for the North region:

1. On the Pivot_North worksheet, select a cell in the pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the Data group, click the top section of the Change Data Source command.

3. The Sales_East sheet is activated, and the Sales_East Excel table has a flashing border. The Change PivotTable Data Source dialog box opens, showing the current data source for the pivot table, Sales_East.

4. In the Table/Range box, change the name of the Excel table to **Sales_North** (see Figure 8-7), and click OK.
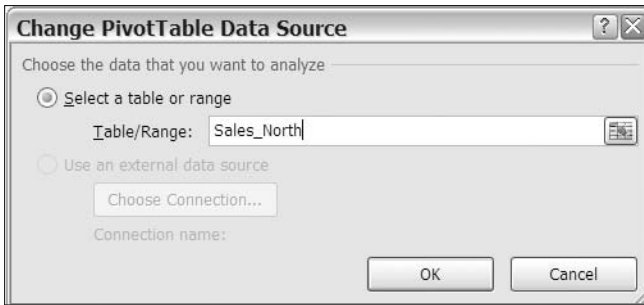
Figure 8-7. *Change PivotTable Data Source dialog box*

5. The pivot table is automatically updated and shows the names of the three cities in the North region—Chicago, Detroit, and Seattle—with their sales totals (see Figure 8-8).

	A	B	C	D	E	F
1						
2						
3	Sum of TotalPrice	Column Lak ▾				
4	Row Labels ▾	Bars	Cookies	Crackers	Snacks	Grand Total
5	Chicago	$50,821	$62,206	$38,103	$15,937	$167,067
6	Detroit	$27,438	$36,317	$8,334	$2,659	$74,749
7	Seattle	$24,662	$39,354	$10,991	$4,099	$79,107
8	**Grand Total**	**$102,921**	**$137,878**	**$57,428**	**$22,695**	**$320,922**

Figure 8-8. *Pivot table after the data source change*

By making a copy of the East region's pivot table and changing the data source, you were able to create a pivot table very quickly, with the same layout and formatting as the existing pivot table.

Refreshing All Pivot Tables in a Workbook

Now that you have multiple pivot tables in the workbook, you may want to refresh them all at the same time instead of refreshing each pivot table individually. You'll correct a record in the source data for each pivot table and then refresh both pivot tables at once:

1. In the Sales_East Excel table, change TotalPrice in the first record from 115.77 to **10115.77**. This record was for a Banana Bars sale in Boston, so that amount should increase when the Pivot_East pivot table is refreshed.

2. In the Sales_North Excel table, change TotalPrice in the first record from 202.03 to **10202.03**. This record was for a Banana Bars sale in Chicago, so that amount should increase when the Pivot_North pivot table is refreshed.

    Neither pivot table has been refreshed yet, and each shows the same grand total amount it showed before you corrected the TotalPrice amounts. The East grand total is still $345,406, and the North grand total is still 320,922. Next, you'll use a command on the Ribbon to refresh both pivot tables with one mouse click.

3. Select any cell in the workbook, and on the Ribbon, click the Data tab, and in the Connections group, click the upper section of the Refresh All command (see Figure 8-9).
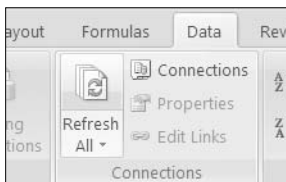
Figure 8-9. *Refresh All command on the Ribbon*

■**Tip** Refresh All is also available under the PivotTable Tools tab on the Ribbon's Options. In the Data group, click the lower section of the Refresh command, and then click Refresh All.

---

4. Check the Pivot_East worksheet, and you'll see that the grand total has increased from $345,406 to $355,406. On the Pivot_North worksheet, you'll see that the grand total has increased from $320,922 to $330,922.

Using the Refresh All command makes it easy to update many pivot tables in one workbook at the same time. If you've changed data in several sources, you can use this command to update all the affected pivot tables with one click of the mouse.

■**Note** Using the Refresh All command will refresh all pivot tables and external data ranges in the active workbook and will affect both visible and hidden worksheets.

Retaining Deleted Items

The sales manager has asked you to change the name of one of the products in the Sales_East Excel table. After testing the new product in the East region, the marketing department has decided to change the cracker name from Cheese to Cheesy. When you change the records, there will no longer be a product named Cheese in the data.

You can decide how you want your pivot table to deal with this deleted product. Do you want to continue to see the product name in the pivot table filters, even if it doesn't have any data in the current month's report? Would you prefer to have deleted items disappear, if they are no longer included in the data?

By retaining the old items, you'll be aware of what has been removed and can investigate the reasons why they no longer have data in the source data. However, the old items can make the filter lists longer than necessary and may make it difficult to find the active items.

Changing the cracker name will result in a product being removed from the source data, and you'll see the effect of that change. Before you make the change to the source data, you'll modify the pivot table layout to show product information instead of cities:

1. On the Pivot_East sheet, remove the City field from the Row Labels area, and add the Product field to the Row Labels area.

2. On the Sales_East sheet, scroll up to row 1, and filter the Product column to see only the Cheese product.

3. In each of the three records for this product, change the product name to Cheesy.

4. On the Pivot_East sheet, refresh the pivot table.

   The Cheese label disappears from the pivot table layout, and *Cheesy* appears at the end of the list of products.

5. Click the arrow for the Row Labels to open the Sort and Filter list. Although the Cheese label has been removed from the pivot table layout, it remains in the Sort and Filter list (see Figure 8-10).
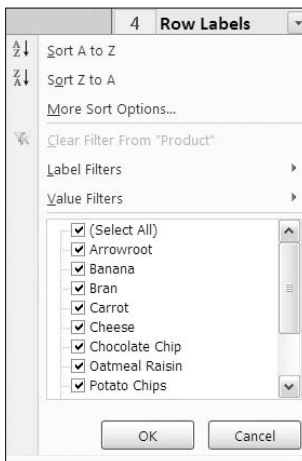
Figure 8-10. *The deleted item remains in the filter list.*

6. Click Cancel to close the Sort and Filter list.

    You'll change a pivot table setting so deleted items don't remain in the filter list. These items can make the filter list excessively long and can make it harder to find the active items in the list.

7. Right-click a cell in the pivot table, and click PivotTable Options.

8. On the Data tab, from the Number of Items to Retain per Field drop-down list, choose None (see Figure 8-11).
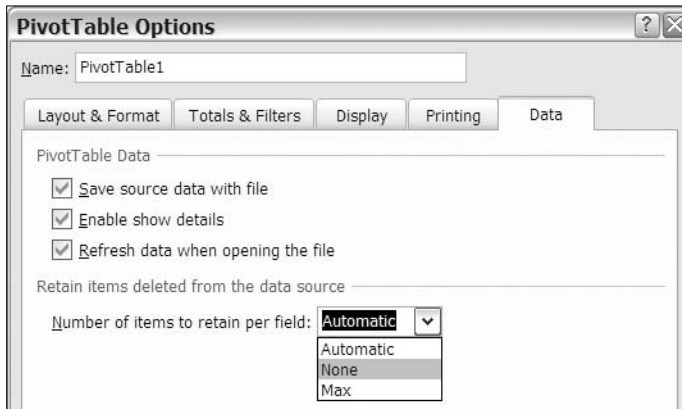
Figure 8-11. *Setting the number of items to retain per field*

9. Click OK to close the PivotTable Options dialog box.

10. Refresh the pivot table, and then click the arrow for the row labels to open the Sort and Filter list. The Cheese label has been removed from the Sort and Filter list.

11. Click Cancel to close the Sort and Filter list.

You can use this setting to prevent the accumulation of old items in the pivot table, especially if the items change frequently.

Now that you have made the corrections to the RegionSales.xlsx file and created a new pivot table for the North region, you can save the file and close it. Next, you'll refresh pivot tables that are based on external data.

■**Tip** Instead of creating multiple pivot tables from data in separate Excel tables, you could combine the data in one Excel table, create a single pivot table, and use a report filter to show the results for a specific region.

Changing an Access Data Source

In the previous chapter, you created a pivot table that was based on a Shipments query in an Access database. Your IT department has revised the database and asked you to use the new file as the data source for your pivot table instead of the old one. They have added a new county to the list of counties, and there are a few new contracts and shipments.

You'll complete these steps when connecting to the new database:

1. Download the new database, and open the Excel file.

2. Create a new connection and a temporary pivot table.

3. Change the existing pivot table so it uses the new connection.

4. Remove the temporary pivot table and the old connection.

Step 1: Download the New Database, and Open the Excel File

Follow these instructions to download the revised database and to open the Excel file that contains the current pivot table. After that, you'll create a connection to the new database and then change the data source for the pivot table.

1. Download the revised version of the database, `ShipmentsNew.accdb` (which is available on the `www.apress.com` web site), and save it in one of your folders. In this example, the database is saved in the `c:\Data` folder.

2. Open the Excel file `ShipmentPivot.xlsx` you created in Chapter 7, or download and open the file `ShipmentPivot02.xlsx` (available on the `www.apress.com` web site).

3. If the Security Warning bar appears, click Options, and enable the content. This will allow the connection to the Access database.

Step 2: Create a New Connection and a Temporary Pivot Table

One of the easiest ways to change the external data source is to create a connection to the new database and then change the data source for the pivot table so it uses the new connection. Now that you have the Excel file open, you'll create a new connection to the new Shipments database:

1. Select a cell outside the pivot table. If a cell inside the pivot table is active, you won't be able to select a new data source.

2. On the Ribbon, click the Data tab, and in the Get External Data group, click From Access.

3. In the Select Data Source dialog box, select the folder in which you saved the `ShipmentsNew.accdb` file, select the file, and click Open.

4. In the Select Table dialog box, select ShipmentsByDate, which is the query you want to use, and click OK (see Figure 8-12).
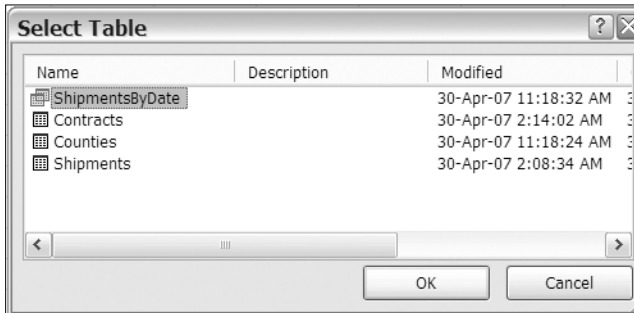
Figure 8-12. *Select Table dialog box*

Although you want to continue to use your existing pivot table, you'll create a new pivot table temporarily to establish the new connection. Later, you'll delete this temporary pivot table.

5. In the Import Data dialog box, select PivotTable Report, select New Worksheet as the location for the pivot table, and then click OK.

Step 3: Change the Existing Pivot Table So It Uses the New Connection

A new worksheet was inserted, and it contains an empty pivot table. Now that you have created the new connection, you'll change the data source for the original pivot table:

1. On Sheet 1, select a cell in the original pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the Data group, click the top section of the Change Data Source command.

The Change PivotTable Data Source dialog box opens and shows Shipments as the connection name.

3. In the Change PivotTable Data Source dialog box, click Choose Connection.

The Existing Connections dialog box opens and shows an All Connections list. You are interested only in the connections in the active workbook, so you'll change the setting at the top of the dialog box to limit the number of connections that are shown in the list. This will make it easier to find the connection you need.

4. At the top of the Existing Connections dialog box, choose Connections in this Workbook from the Show drop-down list (see Figure 8-13).
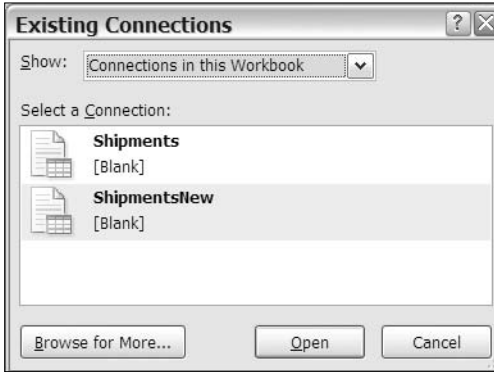
Figure 8-13. *Existing Connections dialog box*

5. In the list of connections, click ShipmentsNew, and then click Open.

   The Change PivotTable Data Source dialog box now shows ShipmentsNew as the connection name.

6. In the Change PivotTable Data Source dialog box, click OK.

7. The pivot table is automatically updated and shows the new county, Tehama, with one shipment.

Step 4: Remove the Temporary Pivot Table and the Old Connection

Now that the original pivot table uses the new connection, you'll delete Sheet4, which contains the empty pivot table that was created for the new connection:

1. Right-click the tab for Sheet4, and click Delete. When the warning message appears, click Delete to delete the sheet.

   Finally, you'll delete the old connection to the query in the Shipment database, since it's no longer needed.

2. On the Ribbon, click the Data tab, and in the Connections group, click the Connections command.

3. In the Workbook Connections dialog box, select the Shipments connection, and click Remove (see Figure 8-14).
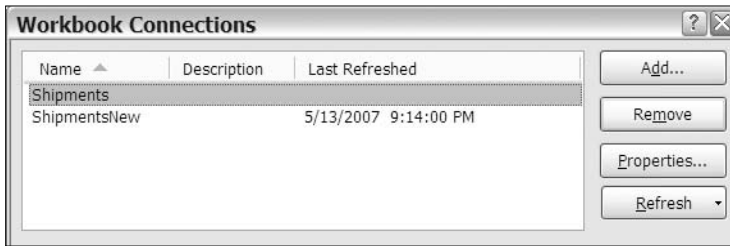
Figure 8-14. *Removing an existing connection*

4. Read the warning message that appears, and then click OK to remove the connection.

5. Click Close to close the Workbook Connections dialog box.

By creating a new connection and changing the data source for the existing pivot table, you were able to change the data source quickly and easily while maintaining the layout and formatting of the existing pivot table. There are other ways to change the data source for an Access database, but this method, while requiring several steps, is one of the easiest.

Refreshing the Pivot Table Regularly

When a pivot table is based on external data, you can change the connection settings so the connection will update regularly while the file is open. You'll set this option for the Shipments pivot table, because you expect the source data to change frequently throughout the day while new shipments are arranged.

1. Select a cell in the pivot table.

2. On the Ribbon, click the Data tab, and in the Connections group, click Properties.

3. In the Connection Properties dialog box, on the Usage tab, add a check mark to Refresh Every 60 Minutes (see Figure 8-15).
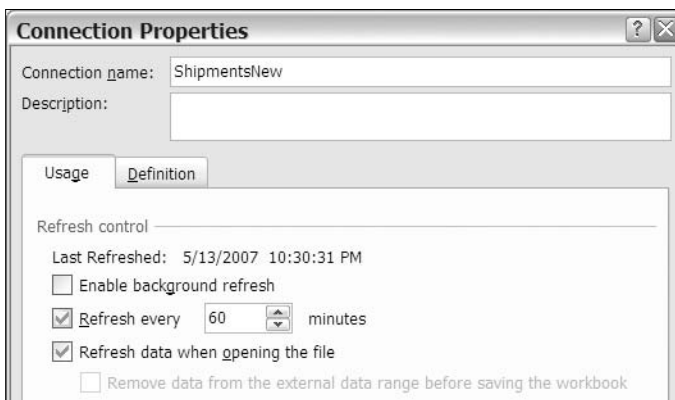
Figure 8-15. *Refreshing data every 60 minutes*

■**Note** This option is available only for pivot tables with an external data source.

After you check the option, the scroll box for minutes is activated. You'll change this setting so the data will refresh every half hour.

4. In the scroll box for minutes, change the setting to 30 minutes.

5. Click OK to close the Connection Properties dialog box.

You can use this option for refreshing the connection if the source data changes frequently and it's important that the pivot table reflect the latest available data.

Saving Source Data with the File

When you create a pivot table, the records from the source data are saved in a memory area named a *pivot cache*. When you close the file, you can save the source data in this pivot cache, or you can choose to not save it. Both options have advantages and disadvantages:

- If you save the source data, the file will be larger but may open more quickly.

- If you do not save the source data, the file will be smaller but may open slowly while the pivot cache is rebuilt.

The `ShipmentPivot.xlxs` file is based on a small query in Access, so there won't be much difference in the file size if the file is saved without the source data. However, you'll change the setting to see the effect:

1. To see the current size of the file, check Windows Explorer. In this example, the file size is 15KB.

2. Right-click a cell in the pivot table, and click PivotTable Options.

3. On the Data tab, in the PivotTable Data section, remove the check mark from Save Source Data with File (see Figure 8-16), and then click OK.
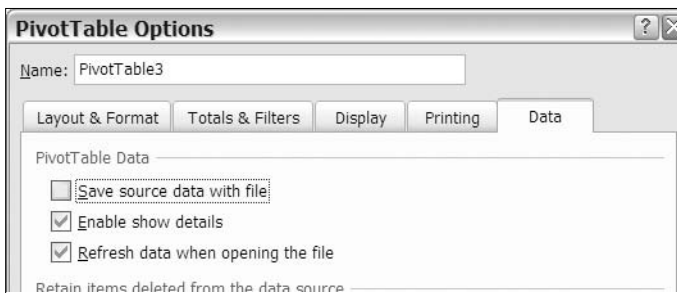
Figure 8-16. *Save Source Data with File option*

4. Save and close the file, and then to see the size of the file saved without the source data, check Windows Explorer. In this example, the file size is 13KB, a slight reduction in size.

With a larger set of records in the source data, the size difference should be more dramatic, and if storage space is limited, use this option to reduce the file size.

■**Note** If you choose to turn off the Save Source Data with File option, you should turn on the Refresh Data When Opening the File option. Otherwise, you will have to manually refresh the pivot table each time you open the workbook before you can use it.

Summary

In this chapter, you learned how to maintain a pivot table after you created it to ensure that it shows the correct data and stores the data in the way that works best for you. Specifically, you performed the following tasks:

- To ensure that the pivot table shows the latest data, you set the pivot table to refresh when the file opened.

- To prevent deleted items from accumulating in the pivot table's filters, you changed a pivot table option.

- In a pivot table that is based on external data, you set an option to refresh at regular intervals while working in a file. This ensures that you get updates throughout the day while data is entered or changed in the source database.

- For a pivot table based on an Excel table, you changed the data source to a different Excel table. This made it easy to create a new pivot table, with layout and formatting identical to the original pivot table.

- For a pivot table based on an Access database, you changed the data source to connect to a different database. This is easier than creating a new pivot table and connecting to the new database.

- With multiple pivot tables in the workbook, you updated all the pivot tables with one click of the mouse.

- You changed the pivot table settings so the external source data was not saved with the file to reduce the size of the file.

Creating Calculations in a Pivot Table

In this chapter, you'll see how easily you can get a different perspective on the data in your pivot tables. Instead of viewing total quantity sold or the average order price, you can change a setting in the pivot table to create any of the following custom calculations:

- Compare sales in one store to another.

- Calculate the difference in sales from one month to the next.

- Create a running total to see how sales accumulate over the year.

- See what percentage of a region's total sales comes from each product.

- Compare overall sales to each product's sales per region.

If none of these built-in calculations provides the perspective you need, you can create your own calculated fields and calculated items in a pivot table. For example:

- Calculate a bonus payment, based on total product sales.

- Total the sales for specific products, creating a temporary category.

- Compare results for one group of stores to another group.

In the first part of this chapter, you'll explore custom calculations using the food sales company data. In the second part, you'll create calculated fields and calculated items. To start, you'll open the sample workbook, as described in the following steps:

1. Download and open the sample file `RegionSales_02.xlsx`, available from the Apress web site.

2. Activate the Pivot_Regions worksheet, which contains a pivot table based on the food sales data (see Figure 9-1). The sales records are on the SalesData worksheet, and they contain the data from the two regions, East and North, that you worked with in Chapter 8.

	A	B	C	D
1				
2				
3	Sum of TotalPrice	Column Labels ▾		
4	Row Labels ▾	East	North	Grand Total
5	Bars	$113,577	$102,785	$216,361
6	Cookies	$157,437	$137,878	$295,314
7	Crackers	$51,360	$57,428	$108,788
8	Snacks	$21,575	$21,694	$43,269
9	Grand Total	$343,948	$319,784	$663,732

Figure 9-1. *Pivot table based on the food sales data*

Currently, the pivot table shows the total sales per region for each food category. In the next section, you'll make a simple change to the pivot table to apply a custom calculation, and you'll see the same data in a different way.

Creating Custom Calculations

In a pivot table, it's easy to get a different perspective on the data by using a custom calculation. After you create a normal sum or average, you can change a setting, and the pivot table will compare the values, show the differences between amounts, or calculate the percentage of a total that a sum contributes.

In this section of the chapter, you'll use each of the custom calculations that are available in a pivot table. The eight types of custom calculation are described here, with an example of how the calculation could be used:

Difference From: Calculates the difference between values. Compare each product's sales to a specific product's sales or each month's quantity to the previous month's.

% Of: Calculates the percentage of one value to another. View one region's sales as a percentage of another region's sales.

% Difference From: Calculates the percentage difference between values. See the percentage change in sales each month compared to the previous month.

Running Total in: Compiles a total over a time period or in a list of items. View the year to date total for each product or region.

% of row: Calculates the percentage that an item contributes to a row's total. See each product's sales as a percentage of the overall sales in a region.

% of column: Calculates the percentage that an item contributes to a column's total. See each region's sales as a percentage of the overall sales of a product.

% of total: Calculates the percentage that an item contributes to the overall total. See each region's sales of a product as a percentage of the overall sales.

Index: Calculates the weight that an item contributes to the overall total. See each region's sales of a product as compared to product sales, region sales, and the overall sales.

In the following examples, you'll use each of these custom calculations with the food company sales data to compare results between regions, across a time period, or among products.

Using Difference From

The sales manager of the food company wants a report that highlights the differences in sales between two regions. In which categories is the North region doing better, and how big is the difference in sales for each category? You'll use the *Difference From* custom calculation in the pivot table so it shows the difference, instead of the total sales, for each category.

In the pivot table, Category is in the Row Labels area, Region is in the Column Labels area, and Sum of TotalPrice is in the Values area.

1. In the pivot table, right-click one of the value cells. For example, right-click cell B6, which is the total for cookies in the East.

2. In the context menu, click Summarize Data By, and then click More Options (see Figure 9-2).
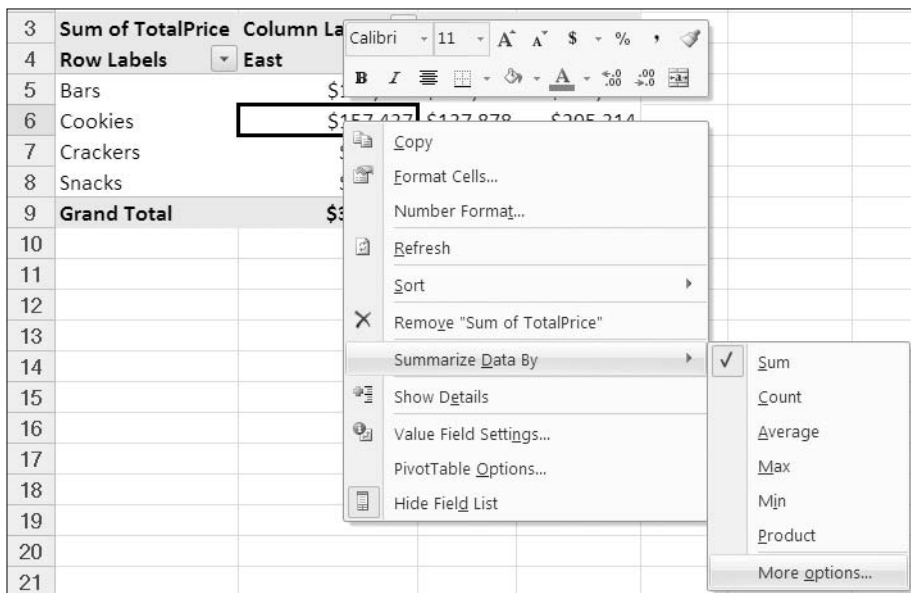
Figure 9-2. *More Options command*

3. In the Value Field Settings dialog box, click the Show Values As tab.

4. From the drop-down list for Show Values As, select Difference From (see Figure 9-3).
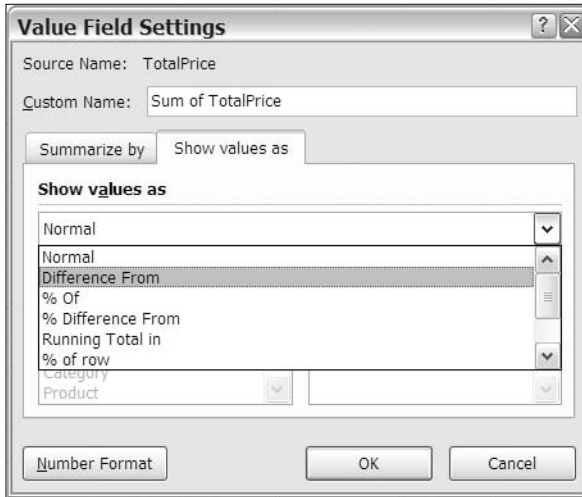
Figure 9-3. *Show Values As Difference From*

5. After you select Difference From, the Base Field and Base Item lists are activated. In this report, you want to compare values between the regions, so select Region as the base field.

6. After you select Region as the Base field, the region names appear in the Base Item list. You'll select North as the base item, and East will be compared to it. For the base item, select North, and then click OK (see Figure 9-4).
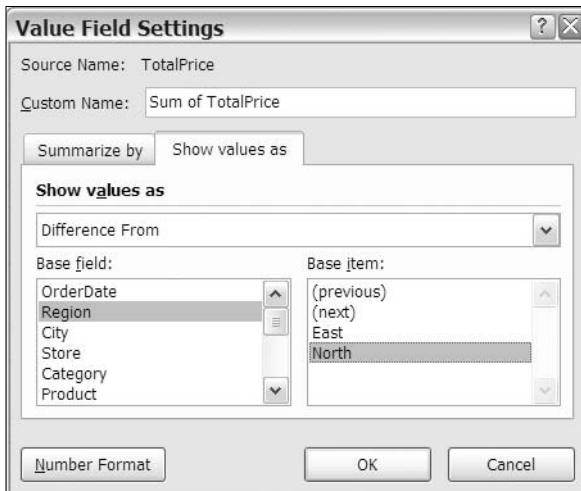
Figure 9-4. *Base field and base item selected*

The values in the pivot table change to show the difference in sales between the East and North regions. In Figure 9-5, the pivot table at the left shows the Difference From custom calculations, and the original calculations (Normal) are in the pivot table at the right.

Difference From					Normal		
Sum of Total	Column L ▾				Sum of TotalP	Column L ▾	
Row Labe ▾	East	North	Grand Total		Row Labels ▾	East	North
Bars	$10,792				Bars	$113,577	$102,785
Cookies	$19,559				Cookies	$157,437	$137,878
Crackers	-$6,067				Crackers	$51,360	$57,428
Snacks	-$119				Snacks	$21,575	$21,694
Grand Total	**$24,164**				**Grand Total**	**$343,948**	**$319,784**

Figure 9-5. *The pivot table at left shows Difference From custom calculation.*

The values in the East column now show the difference from the North region for each category. The North column is empty, because it is the base item, and there is no difference when compared to itself. From the revised pivot table, the sales manager will quickly see how sales differ. For example:

- Bar sales in the East are $10,792 higher than bar sales in the North.

- Snack sales in the East are $119 lower than snack sales in the North.

- Overall sales in the East are $24,164 higher than sales in the North.

■Tip You can hide the grand total for rows, because it will be empty when using this custom calculation.

You can add a heading above the pivot table to explain that the pivot table shows the differences between regions and send the report to the sales manager.

Using % Of

The sales manager is impressed that you were able to calculate the differences between regions so quickly and easily and asks for a slightly different report. Instead of showing the dollars difference between the two regions, could you create a report that compares sales among the different categories? What percentage are the sales of snacks, compared to the sales of bars?

To create this report, you'll use the % Of custom calculation. This will show each category's sales as a percentage of another category's sales. For example, if snack sales are $50, and bar sales are $100, the snack sales are 50 percent of the bar sales.

In the pivot table, Category is in the Row Labels area, Region is in the Column Labels area, and Sum of TotalPrice is in the Values area.

1. In the pivot table, right-click one of the value cells. For example, right-click cell B5, which is Bars for the East region.

2. In the context menu, click Summarize Data By, and then click More Options.

3. In the Value Field Settings dialog box, click the Show Values As tab.

4. From the drop-down list for Show Values As, select % Of.

5. You want to compare categories, so select Category as the Base field.

6. You'll compare the other categories to Bars, so select Bars as the base item.

7. It will be easier to compare the percentages with no decimal places, so click Number Format, and set Decimal places to zero, and then click OK to close the Format Cells dialog box.

8. Click OK to close the Value Field Settings dialog box.

The values in the pivot table change to show each category's percentage of the Bars category sales. In Figure 9-6, the pivot table at the left shows the % Of custom calculations, and the original calculations (Normal) are in the pivot table at the right.

% Of				Normal		
Sum of TotalPrice	Colum ▾			Sum of TotalPı	Column Lá ▾	
Row Labels ▾	East	North	Grand Total	Row Labels ▾	East	North
Bars	100%	100%	100%	Bars	$113,577	$102,785
Cookies	139%	134%	136%	Cookies	$157,437	$137,878
Crackers	45%	56%	50%	Crackers	$51,360	$57,428
Snacks	19%	21%	20%	Snacks	$21,575	$21,694
Grand Total				Grand Total	$343,948	$319,784

Figure 9-6. *The pivot table at left shows the % Of custom calculation.*

The revised pivot table shows the percentage for each category compared to the Bars category. Instead of doing those calculations yourself, the pivot table did them for you, with a few clicks of the mouse. From the revised pivot table, the sales manager can quickly see how category sales differ. For example:

• Cracker sales in the North are 56 percent of bar sales in the North.

• Snack sales in the East are 19 percent of snack sales in the East.

• Total cookie sales are 136 percent of total bar sales.

■**Tip** Make a copy of the pivot table to display the normal values, and leave it on the worksheet, near the pivot table with the custom calculations.

Using % Difference From

Next, the sales manager wants to see whether sales in each region have changed from the beginning of 2007 to the end of 2007. Were there large fluctuations in the total sales per month, or were sales steady throughout the year in each region?

To create this report, you can use the % Difference From custom calculation. It's similar to the Difference From calculation that you used earlier, but it shows the difference as a percentage, instead of an amount.

To analyze the data by month, you'll use the OrderDate, Region, and TotalPrice fields in the pivot table layout. First you'll change the TotalPrice field back to Normal calculation, so it will show the dollar amounts when you change the layout:

1. Right-click a value cell in the pivot table, choose Summarize Data By, and then click More Options.

2. In the Value Field Settings dialog box, click the Show Values As tab, and from the drop-down list for Show Values As, select Normal, and then click OK.

3. In the PivotTable Field List pane, remove Category from the Row Labels area.

4. Add OrderDate to the Row Labels area, leave Region in the Column Labels area, and leave TotalPrice in the Values area as Sum of TotalPrice.

5. Filter the OrderDate field so it shows dates in 2007 only.

The pivot table now shows the order dates, with the total sales for each region (see Figure 9-7).

3	Sum of TotalPrice	Column Labels ▼		
4	Row Labels ▼	East	North	Grand Total
5	01-Jan-07	18510.94	14826.04	33336.98
6	01-Feb-07	17275.53	13548.19	30823.72
7	01-Mar-07	20341.4	18521.25	38862.65
8	01-Apr-07	18158.66	15437.21	33595.87
9	01-May-07	20417.18	16118.61	36535.79
10	01-Jun-07	13936.14	11312.49	25248.63
11	01-Jul-07	12844.61	12966.45	25811.06
12	01-Aug-07	19538.36	18215.79	37754.15
13	01-Sep-07	13778.97	12100.18	25879.15
14	01-Oct-07	14342.64	14072.81	28415.45
15	01-Nov-07	13585.13	13589.57	27174.7
16	01-Dec-07	19923.24	18527.18	38450.42
17	Grand Total	202652.8	179235.77	381888.57

Figure 9-7. *Total sales per date for each region*

You want to compare the totals to see how they change from one month to the next, so you'll use the % Difference From custom calculation to display the change.

For this report, you want to compare each month's total to the total for the previous month and see the change as a percent difference.

1. In the pivot table, right-click one of the value cells.

2. In the context menu, click Summarize Data By, and then click More Options.

3. In the Value Field Settings dialog box, click the Show Values As tab.

4. From the drop-down list for Show Values As, select % Difference From.

5. In this report, you want to compare the totals between dates, so choose OrderDate as the Base field.

6. In this report, you want to compare each month's total to the previous month's total, so select (previous) as the base item (see Figure 9-8).
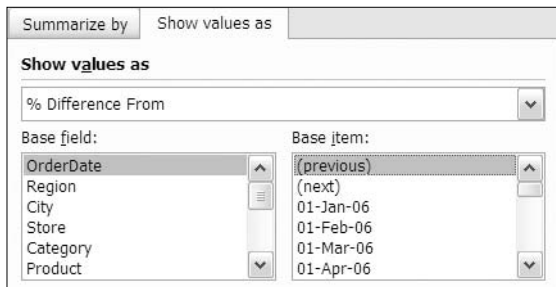
Figure 9-8. *OrderDate with (previous) as base item*

7. It will be easier to compare the values with no decimal places, so click Number Format, and set Decimal places to zero, and then click OK to close the Format Cells dialog box.

8. Click OK to close the Value Field Settings dialog box.

The values in the pivot table change to show the difference for each month, from the previous month (see Figure 9-9).

The revised pivot table shows the percentage change in sales each month, compared to the previous month. The row for the first date is empty, because there's no previous date to which this can be compared. From the revised pivot table, the sales manager can quickly see how the sales totals changed during 2007. For example:

- June sales in the East were 32 percent lower than May sales.

- August sales in the North were 40 percent higher than July sales.

- Total December sales were 41 percent higher than November sales.

3	Sum of TotalPrice	Column ▾		
4	Row Labels ⌄	East	North	Grand Total
5	01-Jan-07			
6	01-Feb-07	-7%	-9%	-8%
7	01-Mar-07	18%	37%	26%
8	01-Apr-07	-11%	-17%	-14%
9	01-May-07	12%	4%	9%
10	01-Jun-07	-32%	-30%	-31%
11	01-Jul-07	-8%	15%	2%
12	01-Aug-07	52%	40%	46%
13	01-Sep-07	-29%	-34%	-31%
14	01-Oct-07	4%	16%	10%
15	01-Nov-07	-5%	-3%	-4%
16	01-Dec-07	47%	36%	41%
17	Grand Total			

Figure 9-9. *Months compared to previous month totals*

Using Running Total In

You've sent your report on how the sales totals change from one month to the next, and now the sales manager wants a report that shows how each region's sales totals accumulate over the year. Each month should show the year to date total for each region.

In the pivot table, OrderDate is in the Row Labels area, filtered for 2007 dates; Region is in the Column Labels area; and Sum of TotalPrice is in the Values area. You'll keep the current pivot table layout and change the custom calculation so it creates a running total.

1. In the pivot table, right-click one of the value cells.

2. In the context menu, click Summarize Data By, and then click More Options.

3. In the Value Field Settings dialog box, click the Show Values As tab.

4. From the drop-down list for Show Values As, select Running Total In.

5. In this report, you want to create a running total based on the Order dates, so choose OrderDate as the base field. For a Running Total In custom calculation, no base item is required.

6. Click Number Format, and format the values as Number, with a thousands separator, and no decimal places.

7. Click OK to close the Format Cells dialog box, and then click OK to close the Value Field Settings dialog box.

The values in the pivot table change to show the running total for each month (see Figure 9-10).

Sum of TotalPrice	Column ▾		
Row Labels ▾	East	North	Grand Total
01-Jan-07	18,511	14,826	33,337
01-Feb-07	35,786	28,374	64,161
01-Mar-07	56,128	46,895	103,023
01-Apr-07	74,287	62,333	136,619
01-May-07	94,704	78,451	173,155
01-Jun-07	108,640	89,764	198,404
01-Jul-07	121,484	102,730	224,215
01-Aug-07	141,023	120,946	261,969
01-Sep-07	154,802	133,046	287,848
01-Oct-07	169,144	147,119	316,263
01-Nov-07	182,730	160,709	343,438
01-Dec-07	202,653	179,236	381,889
Grand Total			

Figure 9-10. *Running totals for each region*

The revised pivot table shows the year-to-date total for each region for each month. In this report, the sales manager can quickly see how each region was going at any point in the year.

■**Tip** The running total in custom calculations is best suited for using a date field as the base field, although you could use another type of field. For example, if recording expenses for different projects, you could show a running total of expenses over different phases of the project.

Using % of Row

You've created two reports from the monthly sales per region pivot table. In the first report, you showed the percentage change from one month to the next. In the second report, you showed the running total, per month, over the year.

Now the sales manager wants a third report, based on the same data. In the new report, you should show what percentage of each month's sales came from each region. For example, if there were $100 sales in the East region in January and $300 in the North region, then East would be 25 percent of the January sales, and North would be 75 percent. Each month's totals are in a row in the pivot table, so you'll use the % of row custom calculation to create the report.

In the pivot table, OrderDate is in the Row Labels area, filtered for 2007 dates; Region is in the Column Labels area; and Sum of TotalPrice is in the Values area. You'll keep the current pivot table layout and change the custom calculation so it shows the percent of monthly sales that each category contributes.

1. In the pivot table, right-click one of the value cells.

2. In the context menu, click Summarize Data By, and then click More Options.

3. In the Value Field Settings dialog box, click the Show Values As tab.

4. From the drop-down list for Show Values As, select % of row.

5. For a % of row custom calculation, no base field or base item is required.

6. Click Number Format, and format the values as Percentage, with no decimal places.

7. Click OK to close the Format Cells dialog box, and then click OK to close the Value Field Settings dialog box.

The values in the pivot table change to show the percent of the monthly sales that each category contributes (see Figure 9-11).

3	Sum of TotalPrice	Colur ▾		
4	Row Labels ⡄⊽	East	North	Grand Total
5	01-Jan-07	56%	44%	100%
6	01-Feb-07	56%	44%	100%
7	01-Mar-07	52%	48%	100%
8	01-Apr-07	54%	46%	100%
9	01-May-07	56%	44%	100%
10	01-Jun-07	55%	45%	100%
11	01-Jul-07	50%	50%	100%
12	01-Aug-07	52%	48%	100%
13	01-Sep-07	53%	47%	100%
14	01-Oct-07	50%	50%	100%
15	01-Nov-07	50%	50%	100%
16	01-Dec-07	52%	48%	100%
17	**Grand Total**	**53%**	**47%**	**100%**

Figure 9-11. *Region sales per month displayed as % of row*

The revised pivot table shows the percentage of the month's total for each region. In this report, the sales manager can quickly see that the East region has the stronger sales most months and that the North region has the weaker sales overall for the entire year.

Using % of Column

Currently the pivot table shows the percent of the row that each region contributes to each month's total sales. To complement this report, the sales manager wants you to create another report that shows what percentage of each region's sales occurred in each month.

To create this new report from the same data, you'll change the custom calculation. The monthly totals are listed down each region's column, so you'll use the % of column custom calculation:

1. In the pivot table, right-click one of the value cells.

2. In the context menu, click Summarize Data By, and then click More Options.

3. In the Value Field Settings dialog box, click the Show Values As tab.

4. From the drop-down list for Show Values As, select % of column.

5. For a % of column custom calculation, no base field or base item is required.

6. Click OK to close the Value Field Settings dialog box.

The values in the pivot table change to show the percent of each region's total sales for each order date (see Figure 9-12).

3	Sum of TotalPrice	Colu ▾		
4	Row Labels	▾ East	North	Grand Total
5	01-Jan-07	9%	8%	9%
6	01-Feb-07	9%	8%	8%
7	01-Mar-07	10%	10%	10%
8	01-Apr-07	9%	9%	9%
9	01-May-07	10%	9%	10%
10	01-Jun-07	7%	6%	7%
11	01-Jul-07	6%	7%	7%
12	01-Aug-07	10%	10%	10%
13	01-Sep-07	7%	7%	7%
14	01-Oct-07	7%	8%	7%
15	01-Nov-07	7%	8%	7%
16	01-Dec-07	10%	10%	10%
17	Grand Total	100%	100%	100%

Figure 9-12. *Region sales per month displayed as % of column*

The Grand Total column shows the overall percent per order date. The Grand Total row shows 100 percent for each category, because that is the total for each column.

By using the custom calculation, % of column, you can see which months have the highest and lowest sales, for each category, and overall.

The revised pivot table shows the percentage of the region's total for each month. In this report, the sales manager can quickly see that July was the lowest month in the East region and that the North region had its weakest sales in June.

Using % of Total

You've reported on the values as percent of column and percent of row to see how each amount compares to a total amount. The sales manager has asked for one more perspective on these percentages and wants to see what percent of the overall total each value contributes. Using the existing layout, you can create the new report by using the % of total custom calculation:

1. In the pivot table, right-click one of the value cells.

2. In the context menu, click Summarize Data By, and then click More Options.

3. In the Value Field Settings dialog box, click the Show Values As tab.

4. From the drop-down list for Show Values As, select % of total.

5. For a % of total custom calculation, no Base Field or base item is required.

6. Because the percentages will be small, it will be best to show one decimal place. Click Number Format, and format the values as Percentage, with one decimal place.

7. Click OK to close the Format Cells dialog box, and then click OK to close the Value Field Settings dialog box.

The values in the pivot table change to show the percent of each value of the overall grand total (see Figure 9-13).

	Sum of TotalPrice	Colum ▾		
3				
4	Row Labels ⬙	East	North	Grand Total
5	01-Jan-07	4.8%	3.9%	8.7%
6	01-Feb-07	4.5%	3.5%	8.1%
7	01-Mar-07	5.3%	4.8%	10.2%
8	01-Apr-07	4.8%	4.0%	8.8%
9	01-May-07	5.3%	4.2%	9.6%
10	01-Jun-07	3.6%	3.0%	6.6%
11	01-Jul-07	3.4%	3.4%	6.8%
12	01-Aug-07	5.1%	4.8%	9.9%
13	01-Sep-07	3.6%	3.2%	6.8%
14	01-Oct-07	3.8%	3.7%	7.4%
15	01-Nov-07	3.6%	3.6%	7.1%
16	01-Dec-07	5.2%	4.9%	10.1%
17	Grand Total	53.1%	46.9%	100.0%

Figure 9-13. *Monthly sales per region shown as % of total*

From the revised pivot table, the sales manager will quickly see how what percentage of the overall sales occurred in each region in each month. For example:

- Sales in the East for March were strong, at 5.3 percent of the overall total.

- Sales in the North for June were weak, at only 3.0 percent of the overall total.

- March has the highest sales, with combined sales at 10.2 percent of the overall total.

Using Index

While creating the reports for the sales manager, you noticed that there was also a custom calculation named Index. To enhance the overall picture for the sales manager's reports, you'll create one final report on the regions' sales per month using the Index custom calculation. The Index compares each value to its row total, its column total, and the overall total, using a weighted average.

To provide a reference point for the sales manager, you'll also make a copy of the pivot table, adjacent to the existing pivot table. In the copy, you'll show a normal view of the sales amounts.

1. To copy the existing pivot table, copy columns A to D, then select cell G1, and finally paste.

2. In the new pivot table, right-click one of the value cells, and in the context menu, click Summarize Data By. Then click More Options.

3. In the Value Field Settings dialog box, click the Show Values As tab.

4. From the drop-down list for Show Values As, select Normal.

5. Click Number Format, and format the values as Number, with no decimal places, and a thousand separator.

6. Click OK to close the Format Cells dialog box, and then click OK to close the Value Field Settings dialog box.

The new pivot table now shows the total sales per month for each region (see Figure 9-14).

	G	H	I	J
Total Sales				
Sum of TotalP	Column ▾			
Row Labels ⌄	East		North	Grand Total
01-Jan-07		18,511	14,826	33,337
01-Feb-07		17,276	13,548	30,824
01-Mar-07		20,341	18,521	38,863
01-Apr-07		18,159	15,437	33,596
01-May-07		20,417	16,119	36,536
01-Jun-07		13,936	11,312	25,249
01-Jul-07		12,845	12,966	25,811
01-Aug-07		19,538	18,216	37,754
01-Sep-07		13,779	12,100	25,879
01-Oct-07		14,343	14,073	28,415
01-Nov-07		13,585	13,590	27,175
01-Dec-07		19,923	18,527	38,450
Grand Total		202,653	179,236	381,889

Figure 9-14. *Copy of pivot table shows sales amounts.*

In the original pivot table, you'll apply the Index custom calculation to see the indexes that are calculated for each month and region:

1. In the pivot table that starts in column A, right-click one of the value cells.

2. In the context menu, click Summarize Data By, and then click More Options.

3. In the Value Field Settings dialog box, click the Show Values As tab.

4. From the drop-down list for Show Values As, select Index. For an Index custom calculation, no base field or base item is required.

5. Click Number Format, and format the values as Number, with two decimal places.

6. Click OK to close the Format Cells dialog box, and then click OK to close the Value Field Settings dialog box.

The values in the pivot table change to show each region's index for each month (see Figure 9-15).

Index				Total Sales			
Sum of TotalPr Colum ▾				Sum of TotalP Column ▾			
Row Labels ↓▼	East	North	Grand Total	Row Labels ↓▼	East	North	Grand Total
01-Jan-07	1.05	0.95	1.00	01-Jan-07	18,511	14,826	33,337
01-Feb-07	1.06	0.94	1.00	01-Feb-07	17,276	13,548	30,824
01-Mar-07	0.99	1.02	1.00	01-Mar-07	20,341	18,521	38,863
01-Apr-07	1.02	0.98	1.00	01-Apr-07	18,159	15,437	33,596
01-May-07	1.05	0.94	1.00	01-May-07	20,417	16,119	36,536
01-Jun-07	1.04	0.95	1.00	01-Jun-07	13,936	11,312	25,249
01-Jul-07	0.94	1.07	1.00	01-Jul-07	12,845	12,966	25,811
01-Aug-07	0.98	1.03	1.00	01-Aug-07	19,538	18,216	37,754
01-Sep-07	1.00	1.00	1.00	01-Sep-07	13,779	12,100	25,879
01-Oct-07	0.95	1.06	1.00	01-Oct-07	14,343	14,073	28,415
01-Nov-07	0.94	1.07	1.00	01-Nov-07	13,585	13,590	27,175
01-Dec-07	0.98	1.03	1.00	01-Dec-07	19,923	18,527	38,450
Grand Total	1.00	1.00	1.00	Grand Total	202,653	179,236	381,889

Figure 9-15. *Regions' index per month compared to normal view of total sales*

Values that are similar in the total sales pivot table can have much different indexes. For example, in November, the values for the East and North are almost equal. However, the index for the North region in November is 1.07, and the East region's index is 0.94.

The index formula is as follows:

```
((value in cell) x (Grand Total of Grand Totals)) /
((Grand Row Total) x (Grand Column Total))
```

Because the grand total is higher for the East column, the Grand Column Total in the formula is larger. The East November amount is divided by this larger number, and its resulting index is smaller.

Using the Index custom calculation gives you a picture of each value's importance in its row and column context. If all values in the pivot table were equal, each value would have an index of 1. If an index is less than 1, it's of less importance in its row and column, and if an index is greater than 1, it's of greater importance in its row and column.

Creating Formulas

In addition to summary functions and custom calculations, you can create calculated fields and calculated items in a pivot table. These formulas are similar to worksheet calculations but use the pivot table's field names or item names, instead of cell references. For example, in a pivot table, you could do the following:

- You could calculate a discount for stores that order more than 1,000 items this month.

- You could subtract total expenses from total income to calculate a profit for each region.

- You could forecast sales for a new product, based on a percentage of a current product's sales.

A calculated field is used when you want to create a new field in the Values area. With a calculated field, you can perform calculations on the totals for other fields, such as multiplying another field's values by a percentage or dividing one field by another.

With a calculated item, you can perform calculations on the totals for other items in the same field, such as multiplying another item's values by a percentage or totaling two of the other items.

Creating a Calculated Field

As part of a special promotion, the sales manager has decided to pay a 3 percent bonus to the sales staff, based on Bars sales in December 2007. You have been asked to create a report that shows the total for each store and calculate the 3 percent bonuses. You could summarize the sales data in a pivot table and calculate the bonuses using worksheet formulas (see Figure 9-16).

	A	B	C	D
1	Category	Bars 🔽		
2	OrderDate	01-Dec-07 🔽		
3				3%
4	Row Labels 🔽	Sum of TotalPrice		Bonus
5	3000	1147.07		34.41
6	3036	1134.45		34.03
7	3055	2148.17		64.45
8	3074	942.27		28.27
9	3082	2220.16		66.60
10	3090	996.09		29.88
11	3166	1183.73		35.51
12	**Grand Total**	**9771.94**		293.16

Figure 9-16. *Calculating bonus amounts with worksheet formulas*

However, you would prefer to include the bonus calculation within the pivot table, so the column of bonus formulas will automatically adjust if stores are added or hidden or if other fields are added to the pivot table layout.

In the following steps, you will clear the pivot table and add the fields you need in the report. Then, you will create a calculated field with a simple formula that multiplies the Sum of TotalPrice field by 3 percent. This will create a new field in the Values area that shows the bonus amount for each store.

1. Clear the original pivot table, and delete the comparison pivot table you created in column G.

2. In the PivotTable Field List pane, add Store to the Row Labels area, and add TotalPrice to the Values area as Sum of TotalPrice.

3. Add the Category field to the Report Filter area, and select Bars from the Category drop-down list to limit the pivot table to showing only the sales for that category.

4. Add the OrderDate field to the Report Filter area, below the Category field.

5. From the OrderDate drop-down list, select 01-Dec-07 to limit the pivot table to show-
    ing the sales only for that order date.

The pivot table now shows the total bar sales for each store in December 2007 (see
Figure 9-17).

	A	B	
1	Category	Bars	
2	OrderDate	01-Dec-07	
3			
4	Row Labels	Sum of TotalPrice	
5	3000	1147.07	
6	3036	1134.45	
7	3055	2148.17	
8	3074	942.27	
9	3082	2220.16	
10	3090	996.09	
11	3166	1183.73	
12	Grand Total	9771.94	

Figure 9-17. *Total bar sales per store for selected order date*

Now that the pivot table layout is set up for this report, you'll create a calculated field to
determine the bonus amount for each store:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Tools group, click Formulas, and then click Calculated Field (see Figure 9-18).
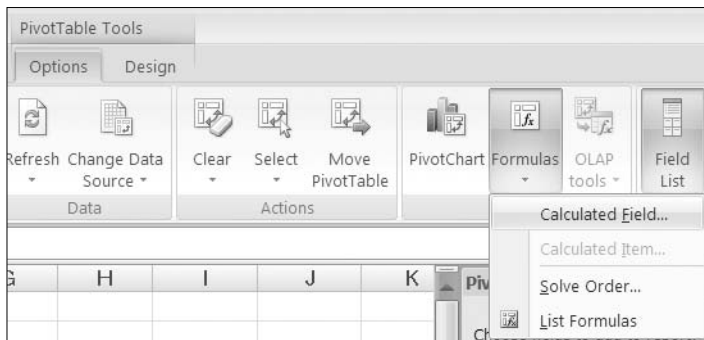
Figure 9-18. *Calculated Field command on the Ribbon*

The Insert Calculated Field dialog box opens, where you'll enter a name for your calcu-
lated field and create a formula to determine the bonus on each store's sales. The
Name box contains a default name, Field1, and a default formula, = 0. You'll replace
these with your field name and formula.

■**Tip** When naming a calculated field, you can use up to 255 characters, including letters, numbers, and punctuation. However, it's best to use a short, meaningful name so your pivot table is easy to read and understand. Since this calculated field is for a sales bonus, you'll name the field Bonus.

---

4. In the Name box, type **Bonus** as the name for the calculated field.

5. On the keyboard, press the Tab key to move to the Formula box and to select its current contents, and then press the Delete key to remove the existing formula.

6. In the Formula box, type an equal sign to start the formula.

7. In your formula, you want to calculate a bonus amount that is 3 percent of the order total. The order total is in the TotalPrice field, so you'll use that in the formula. In the list of Fields, select TotalPrice, and click Insert Field to add it to the formula.

8. To complete the formula, type *** 3%** (see Figure 9-19). Space characters are included here to make the formula easier to read—you can enter the formula with or without the spaces.
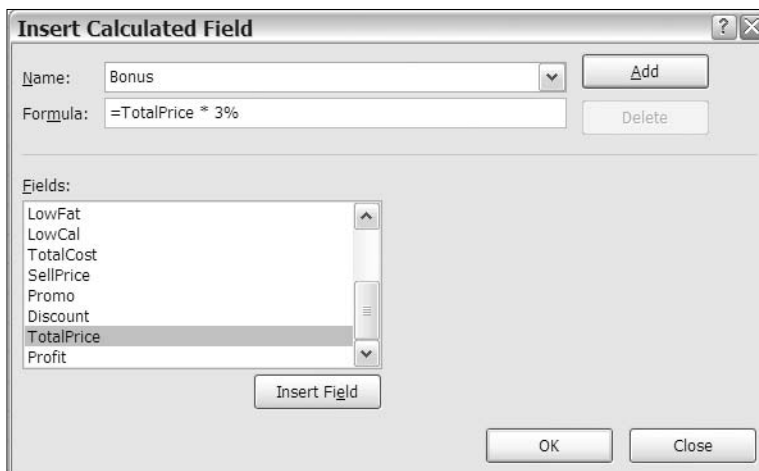
Figure 9-19. *Insert Calculated Field dialog box*

9. Click OK to close the Insert Calculated Field dialog box.

The new calculated field, Bonus, appears in the PivotTable Field List pane and in the Values area of the pivot table (see Figure 9-20). For each store, the bonus amount is 3 percent of its total sales, and the Grand Total row shows the total bonus amount.

	A	B	C
1	Category	Bars	
2	OrderDate	01-Dec-07	
3			
4		Values	
5	Row Labels	Sum of TotalPrice	Sum of Bonus
6	3000	1147.07	34.4121
7	3036	1134.45	34.0335
8	3055	2148.17	64.4451
9	3074	942.27	28.2681
10	3082	2220.16	66.6048
11	3090	996.09	29.8827
12	3166	1183.73	35.5119
13	Grand Total	9771.94	293.1582

Figure 9-20. *Calculated field added to the pivot table*

Editing a Calculated Field

After seeing your report, the sales manager decides that the bonus can be a bit higher and asks you to change the bonus to 5 percent, instead of 3 percent. You'll modify the formula, so the bonus shows the increased amount:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Tools group, click Formulas, and then click Calculated Field.

4. In the Insert Calculated Field dialog box, in the Name box, click the drop-down arrow, and select Bonus, which is the formula you want to change.

5. In the Formula box, change the 3% to **5%**, and then click Modify (see Figure 9-21).
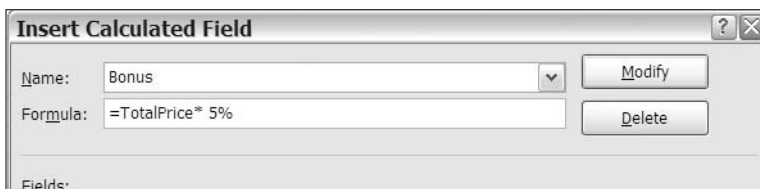
Figure 9-21. *Modifying a calculated field*

6. Click OK to close the Insert Calculated Field dialog box.

The revised bonus amounts now appear in the Values area of the pivot table (see Figure 9-22). For each store, the bonus amount is 5 percent of its total sales, and the Grand Total row shows the total bonus amount.

	A	B	C
1	Category	Bars	
2	OrderDate	01-Dec-07	
3			
4		Values	
5	Row Labels	Sum of TotalPrice	Sum of Bonus
6	3000	1147.07	57.3535
7	3036	1134.45	56.7225
8	3055	2148.17	107.4085
9	3074	942.27	47.1135
10	3082	2220.16	111.008
11	3090	996.09	49.8045
12	3166	1183.73	59.1865
13	**Grand Total**	**9771.94**	**488.597**

Figure 9-22. *The modified calculated field*

Creating a Complex Calculated Field

The sales manager wants you to calculate an additional bonus for the bar sales. For stores that ordered more than 1,000 units in December 2007, there will be a special bonus of 4 percent, in addition to the bonus you previously calculated. If you calculated the additional bonus outside of the pivot table, it would use the formula shown in Figure 9-23.

	A	B	C	D	E	F	G
1	Category	Bars					
2	OrderDate	01-Dec-07					
3							
4		Values				4% Bonus	
5	Row Labels	Sum of TotalPrice	Sum of Bonus	Sum of Qty		if Qty>1000	
6	3000	1147.07	57.3535	601		=IF(D6>1000,B6*4%,0)	
7	3036	1134.45	56.7225	585		-	
8	3055	2148.17	107.4085	1161		85.93	
9	3074	942.27	47.1135	511		-	
10	3082	2220.16	111.008	1208		88.81	
11	3090	996.09	49.8045	537		-	
12	3166	1183.73	59.1865	649		-	
13	**Grand Total**	**9771.94**	**488.597**	**5252**		174.73	

Figure 9-23. *Calculating the additional bonus amounts with worksheet formulas*

To calculate the additional bonus within the pivot table, you'll use a similar formula, but you'll use the Qty field and the TotalPrice field, instead of cell references. You'll add the Qty field to the pivot table layout and then create the new calculated field:

1. Select a cell in the pivot table.

2. In the PivotTable Field List pane, add a check mark to the Qty field to add it to the Values area as Sum of Qty.

The pivot table now shows the total quantity for bar sales for each store in December 2007, and stores 3055 and 3082 have quantities greater than 1,000 (see Figure 9-24). Their sales will be eligible for the special bonus.

	A	B	C	D
1	Category	Bars		
2	OrderDate	01-Dec-07		
3				
4		Values		
5	Row Labels ▾	Sum of TotalPrice	Sum of Bonus	Sum of Qty
6	3000	1147.07	57.3535	601
7	3036	1134.45	56.7225	585
8	3055	2148.17	107.4085	1161
9	3074	942.27	47.1135	511
10	3082	2220.16	111.008	1208
11	3090	996.09	49.8045	537
12	3166	1183.73	59.1865	649
13	**Grand Total**	**9771.94**	**488.597**	**5252**

Figure 9-24. *Store sales with Bonus and Qty fields*

Now that the pivot table layout is set up for this report, you'll create a new calculated field to determine the additional bonus amount for each qualified store:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Tools group, click Formulas, and then click Calculated Field.

4. In the Insert Calculated Field dialog box, type **Bonus2** as the name for the calculated field.

5. On the keyboard, press the Tab key to move to the Formula box and to select its current contents, and then press the Delete key to remove the existing formula.

In your formula, you want to calculate a bonus amount that is 4 percent of the order total, but only if the total quantity is greater than 1,000. To do this calculation on a worksheet, you would use an IF function to test the quantity and calculate the bonus if the quantity passed the test. For example, with a quantity in cell D6 and sales amount in cell B6, you would use the formula: =IF(D6>1000,B6*4%,0) (see Figure 9-25).

Values			4% Bonus
Sum of TotalPrice	Sum of Bonus	Sum of Qty	if Qty>1000
1147.07	57.3535	601	=IF(D6>1000,B6*4%,0)

Figure 9-25. *Worksheet calculation for special bonus*

This formula tests the quantity, IF(D6>1000, and if that is true, the sales amount is multiplied by the bonus percentage, B6*4%. If the quantity is not greater than 1,000, the test result is false, and the formula result is 0.

To replicate this formula in the Calculated Field, you'll use field names instead of cell references:

6. In the Formula box, type **=IF(**.

7. In the list of Fields, select Qty, and click Insert Field to add it to the formula.

8. Next, type **>1000** followed by a comma.

9. In the list of Fields, select TotalPrice, and click Insert Field to add it to the formula.

10. To complete the formula, type *** 4%,0)**. The completed formula (see Figure 9-26) is as follows:

```
=IF( Qty>1000, TotalPrice*4%,0)
```
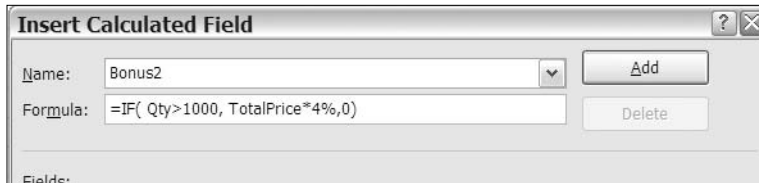

Figure 9-26. *Insert Calculated Field dialog box*

11. Click OK to close the Insert Calculated Field dialog box.

The new calculated field, Bonus2, appears in the PivotTable Field List pane and in the Values area of the pivot table. For each store with quantity greater than 1,000, the additional bonus amount is 4 percent of its total sales, and the other stores show a zero (see Figure 9-27).

	A	B	C	D	E
1	Category	Bars			
2	OrderDate	01-Dec-07			
3					
4		Values			
5	Row Labels	Sum of TotalPrice	Sum of Bonus	Sum of Qty	Sum of Bonus2
6	3000	1147.07	57.3535	601	0
7	3036	1134.45	56.7225	585	0
8	3055	2148.17	107.4085	1161	85.9268
9	3074	942.27	47.1135	511	0
10	3082	2220.16	111.008	1208	88.8064
11	3090	996.09	49.8045	537	0
12	3166	1183.73	59.1865	649	0
13	**Grand Total**	**9771.94**	**488.597**	**5252**	**390.8776**

Figure 9-27. *Pivot table with two calculated fields*

■**Note** The grand total row shows a bonus amount that is 4 percent of the total sales, because the total quantity is greater than 1,000. When you create a calculated field, the grand total performs the same calculation as the row calculations, instead of summing the rows above. In some cases, such as this, the grand total may not provide the information that you need, so you can ignore or hide the Grand Total row.

Using Calculated Fields in Formulas

As a final step in the report, you'll create one more calculated field to add the two bonus amounts. This will make it easier for the sales manager to see the total bonus for each store. In this calculated field, you'll refer to the other calculated fields that you created:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Tools group, click Formulas, and then click Calculated Field.

4. In the Insert Calculated Field dialog box, type **Total Bonus** as the name for the calculated field.

5. In the Formula box, type =.

6. In the list of fields, select Bonus, and click Insert Field to add it to the formula.

7. Next, type a plus sign: **+**.

8. In the list of Fields, select Bonus2, and click Insert Field to add it to the formula (see Figure 9-28). The completed formula is as follows:

   `=Bonus+Bonus2`
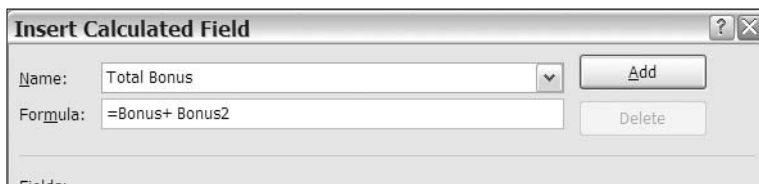
Figure 9-28. *Using calculated fields in a formula*

9. Click OK to close the Insert Calculated Field dialog box.

The new calculated field, Total Bonus, appears in the PivotTable Field List pane and in the Values area of the pivot table. It totals the values in the Bonus and Bonus2 columns.

To simplify the report, you can remove the other bonus fields from the pivot table layout and leave just the Total Bonus field:

1. Select a cell in the pivot table.

2. In the PivotTable Field List pane, remove the check marks from the Bonus and Bonus2 fields.

3. Format the Total Bonus values as Number, with two decimal places.

The pivot table now shows just the Total Bonus calculated field, instead of all three. Even though the Bonus and Bonus2 fields have been removed from the pivot table layout, the Total Bonus field still calculates the total bonus correctly (see Figure 9-29).

	A	B	C	D
1	Category	Bars		
2	OrderDate	01-Dec-07		
3				
4		Values		
5	Row Labels	Sum of TotalPrice	Sum of Qty	Sum of Total Bonus
6	3000	1147.07	601	57.35
7	3036	1134.45	585	56.72
8	3055	2148.17	1161	193.34
9	3074	942.27	511	47.11
10	3082	2220.16	1208	199.81
11	3090	996.09	537	49.80
12	3166	1183.73	649	59.19
13	Grand Total	9771.94	5252	879.47

Figure 9-29. *Total Bonus Calculated field*

Understanding a Calculated Field

It is important to understand that the formulas in a calculated field will always operate on the sum of the fields, no matter what summary function is currently used for that field in the pivot table. To verify this, you'll change the summary function for the Qty field, which is used in the Bonus2 calculated field.

1. Right-click a value cell in the Qty column.

2. In the context menu, click Summarize Data By, and then click Count.

The values in the Total Bonus column do not change, even though all the values in the Qty column display a 3, which is less than the 1,000 limit. The result in the Total Bonus calculation is based on the Sum of Qty for each store, not the displayed Count of Qty.

When creating formulas in a calculated field, you can use some of the worksheet functions, such as IF, AND, OR, but you cannot use functions such as TODAY, NOW, or RAND, where the results will change.

Also, you cannot use functions that require a range reference, such as OFFSET or COUNTIF.

Some calculations should be done in the source data, instead of the pivot table, to provide accurate results. For example, multiply item cost by item quantity in the source data to calculate the total for each record. Then, in the pivot table, sum the total cost field. If you do the calculation in the pivot table, it would multiply the sum of the item cost by the sum of the item quantity, and the result may not be what you expect or need.

Deleting a Calculated Field

If you no longer need a calculated field in a pivot table, you can delete it. Now that your bonus report is finished, you'll delete the Total Bonus calculated field:

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Tools group, click Formulas, and then click Calculated Field.

4. In the Insert Calculated Field dialog box, in the Name box, click the drop-down arrow, and select Total Bonus, which is the calculated field you want to delete.

5. Click the Delete button, and then click OK.

6. The Total Bonus field is removed from the Values area of the pivot table and from the PivotTable Field List pane.

■**Caution** You cannot undo the deletion of a calculated field.

Creating a Calculated Item

The sales manager is doing the sales forecasts for the upcoming year and wants a report that compares the total sales for sweet categories, Bars and Cookies, to salty categories, Snacks and Crackers, for each store. Because you want to perform a calculation on specific items within a field, you'll create a calculated item instead of a calculated field.

In the following steps, you will clear the pivot table and add the fields you need in the report. Then, you will create two calculated items—one to total the sweet categories and one to total the salty categories.

■**Note** Clearing the pivot table with the Clear All command will delete any calculated fields and calculated items.

---

1. Remove all the fields from the pivot table.

2. In the PivotTable Field List pane, add the Store field to the Row Labels area, add the Category field to the Column Labels area, and add TotalPrice to the Values area as Sum of TotalPrice.

3. Format the values as Number, with zero decimal places, and a thousand separator.

The pivot table now shows all four categories separately and a grand total for all four (see Figure 9-30).

4	Sum of Tota Column				
5	Row Labe ▾	Bars	Cookies	Crackers	Snacks	Grand Total
6	3000	33,659	58,757	23,666	10,402	126,484
7	3036	11,883	15,989	7,142	2,308	37,322
8	3055	50,821	62,206	38,103	15,115	166,245
9	3074	27,302	36,317	8,334	2,565	74,518
10	3082	36,416	47,244	13,981	6,113	103,755
11	3090	31,618	35,446	6,571	2,751	76,387
12	3166	24,662	39,354	10,991	4,013	79,021
13	Grand Total	216,361	295,314	108,788	43,269	663,732

Figure 9-30. *Total sales per category per store*

You'll create a calculated item to combine the totals for the sweet items, the Bars and Cookies items. This will create a new item in the Category field:

1. Select a cell that contains one of the Category headings in the pivot table. For example, select cell B5, which contains the Bars heading.

■**Note** You must select a label for the field in which you want to create a calculated item, or the Calculated Item command will not be available.

---

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Tools group, click Formulas, and then click Calculated Item.

4. In the Insert Calculated Item dialog box, type **Sweet** as the name for the calculated item.

5. On the keyboard, press the Tab key to move to the Formula box and to select its current contents, then press the Delete key to remove the existing formula.

6. In the Formula box, type an equal sign to start the formula.

7. In the list of fields, select Category, the field in which you want to create a new item. Do not click the Insert Field button, because the name of the field is not required in this formula.

■**Note** You can refer to the active field only when creating a calculated item.

---

8. In the list of Items, select Bars, and click Insert Item to add it to the formula.

9. Type a plus sign, then select Cookies in the Items list, and click Insert Item. The completed formula is =Bars + Cookies (see Figure 9-31).
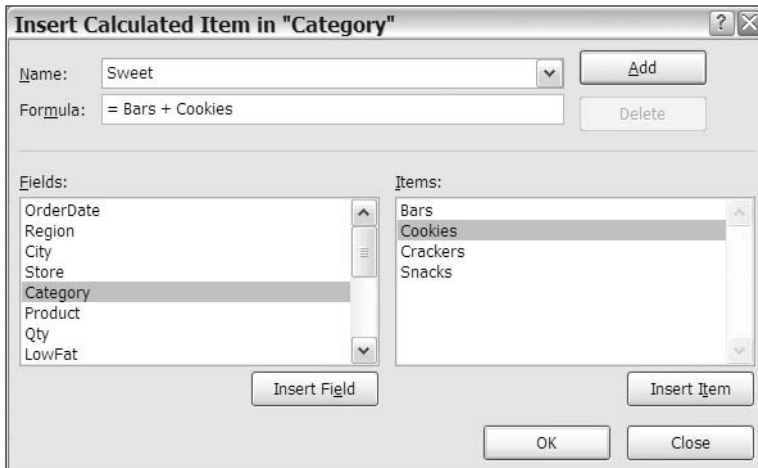
Figure 9-31. *Insert Calculated Item dialog box*

10. Click OK to close the Insert Calculated Item dialog box.

The new calculated item, Sweet, appears in the Column Labels area of the pivot table but does not appear in the PivotTable Field List pane, because it is an item, not a field.

■**Note** When you click a value cell in the pivot table that contains a calculated item, you see the formula in the formula bar, instead of the number.

Now the grand total is inflated, because Bars and Cookies appear individually and are totaled in the Sweet category. You'll hide the individual items so the grand total is correct:

1. In cell B4, click the drop-down arrow for Column Labels.

2. Remove the check marks from Bars and Cookies, and then click OK.

With the individual items, Bars and Cookies, removed, the grand total is correct (see Figure 9-32).

	A	B	C	D	E
1					
2					
3					
4	Sum of TotalPrice	Column Labels ▽			
5	Row Labels ▽	Crackers	Snacks	Sweet	Grand Total
6	3000	23,666	10,402	92,416	126,484
7	3036	7,142	2,308	27,872	37,322
8	3055	38,103	15,115	113,027	166,245
9	3074	8,334	2,565	63,619	74,518
10	3082	13,981	6,113	83,661	103,755
11	3090	6,571	2,751	67,065	76,387
12	3166	10,991	4,013	64,016	79,021
13	**Grand Total**	**108,788**	**43,269**	**511,676**	**663,732**

Figure 9-32. *Calculated Item in the pivot table*

Next, you'll create a calculated item to combine the totals for the salty items, Snacks and Crackers. This will create another new item in the Category field:

1. Select a cell that contains one of the Category headings in the pivot table. For example, select cell B5, which contains the Crackers heading.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Tools group, click Formulas, and then click Calculated Item.

4. In the Insert Calculated Item dialog box, type **Salty** as the name for the calculated item.

5. In the Formula box, create the formula: **=Snacks + Crackers**.

■**Tip** To insert an Item name in the formula, you can type the name or double-click a name in the Items list.

---

6. Click OK to close the Insert Calculated Item dialog box.

   The new calculated item, Salty, appears in the Column Labels area of the pivot table, but does not appear in the PivotTable Field List pane, because it is an item, not a field.

   Now the grand total is inflated, because Snacks and Crackers appear individually, and are totaled in the Salty category. You'll hide the individual items, so the grand total is correct.

7. In cell B4, click the drop-down arrow for Column Labels.

8. Remove the check marks from Snacks and Crackers, and then click OK.

With the individual items, Snacks and Crackers, removed, the grand total is correct (see Figure 9-33).

	A	B	C	D
1				
2				
3				
4	Sum of TotalPrice	Column ▾		
5	Row Labels ▾	Sweet	Salty	Grand Total
6	3000	92,416	34,068	126,484
7	3036	27,872	9,450	37,322
8	3055	113,027	53,218	166,245
9	3074	63,619	10,899	74,518
10	3082	83,661	20,095	103,755
11	3090	67,065	9,322	76,387
12	3166	64,016	15,004	79,021
13	Grand Total	511,676	152,057	663,732

Figure 9-33. *Two calculated items*

Editing a Calculated Item

Instead of the previous sales in the Sweet and Salty calculated items, the sales manager wants to see a projection for 2008 sales, based on 2007 sales. The estimated increase is 5 percent for Sweet items and 12 percent for Salty items.

To create this report, you'll add the OrderDate field to the Report Filter area, where you can filter for 2007 order dates. Then you'll modify the Calculated Items to show the projected increases.

1. Select a cell in the pivot table.

2. In the PivotTable Field List pane, add OrderDate to the Report Filter area.

3. In cell B2, click the drop-down arrow for the OrderDate list, and add a check mark to Select Multiple Items.

4. Remove the check marks from all the order dates in 2006, and then click OK, so only the 2007 order dates are included in the pivot table summary.

The OrderDate cell in the Report Filters area now shows (Multiple Items) as the selection (see Figure 9-34), and only the 2007 sales are included in the totals. Next, you'll modify the calculated items.

	A	B	C	D
1				
2	OrderDate	(Multiple Items) 🔽		
3				
4	Sum of TotalPrice	Column Labels 🔽		
5	Row Labels 🔽	Sweet	Salty	Grand Total
6	3000	54,021	19,295	73,316
7	3036	14,272	4,239	18,511
8	3055	60,673	28,105	88,779
9	3074	37,787	6,136	43,923
10	3082	52,184	10,592	62,776
11	3090	42,351	5,700	48,051
12	3166	37,126	9,408	46,534
13	Grand Total	298,414	83,475	381,889

Figure 9-34. *Calculated items filtered by order date*

5. Select a cell that contains one of the Category headings in the pivot table. For example, select cell B5, which contains the Sweet heading.

6. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

7. In the Tools group, click Formulas, and then click Calculated Item.

8. In the Insert Calculated Item dialog box, in the Name box, click the drop-down arrow, and select Sweet, which is the first formula you want to change.

   The Sweets are projected to increase by 5 percent, so you'll modify the formula to calculate the increased amount.

9. In the Formula box, change the formula to **=(Bars +Cookies) * 1.05**, and then click Modify (see Figure 9-35).

Figure 9-35. *Modifying a calculated item*

▮Tip Click Modify to change the formula and to leave the dialog box open. Click OK to change the formula and to close the dialog box.

Next, you'll modify the formula for the Salty calculated item.

10. In the Insert Calculated Item dialog box, in the Name box, click the drop-down arrow, and select Salty, which is the next formula you want to change.

   The Salty items are projected to increase by 12 percent, so you'll modify the formula to calculate the increased amount.

11. In the Formula box, change the formula to **=(Snacks +Crackers) * 1.12**, and then click OK to close the Insert Calculated Field dialog box.

   The projected sales amounts now appear in the Values area of the pivot table (see Figure 9-36).

	A	B	C	D
1				
2	OrderDate	(Multiple Items)		
3				
4	Sum of TotalPrice	Column Labels		
5	Row Labels	Sweet	Salty	Grand Total
6	3000	56,722	21,610	78,332
7	3036	14,985	4,748	19,733
8	3055	63,707	31,478	95,185
9	3074	39,677	6,872	46,548
10	3082	54,793	11,863	66,656
11	3090	44,468	6,384	50,852
12	3166	38,983	10,537	49,519
13	Grand Total	313,334	93,492	406,826

Figure 9-36. *Pivot table with modified calculated items*

Creating a List of Formulas

When you have created calculated fields and calculated items in a pivot table, you may lose track of what you have created and want a reminder. Or you may want to document the calculations you have added to help yourself, or other users, understand what the pivot table contains.

   You can use one of Excel's built-in features to create a list of the calculated fields and calculated items to view or to print. Before you send the report to the sales manager, you'll create a list of formulas for future reference.

1. Select a cell in the pivot table.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Tools group, click Formulas, and then click List Formulas.

A new sheet is inserted in the workbook, with a list of calculated fields and their formulas and solve order (see Figure 9-37). All the formulas are listed, even if they are not currently in the pivot table layout.

	A	B	C
1	*Calculated Field*		
2	**Solve Order**	**Field**	**Formula**
3		1 Bonus	=TotalPrice* 5%
4		2 Bonus2	=IF(Qty>1000,TotalPrice*4%,0)
5			
6	*Calculated Item*		
7	**Solve Order**	**Item**	**Formula**
8		1 Sweet	=(Bars+Cookies) * 1.05
9		2 Salty	=(Snacks+Crackers) * 1.12
10			

Figure 9-37. *List of formulas in the pivot table*

Changing the Solve Order

The solve order is the order in which the items are calculated, if two or more formulas update a cell. For example, you might have calculated items in Row Labels and other calculated items in the Column Labels area. In cells where these calculated items intersect, you can control which calculation occurs last. For most pivot tables, you won't need to change the solve order, but it can sometimes be required, as you will see in the report that you are about to create.

The sales manager has asked for a report to compare the forecasted sales at the older stores and the newer stores, so you'll create a calculated item to do that. The older stores are 3000, 3036, 3055, and 3074, and the newer stores area 3082, 3090, and 3166.

1. Select a cell that contains one of the store headings in the pivot table. For example, select cell A7, which contains the store 3036 heading.

2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the Tools group, click Formulas, and then click Calculated Item.

4. In the Insert Calculated Item dialog box, type **OldVsNew** as the name for the calculated item.

5. In your formula, you want to divide the sum of old stores by the sum of the new stores. In the Formula box, enter the following formula:

   ```
   = SUM('3000','3036','3055','3074' )/SUM('3082','3090','3166' )
   ```

6. Click OK to close the Insert Calculated Item dialog box.

The new calculated item, OldVsNew, appears in the Row Labels area of the pivot table as whole numbers (see Figure 9-38). You'll format the values as percentage to see the results with more accuracy.

12	3166	38,983	10,537	49,519
13	OldVsNew	1	2	4
14	**Grand Total**	**313,336**	**93,494**	**406,830**

Figure 9-38. *Calculated item for OldVsNew stores*

7. In the pivot table, select cells B13 to D13, which contain the OldVsNew values.

8. On the Ribbon, click the Home tab, and in the Number group, click Percent Style (see Figure 9-39). This will format the three cells and leave the other values unchanged.

Figure 9-39. *Percent Style command on the Ribbon*

The Grand Total row is now incorrect, because it includes the OldVsNew values. The OldVsNew value in the Grand Total column (351%) is a sum of the Sweet and Salty values, instead of a calculation of OldVsNew (see Figure 9-40). You'll hide the Grand Total row and column and then create another calculated item to total the Sweet and Salty categories.

	A	B	C	D
1				
2	OrderDate	(Multiple Items)		
3				
4	Sum of TotalPrice	Column Labels		
5	Row Labels	Sweet	Salty	Grand Total
6	3000	56,722	21,610	78,332
7	3036	14,985	4,748	19,733
8	3055	63,707	31,478	95,185
9	3074	39,677	6,872	46,548
10	3082	54,793	11,863	66,656
11	3090	44,468	6,384	50,852
12	3166	38,983	10,537	49,519
13	OldVsNew	127%	225%	351%
14	**Grand Total**	**313,336**	**93,494**	**406,830**

Figure 9-40. *Incorrect grand totals after adding OldVsNew calculated item*

1. To hide both grand totals, select a cell in the pivot table, and on the Ribbon, click the Design tab. In the Layout group, click Grand Totals, and click Off for Rows and Columns.

   2. Select a cell that contains one of the Category headings in the pivot table. For example, select cell B5, which contains the Sweet heading.

   3. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

   4. In the Tools group, click Formulas, and then click Calculated Item.

   5. In the Insert Calculated Item dialog box, type **Category Total** as the name for the calculated item.

   6. In the Formula box, enter the formula **= Sweet + Salty**.

   7. Click OK to close the Insert Calculated Item dialog box.

The new calculated item, Category Total, appears in the Column Labels area of the pivot table. It totals Sweet and Salty in each of the rows, which is correct. However, for the last row, you'd like it to show the OldVsNew calculation, instead of the Category Total calculation. You'll change the Solve Order, so it does the OldVsNew calculation last.

   1. Select a cell in the pivot table.

   2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

   3. In the Tools group, click Formulas, and then click Solve Order.

The Solve Order dialog box opens, with the four calculated items listed (see Figure 9-41).
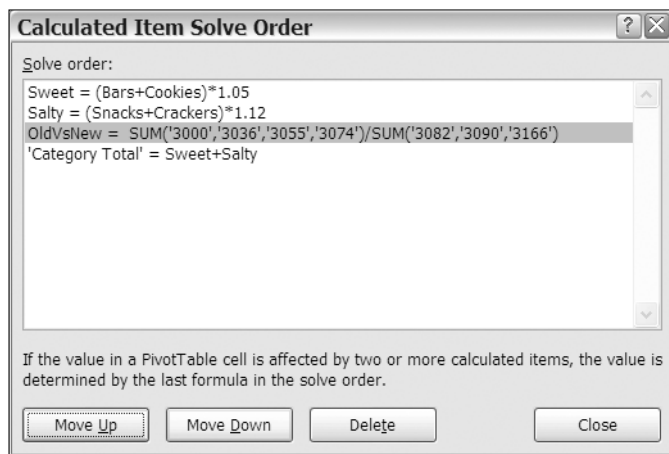
Figure 9-41. *Calculated Item Solve Order dialog box*

   You want the OldVsNew calculation to occur last, so you'll move it down in the order.

   4. Select the OldVsNew item, and click Move Down to change its Solve Order to 4, instead of 3. Then click Close.

The Category Total cell in the last row now shows the OldVsNew calculation, instead of the sum of the Sweet and Salty percentages (see Figure 9-42).

	A	B	C	D
1				
2	OrderDate	(Multiple Items) ⊽		
3				
4	Sum of TotalPrice	Column Labels ⊽		
5	Row Labels ⯆	Sweet	Salty	Category Total
6	3000	56,722	21,610	78,332
7	3036	14,985	4,748	19,733
8	3055	63,707	31,478	95,185
9	3074	39,677	6,872	46,548
10	3082	54,793	11,863	66,656
11	3090	44,468	6,384	50,852
12	3166	38,983	10,537	49,519
13	OldVsNew	127%	225%	144%

Figure 9-42. *Corrected calculation after solve order changed*

Summary

In this chapter, you created formulas and calculations to perform analysis beyond the scope of the summary functions. You used custom calculations to gain a different perspective on the totals in the pivot table. With a few clicks of the mouse and no complex formulas, you were able to see the differences between one item's totals and all other totals or to compare one month's sales to the previous month. You created a running total over a year of orders and calculated the percent that each total was compared to its row, its column, or the grand total.

You also created your own calculated fields and calculated items in a pivot table, specific to your data and your reporting requirements. With these calculations you can create a unique and powerful analysis tool from your pivot table.

Finally, you used the list formulas and solve order features to document and manage the formulas you created.

Enhancing Pivot Table Formatting

Pivot tables are excellent tools for summarizing and presenting data, but sometimes the amount of data they contain is overwhelming. To ensure that the key information is delivered, you can use special formatting features to highlight the most important numbers or to replace the numbers altogether.

In this chapter, you'll use conditional formatting to color cells in a pivot table, and you'll add data bars to illustrate the amounts. You'll also add icons, such as red, yellow, and green traffic lights to indicate progress or decline or to indicate good or poor results. With conditional formatting, you'll color only the values that fall within a specific date range or those that are above or below a certain level.

You'll add other formatting features to your pivot tables to hide or show field items, empty cells, or errors in the pivot table. You can also control the appearance of the pivot table by specifying whether drop-downs, plus signs, and other elements appear.

Applying Conditional Formatting

The safety director wants you to create reports from the company's safety records. The reports will be shared with employees in all the company's locations, and they should present the results clearly and quickly. Instead of creating pivot tables that contain only numbers and headings, you'll use conditional formatting to add visual impact to the data.

Using a Two-Color Scale

Your first report will summarize the safety incidents at each plant location in 2007 and will use color to highlight the locations with the highest and lowest number of incidents. You'll open the file that contains the safety data, create a pivot table, and then add conditional formatting to the values:

1. Download and open the sample file named `SafetyData.xlsx` that is available at `www.apress.com`.

   On Sheet1 is an Excel table that contains safety data, listing the incidents that occurred at each location (see Figure 10-1) from January 2006 to June 2008. The data shows when and where the incident occurred, the type and severity of the incident, and the

effects of the incident. The Excel table is named SafetyData, and you'll create a pivot table from this data.

Figure 10-1. *Safety data in an Excel table*

2. Select a cell in the Excel table named SafetyData on Sheet1.

3. Create a pivot table on a new worksheet.

   Your first report will show the number of incidents per plant location for 2007, so you'll add those fields to the pivot table and use the Date field to count the records.

4. In the pivot table, add the Plant field to the Row Labels area, add the Year field to the Report Filter area, and add Date to the Values area as Count of Date.

5. In the report filter for Year, select 2007.

The pivot table shows the number of incidents at each location in 2007 and the grand total of 201 (see Figure 10-2).

	A	B
1	Year	2007
2		
3	Row Labels	Count of Date
4	Alabama	19
5	California	20
6	Florida	23
7	Georgia	25
8	Illinois	26
9	Iowa	20
10	Montana	22
11	Ohio	21
12	Texas	25
13	**Grand Total**	**201**

Figure 10-2. *Safety incidents per location*

To highlight the locations with the highest number of incidents, you'll add conditional formatting. A color scale, with two colors, will use one color for the cell with the highest number and a second color for the cell with the lowest number. Cells with values between the highest and lowest will be shaded in a graduated color scale.

1. Select cells B4 to B12, which contain the location totals you want to color.

■**Caution** Do not include the Grand Total cell, or it will be colored as the highest value.

---

2. On the Ribbon, click the Home tab.

3. In the Styles group, click Conditional Formatting (see Figure 10-3).
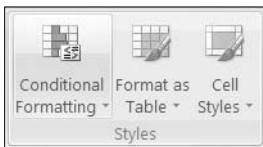
Figure 10-3. *Conditional Formatting command on the Ribbon*

4. In the list of conditional formatting options, click Color Scales, and in the second row of Color Scale options, point to the first option, Yellow – Red Color Scale (see Figure 10-4).
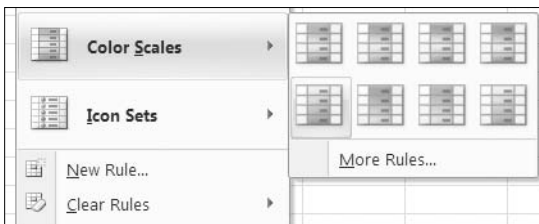
Figure 10-4. *Yellow – Red Color Scale option for conditional formatting*

While pointing to this option, you can see a preview of the formatting on the pivot table. Cell B4, which contains the lowest value, is red, and cell B8, which contains the highest value, is yellow. Red is often associated with danger, so you'd prefer that the highest number be red and the lowest be yellow.

5. In the second row of Color Scale options, point to the second option, Red – Yellow Color Scale. In the formatting preview on the pivot table, the highest number is now red, and the lowest is yellow.

6. Click the Red – Yellow Color Scale option to apply the conditional formatting to the selected cells in the pivot table.

The list of plant locations is now formatted the way you wanted, highlighting the highest and lowest numbers and shading the values in between, in graduated colors from yellow to red. When employees at the locations see the report, they'll quickly recognize which plants have the best and worst results. You can send this report to the safety director and get ready to create the next report.

Removing Conditional Formatting

After applying conditional formatting, you can remove it if it's no longer required. Before starting on your next report, you'll remove the conditional formatting from the pivot table.

1. Select the cells B4 to B12, which contain the cells with conditional formatting.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

3. Click Clear Rules, and click Clear Rules from Selected Cells (see Figure 10-5).
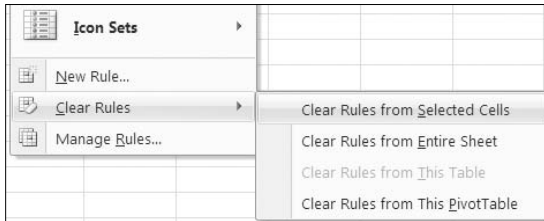
Figure 10-5. *Clear Rules from Selected Cells command*

The conditional formatting is removed from the selected cells, and you're ready to start the next report.

Applying a Three-Color Scale

Your next report will summarize the safety incidents in each department per shift in 2007 and will again use color to highlight the locations with the highest and lowest number of incidents. In this report there will be more values, so you'll use a different color scale option. To create the report, you'll change the fields that are in the Row Labels and Column Labels areas.

1. In the pivot table, remove the Plant field from the Row Labels area, add the Department field to the Row Labels area, and add the Shift field to the Column Labels area.

   The pivot table shows the number of incidents per department per shift in 2007, and the grand total remains at 201 (see Figure 10-6).

	A	B	C	D	E
1	Year	2007			
2					
3	**Count of Date**	**Column Labels**			
4	**Row Labels**	Afternoon	Day	Night	Grand Total
5	Administration	3	10	8	21
6	Fabrication	1	7	6	14
7	Finishing	9	4	7	20
8	Maintenance	7	6	6	19
9	Melting	13	6	10	29
10	Painting	15	11	6	32
11	Purchasing	7	8	6	21
12	Security	5	12	4	21
13	Shipping	4	11	9	24
14	**Grand Total**	**64**	**75**	**62**	**201**

Figure 10-6. *Safety incidents per department per shift*

Again to highlight the locations with the highest number of incidents, you'll add color scale conditional formatting. Because this layout has more value cells, you'll use a three-color scale. The cells with the lowest, median, and highest values will be a solid color, and cells with values in between will have a graduated color.

1. Select cells B5 to D13, which contain the values you want to color.

■**Caution** Do not include the Grand Total row or column, or these values may be colored as the highest values.

---

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

3. In the list of conditional formatting options, click Color Scales, and in the first row of Color Scale options, point to the second option, Red – Yellow – Green Color Scale. In the formatting preview on the pivot table, the highest number is now red, the median cells are yellow, and the lowest value is green.

4. Click the Red – Yellow – Green Color Scale option to apply the conditional formatting to the selected cells in the pivot table.

■**Tip** Make all the value columns the same width so they appear to be of equal importance in the report.

In the report on departments by shift, the afternoon shift in the Painting department is solid red, indicating this is the highest number of incidents. The afternoon shift for Fabrication stands out as the lowest number, since it's solid green. Managers and employees in each department can easily see how their performance compares to other departments. You can send this report to the safety director for distribution and start on the next report.

Using an Icon Set

Instead of color scales, you can use icon sets to illustrate the data. These small pictures will use shapes and colors to mark the values. In your next report, you have been asked to show the change in the number of incidents of each report type from 2006 to 2007. You'll remove two of the fields from the pivot table layout and then add the Report Type field:

1. In the pivot table, remove the Departments field from the Row Labels area, and remove the Shift field from the Column Labels area. Add Report Type to the Row Labels area, and move the Year field to the Column Labels area.

2. Right-click a cell in the Values area, and click Value Field Settings.

3. On the Show Values As tab, choose % Difference From from the Show Values As drop-down list.

4. For the Base field, select Year, and for the Base Item, select (previous).

5. Click Number Format, and format the field as Percentage, with no decimal places.

6. Click OK twice to close the dialog boxes.

7. In the Column Labels drop-down list, remove the check mark from 2008. That year has data for the first six months only, so you don't want to compare it to the other years in this report.

8. Widen column C to about twice its current width, and make column B narrower, since it doesn't contain any values. You can also hide the Grand Total for rows, which is empty.

The pivot table shows the percent difference in the number of incidents per report type from 2006 to 2007 (see Figure 10-7).

	A	B	C
1			
2			
3	**Count of Date**	**Colum** ▾	
4	**Row Labels** ▾	**2006**	**2007**
5	First Aid		-21%
6	Lost Time		-24%
7	Medical Claim		14%
8	Near Miss		-2%
9	**Grand Total**		**-9%**

Figure 10-7. *Percent difference in incidents per report type*

To illustrate the changes in the number of incidents per report type, you'll use an icon set with colored arrows. This will graphically represent the increases, decreases, and lack of change:

1. Select cells C5 to C9, where you want to add icons. For this report you have included the grand total, so its change will also be graphically portrayed.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

3. In the list of conditional formatting options, click Icon Sets, and in the first row of Icon Sets options, point to the first option, 3 Arrows (Colored), as shown in Figure 10-8.

Figure 10-8. *3 Arrows (Colored) Icon Sets option for conditional formatting*

While pointing to this option, you can see a preview of the formatting on the pivot table. Cells C5 and C6, which contain the lowest values, have a red downward-pointing arrow, and cell C7, which contains the highest value, has a green upward-pointing arrow.

4. Click the 3 Arrows (Colored) Icon Sets option to apply the conditional formatting to the selected cells in the pivot table (see Figure 10-9).

	A	B	C
1			
2			
3	**Count of Date**	**Colum** ▾	
4	**Row Labels** ▾	**2006**	**2007**
5	First Aid	⬇	-21%
6	Lost Time	⬇	-24%
7	Medical Claim	⬆	14%
8	Near Miss	⇨	-2%
9	**Grand Total**	⇨	**-9%**

Figure 10-9. *3 Arrows (Colored) Icon Sets option applied to the pivot table*

From your report's numbers and icons, employees will see that first aid and lost time incidents have decreased and medical claims have increased. Near-miss incidents had a slight decrease, and overall, the grand total shows a decrease. You can send this report to the safety director for distribution and start on the next report.

Using Data Bars

The safety director wants a report that shows the number of days lost per month. In this report, you'll have a list of the twelve months and can use conditional formatting to add data bars to the value cells. This will make it easy to visually compare the list of numbers to see which months have the highest number of lost days and which have the fewest.

To start, you'll clear the pivot table to remove the current fields and conditional formatting. Then you'll add the Month field and the Days Lost field, which contains the data on days lost for each incident.

Tip You can apply color scales, icon sets, and data bars simultaneously to the cells. However, using more than one of the conditional formatting options may add confusion to the pivot table, rather than help illustrate the data, and using a single type is best in most cases.

---

1. Select a cell in the pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the Actions group, click Clear, and then click Clear All to remove all the fields and formatting from the pivot table layout.

3. Add the Month field to the Row Labels area, and add the Days Lost field to the Values area.

4. Format the Days Lost field as Number, with zero decimal places.

To show which months have the highest number of days lost, you could sort the days in descending order. That would move April and June to the top of the list and put May and September at the bottom. However, you want to keep the months in chronological order, so you'll add data bars to graphically represent the numbers.

1. Select cells B4 to B15, which contain the value cells you want to format. Don't include the Grand Total value, because it is only the individual months you want to compare.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

3. In the list of conditional formatting options, click Data Bars, and in the first row of Data Bar options, point to the first option, Blue Data Bar (see Figure 10-10).

Figure 10-10. *Blue Data Bar option for conditional formatting*

While pointing to this option, you can see a preview of the formatting on the pivot table. Cell B5 has the longest data bar, and cell B12 has the shortest. All the data bar options are identical, except for the color.

4. Click the Blue Data Bar option to apply the conditional formatting to the selected cells in the pivot table (see Figure 10-11).

	A	B
1		
2		
3	Row Labels ▾	Sum of Days Lost
4	Jan	34
5	Feb	57
6	Mar	30
7	Apr	52
8	May	16
9	Jun	34
10	Jul	32
11	Aug	31
12	Sep	12
13	Oct	29
14	Nov	26
15	Dec	27
16	**Grand Total**	**379**

Figure 10-11. *Blue Data Bar option applied to the pivot table*

When using data bars, it's important to understand that they aren't exactly like using a bar chart. The data bars are not zero based; the shortest data bar represents the lowest value in the formatted data, and the longest bar represents the highest value in the formatted data. If the lowest value is zero and the highest value is 50, the data bars might look the same as the data bars for data with values that ranged from 500 to 3000 or values from –3000 to –500 (see Figure 10-12). Even if the lowest value is zero or a negative number, it is represented by a small data bar. Later in this chapter you'll learn to change the settings for conditional formatting, and you will be able to adjust how the bars are configured.

Figure 10-12. *Data bars appear the same for widely different values.*

If you find it difficult to see where the bars end, because of the graduated coloring in the data bars, you can apply a dark fill color to the cells. For example, in Figure 10-13 the cells have been filled with black, and the number is formatted in a bold six-point font size, with white font color. Column A was made narrower, so the month names are closer to the data bars.

Figure 10-13. *Dark fill color in cells with data bars*

With the data bars in your report, the safety director can easily compare the number of lost days in the list of months. You can send this report to the safety director and start on the next report.

Formatting Top 10 Items

Pleased with the work you've done so far, the safety director asks for a few more reports. For the next one, the average incident cost should be calculated for each incident type within each age group. The top three amounts should be highlighted, so the safety director can investigate these items further.

To start, you'll clear the pivot table to remove the current fields and conditional formatting. Then you'll add the Age Group field, the Incident Type field, and the Incident Cost field.

1. Select a cell in the pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the Actions group, click Clear, and then click Clear All to remove all the fields and formatting from the pivot table layout.

3. Add the Incident Type field to the Row Labels area, add the Age Group field to the Column Labels area, and add the Incident Cost field to the Values area.

4. Summarize the Incident Cost by Average, and format it as Currency, with zero decimal places.

5. On the Ribbon, under the PivotTable Tools tab, click the Design tab. In the Layout group, click Grand Totals, and then click For Columns Only.

To highlight the amounts that are the top three, you'll use one of the conditional formatting options:

1. Select cells B5 to E13, which contain the value cells you want to format.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

3. In the list of conditional formatting options, click Top/Bottom Rules, and then click Top 10 Items (see Figure 10-14).
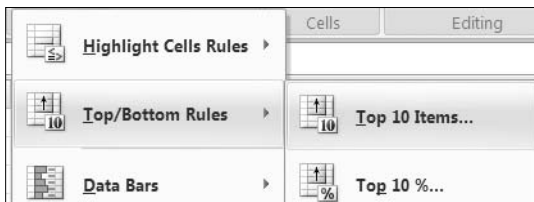
Figure 10-14. *Top 10 Items command in the list of conditional formatting options*

The Top 10 Items dialog box opens, with 10 as the setting in the scroll box on the left. This is similar to the Top 10 feature you used when filtering in the pivot table. The formatting option, Light Red Fill with Dark Red Text, is selected in the drop-down list on the right. The pivot table shows a preview of this formatting, and you'll change the settings to meet your requirements.

4. In the scroll box, change the number of items to 3, and then click the arrow to open the formatting drop-down list (see Figure 10-15).
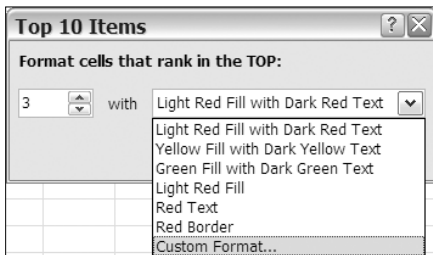
Figure 10-15. *Top 10 Items dialog box*

There is a limited selection of formatting options and none you want to use, so you'll create a custom format of orange fill and bold, black text.

5. In the formatting list, click Custom Format to open the Format Cells dialog box.

6. On the Font tab, select the Bold font style, and select Black from the Color drop-down list.

■**Note** Some formatting options, such as font size or thick borders, are not available, because conditional formatting doesn't allow settings that could affect the cell size.

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7. On the Fill tab, select Orange as the fill color, and then click OK to close the Format Cells dialog box.

8. Click OK to close the Top 10 Items dialog box.

9. The colors don't display correctly while the cells are selected, so select a cell that is not one of the formatted top three to see the effects of the conditional formatting (see Figure 10-16).

	A	B	C	D	E
1					
2					
3	Average of Incident Cost	Column			
4	Row Labels	18-24	25-34	35-49	50+
5	Burn	$809	$2,016	$1,521	$1,412
6	Crush & Pinch	$508	$2,000	**$2,688**	$1,515
7	Cut	$744	$1,829	$940	$874
8	Equipment	$1,488	$1,495	$1,338	$1,981
9	Fall	$1,088	$1,541	$1,259	$588
10	Falling object	$974	$1,793	$1,343	$442
11	Lifting	**$2,256**	$768	$1,256	$1,353
12	Slip/trip	$1,611	$1,655	**$2,100**	$938
13	Vehicle	$1,502	$1,731	$1,249	$948
14	**Grand Total**	**$1,295**	**$1,658**	**$1,383**	**$1,167**

Figure 10-16. *Top three items highlighted*

■Note In the case of a tie, more than the specified number of cells can be formatted.

With the Top 10 Items formatting in your report, the safety director can easily identify the items for further investigation. You can send this report to the safety director and start on the next report.

Formatting Cells Between Two Values

The safety director found the Top 10 Items report to be helpful and asks whether you can highlight a few more amounts in that report. Any amount that is between 1,500 and 2,000 should be blue to stand out from the other amounts.

You won't make any changes to the pivot table layout but will add another conditional formatting option to the value cells. To make this formatting more flexible, you'll type the minimum and maximum amounts on the worksheet and refer to those cells in the conditional formatting.

1. In cell G1 on the worksheet, type **1500**, which is the minimum amount for the conditional formatting.

2. In cell H1 on the worksheet, type **2000**, which is the maximum amount for the conditional formatting.

3. Select cells B5 to E13, which contain the value cells you want to format.

4. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

5. In the list of conditional formatting options, click Highlight Cells Rules, and then click Between (see Figure 10-17).
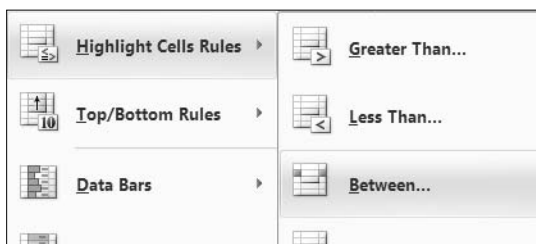
Figure 10-17. *Highlight Cells Rules command in the conditional formatting options*

The Between dialog box opens, with default values in the minimum and maximum boxes. The default formatting option, Light Red Fill with Dark Red Text, is selected in the drop-down list on the right. The pivot table shows a preview of this formatting, and you'll change the settings to meet your requirements.

6. Delete the default value in the minimum box, and click cell G1, which contains the minimum value you typed on the worksheet. Delete the default value in the maximum box, and click cell H1, which contains the minimum value you typed on the worksheet (see Figure 10-18).
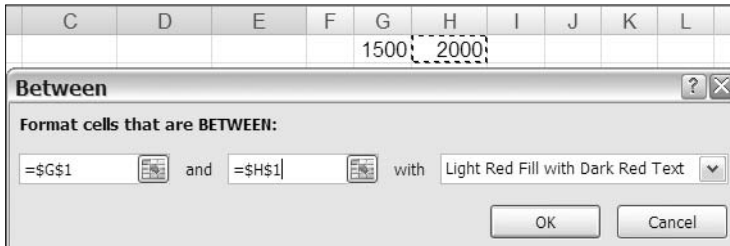
Figure 10-18. *Refer to worksheet cells in the Between dialog box.*

7. In the formatting list, click Custom Format to open the Format Cells dialog box.

■**Note** In some drop-down lists, such as the formatting list in the Between dialog box, the drop-down list closes automatically when you release the mouse button or when you point with your cursor outside the list. To select an item in this type of list, point to the item, and then release the mouse button. In other lists you may have to click an item to select it and to close the list.

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8. On the Fill tab, select blue as the fill color, and then click OK to close the Format Cells dialog box.

9. Click OK to close the Between dialog box.

10. The top three cells are still highlighted with orange fill and bold text, and cells with a value between 1,500 and 2,000 are now blue (see Figure 10-19).

Figure 10-19. *Two conditional formatting options applied*

11. To test the maximum limit, in cell H1 type **1800** as the new limit.

When you press the Enter key to complete the change, the conditional formatting in the pivot table changes to match the new limit.

The safety director will now be able to highlight any range of values simply by changing the amounts in cells G1 and H1. You can send this report to the safety director and start on the next report.

Formatting Labels in a Date Period

The safety director wants some statistics for an education program on preventing injuries, and she has asked whether you can create a report that shows the number of slip/trip injuries during each shift for the current quarter. If possible, any incidents from the current month should be highlighted.

To start, you'll clear the pivot table to remove the current fields and conditional formatting. Then you'll add the Date field, the Incident Type field, and a field to use for counting the incidents.

1. Select a cell in the pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the Actions group, click Clear, and then click Clear All to remove all the fields and formatting from the pivot table layout.

3. Clear cells G1 and H1, which won't be needed for this report.

4. You want to limit the data that's shown in the pivot table, so add the Incident Type field to the Report Filter area, and select Slip/Trip from the Incident Type drop-down list.

5. Add the Date field to the Row Labels area, add the Shift field to the Column Labels area, and add the Report Type field to the Values area, where it will become Count of Report Type.

6. The report should show the incidents from the current quarter, so click the Row Labels arrow, then click Date Filters, and finally click This Quarter.

The results you see will depend on the date you create the report. In this example, the report was created in June 2008 (see Figure 10-20).

	A	B	C	D
1	Incident Type	Slip/trip		
2				
3	**Count of Report Type**	Column Labels		
4	**Row Labels**	Afternoon	Day	Night
5	08-Apr-08	1		
6	24-Apr-08		1	
7	27-Apr-08		1	
8	29-Apr-08			1
9	08-May-08		1	
10	05-Jun-08		1	
11	10-Jun-08		1	
12	**Grand Total**	1	5	1

Figure 10-20. *Report labels filtered for last quarter*

1. In this report, you have been asked to highlight the dates from the current month, so select cells A5 to A11, which contain the date labels you want to format.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

3. In the list of conditional formatting options, click Highlight Cells Rules, and then click A Date Occurring (see Figure 10-21).
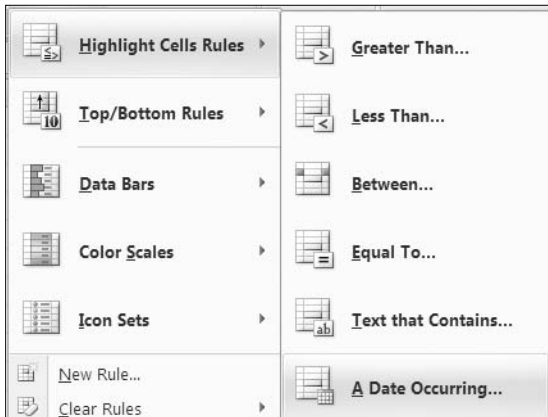
Figure 10-21. *A Date Occurring option in conditional formatting options*

The A Date Occurring dialog box opens, with Yesterday as the setting in the drop-down list at the left. The formatting option, Light Red Fill with Dark Red Text, is selected in the drop-down list at the right. You'll change the settings to meet your requirements.

4. In the date range drop-down list, select This Month Figure 10-22).
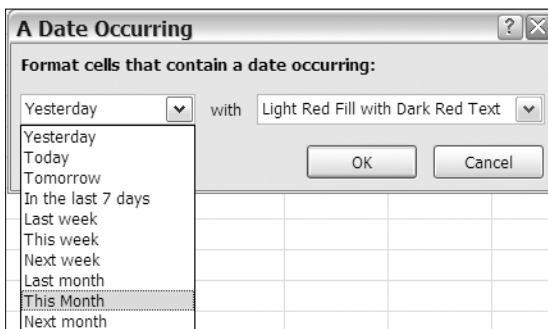
Figure 10-22. *A Date Occurring dialog box*

5. Leave the formatting option as the default fill and text, and click OK to close the A Date Occurring dialog box.

The dates from the current month are highlighted and will stand out in the report that you send to the safety director (see Figure 10-23). Because both the date filter (This Quarter) and conditional formatting (This Month) are dynamic, the visible results and highlighting may change the next time the pivot table is refreshed.

	A	B	C	D
1	Incident Type	Slip/trip		
2				
3	Count of Report Type	Column Labels		
4	Row Labels	Afternoon	Day	Night
5	08-Apr-08	1		
6	24-Apr-08		1	
7	27-Apr-08		1	
8	29-Apr-08			1
9	08-May-08		1	
10	05-Jun-08		1	
11	10-Jun-08		1	
12	**Grand Total**	1	5	1

Figure 10-23. *Dates from last month are highlighted.*

You can send this report to the safety director and start on the next report.

Editing a Rule for Data Bars

The Texas plant has the highest number of days lost, and the safety director wants a report that shows the number of days lost, based on the weekday on which the incident occurred, using data bars instead of numbers. To create an accurate set of data bars, without numbers, you'll use one of the existing Data Bars options and then edit it.

To start, you'll clear the pivot table to remove the current fields and conditional formatting. Then you'll add the WkDay field, which stores the name of the weekday, the Plant field, and the Days Lost field.

1. Select a cell in the pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the Actions group, click Clear, and then click Clear All to remove all the fields and formatting from the pivot table layout.

3. Add the WkDay field to the Row Labels area, and add the Days Lost field to the Values area. The WkDay field will be sorted by weekday, starting with Sunday or Monday.

4. Add the Plant field to the Report Filter area, and filter for Texas, so only the days lost at that plant are showing.

The pivot table shows the days lost for each weekday for the Texas plant. The days range from 4.5 for Sunday, Tuesday, and Thursday to 14.5 for Monday. You'll apply one of the conditional formatting Data Bars options and then modify it to remove the numbers from the cells.

1. Select cells B4 to B10, which contain the value cells you want to format.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

3. Click Data Bars, and click Orange Data Bar.

The data bars appear in the cells, with the shortest bars in the three days with 4.5 days lost and the longest bar in Monday (see Figure 10-24). Currently, the bars are distorting the data, because the shortest bar represents the lowest value. Although the lowest number, 4.5, is approximately one half of 9.5, its bar appears to be about one quarter the length of the 9.5 bar.

	A	B
1	Plant	Texas
2		
3	Row Labels ▾	Sum of Days Lost
4	Sun	4.5
5	Mon	14.5
6	Tue	4.5
7	Wed	9.5
8	Thu	4.5
9	Fri	8.5
10	Sat	10.5
11	**Grand Total**	**56.5**

Figure 10-24. *Data bars and numbers*

Because you will be removing the numbers, it will be important that the data bars reflect the number of days lost as accurately as possible. You'll modify the conditional formatting to remove the numbers and to fix the scale of the data bars.

1. Select cells B4 to B10, which contain the formatted value cells.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting. Then click Manage Rules (see Figure 10-25).

Color Scales ▸

Icon Sets ▸

New Rule...

Clear Rules ▸
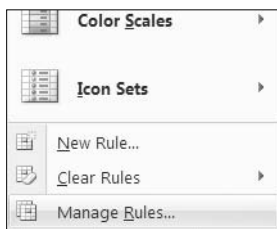
Manage Rules...

Figure 10-25. *Manage Rules option*

The Conditional Formatting Rules Manager dialog box opens, where you can see the Data Bar rule you created when you applied conditional formatting to the Days Lost cells (see Figure 10-26). You'll select that rule and then edit it.
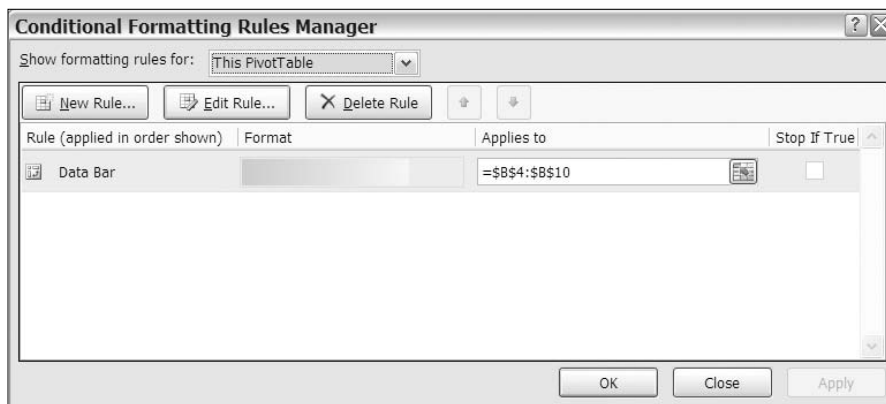
Figure 10-26. *Conditional Formatting Rules Manager dialog box*

1. In the list of rules, click your Data Bar rule.

2. Click the Edit Rule button to open the Edit Formatting Rule dialog box (see Figure 10-27).
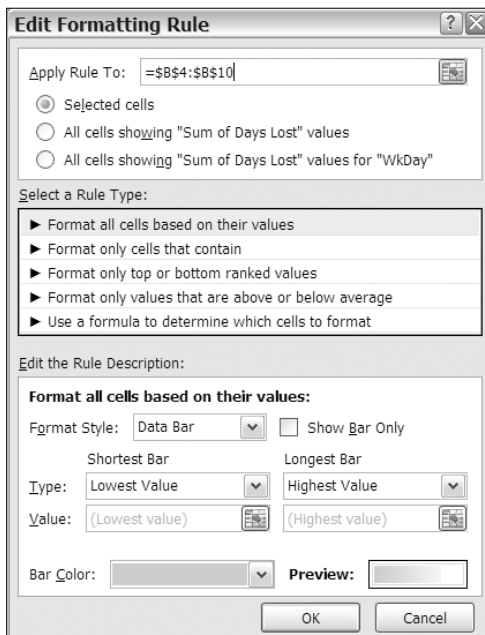
Figure 10-27. *Edit Formatting Rule dialog box*

The top section of the Edit Formatting Rule dialog box shows where the rule is applied. The second section shows the type of rule that has been applied. In the third section, Edit the

Rule Description, you can see the current settings for the Data Bar rule, and this is where you'll edit the rule. No changes will be required in the first or second section.

1. You want to remove the numbers from the cells, so in the third section, add a check mark to Show Bar Only.

   Currently, the shortest bar represents the lowest value in the range of cells, and this affects the scale of the data bars and exaggerates the differences between numbers. You want to ensure that the amounts are accurately represented in the data bars, so you'll change the settings for Shortest Bar. Instead of using the lowest value in the range of cells, you'll use zero as the setting for Shortest Bar.

2. Click the arrow for the Type drop-down list under Shortest Bar (see Figure 10-28).
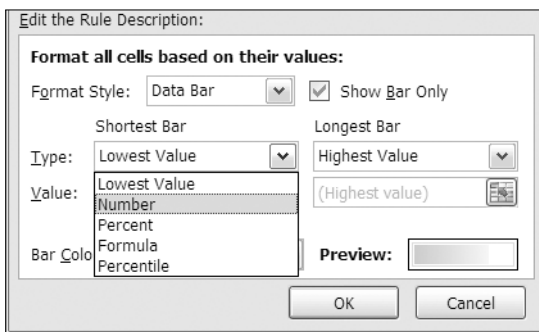
Figure 10-28. *Type options for Shortest Bar*

3. Click Number, and a zero automatically appears in the Value box for Shortest Bar. This is the setting you want, so leave Value as zero.

4. Click OK to close the Edit Formatting Rule dialog box, and click OK to close the Conditional Formatting Rules Manager dialog box.

The numbers have been removed from the cells, and the data bars use a scale from zero to the highest number to show a more accurate representation of the numbers. In Figure 10-29 the revised data bars are on the right, and the original data bars are on the left. Fill color was added to make the end of the data bars stand out more clearly.

Figure 10-29. *Original data bars (left) compared to revised data bars (right)*

With the data bars revised to more accurately show the lost days per weekday, you can send this report to the safety director and start on the next report.

Changing the Order of Rules

The next report that the safety director needs is a summary of incident costs per year for each injury location, such as head or back. The top three costs should be highlighted, and any cost that is above average should also be highlighted using a different color.

To start, you'll clear the pivot table to remove the current fields and conditional formatting. Then you'll add the Injury Location field, the Year field, and the Incident field.

1. Select a cell in the pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the Actions group, click Clear, and then click Clear All to remove all the fields and formatting from the pivot table layout.

3. Add the Injury Location field to the Row Labels area, add Year to the Column Labels area, and add the Incident Cost field to the Values area. Format the values as Currency with zero decimal places.

4. Because 2008 is not completed, its values will skew the average, so you'll remove it from the pivot table layout. Click the drop-down arrow for the Column Labels, and remove the check mark for 2008.

First you'll apply conditional formatting to add red fill color to the top three costs:

1. Select cells B5 to C16, which contain the value cells you want to format.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

3. In the list of conditional formatting options, click Top/Bottom Rules, and then click Top 10 Items.

4. In the scroll box, change the number of items to 3, and then click the arrow to open the formatting drop-down list.

5. In the formatting list, click Custom Format to open the Format Cells dialog box.

6. On the Fill tab, select a shade of red as the fill color, and then click OK to close the Format Cells dialog box.

7. Click OK to close the Top 10 Items dialog box.

The top three costs are highlighted with red fill (see Figure 10-30). Next, you'll apply conditional formatting so the cells with above average costs are highlighted with yellow fill color.

	A	B	C
1			
2			
3	Sum of Incident Cost	Column l 🔽	
4	Row Labels 🔽	2006	2007
5	Abdomen	$40,692	$24,563
6	Arms	$20,840	$24,611
7	Back	$42,983	$25,753
8	Eye	$12,763	$16,869
9	Feet	$27,598	$24,297
10	Hands	$27,412	$21,451
11	Head	$37,172	$28,787
12	Legs	$8,589	$31,494
13	Multiple	$19,289	$23,345
14	N/A	$42,536	$22,259
15	Neck	$27,670	$10,891
16	Trunk	$19,459	$22,949
17	Grand Total	$327,003	$277,269

Figure 10-30. *The top three items are highlighted with conditional formatting.*

1. Select cells B5 to C16, which contain the value cells you want to format.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting.

3. In the list of conditional formatting options, click Top/Bottom Rules, and then click Above Average.

4. In the formatting list, click Custom Format to open the Format Cells dialog box.

5. On the Fill tab, select yellow as the fill color, and then click OK to close the Format Cells dialog box.

6. Click OK to close the Above Average dialog box.

The cells with above average costs are highlighted with yellow fill, but the red fill has been replaced with yellow in the top three cells (see Figure 10-31).

	A	B	C
1			
2			
3	Sum of Incident Cost	Column l 🔽	
4	Row Labels 🔽	2006	2007
5	Abdomen	$40,692	$24,563
6	Arms	$20,840	$24,611
7	Back	$42,983	$25,753
8	Eye	$12,763	$16,869
9	Feet	$27,598	$24,297
10	Hands	$27,412	$21,451
11	Head	$37,172	$28,787
12	Legs	$8,589	$31,494
13	Multiple	$19,289	$23,345
14	N/A	$42,536	$22,259
15	Neck	$27,670	$10,891
16	Trunk	$19,459	$22,949
17	Grand Total	$327,003	$277,269

Figure 10-31. *Above average cells are highlighted with conditional formatting.*

You want to keep the red highlighting for the top three cells, so you'll change the order in which the conditional formatting is applied. If the above average cells are formatted first, then the top three, the red ones, will be visible. To change the order, you'll open the Conditional Formatting Rules Manager dialog box:

1. Select cells B5 to C16, which contain the formatted value cells.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting, and then click Manage Rules.

The Conditional Formatting Rules Manager dialog box opens, where you can see the two rules you created when you applied conditional formatting to the pivot table cells (see Figure 10-32). To the right of the Delete Rule button are the Move Up and Move Down buttons.
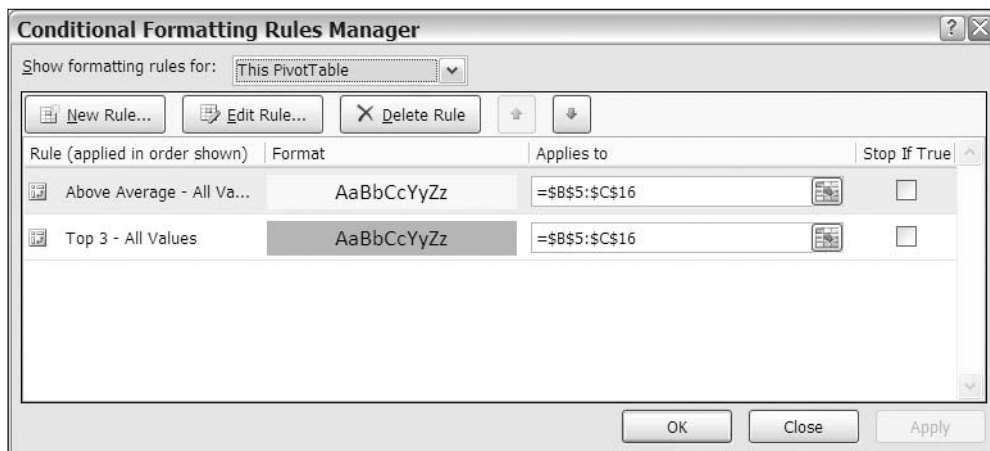
Figure 10-32. *Two rules in the Conditional Formatting Rules Manager dialog box*

The higher items in the list have precedence over the lower items, and if there is a formatting conflict between rules, the rule with precedence is used. You created the Top 3 rule first, so it is at the bottom of the list. When you created the Above Average rule, it was added to the top of the list, taking precedence over the Top 3 rule. Because the Top 3 cells are also above average, they are affected by both rules, and the formatting for the Above Average rule, which has precedence, is applied last, so the cells are colored yellow.

You'll change the order of the rules so the Top 3 rule has precedence and the red fill color is applied to the Top 3 cells:

1. In the list of rules, click the Top 3 rule.

2. To the right of the Delete Rule button, click the Move Up button to move the Top 3 rule above the Above Average rule.

3. Click OK to close the Conditional Formatting Rules Manager dialog box.

Because you changed the order of the rules, the Top 3 rule now has precedence, and the top three cells are red.

Changing the Pivot Table Layout

Just when you are ready to send the report, the safety director calls to ask whether you can change the report so it shows the injury location per age group per year. You'll add the Age Group field to the report and see whether the conditional formatting needs any changes.

1. Add the Age Group field to the Row Labels area, above the Injury Location field.

   The incident costs change, because they are now broken down by age group. However, the conditional formatting is still applied correctly. The top three amounts are highlighted in red, and all the amounts above average are highlighted in yellow (see Figure 10-33).

	A	B	C
1			
2			
3	**Sum of Incident Cost**	**Column Labels** ▾	
4	**Row Labels** ▾	**2006**	**2007**
5	⊟ **18-24**	**$64,465**	**$47,669**
6	Abdomen	$0	$1,269
7	Arms	$6,317	$9,126
8	Back	$9,217	$3,689
9	Eye	$6,378	$2,376
10	Feet	$4,607	$8,518
11	Hands	$4,076	$3,003

Figure 10-33. *The conditional formatting adjusts to revised layout.*

You're not sure whether the safety director will like the long, narrow report, so you decide to try a different layout.

2. Move the Age Group field to the Column Labels area, below the Year field.

The conditional formatting is now applied to the Year subtotals, and because they are included, the above average cells include all the subtotals and only a few of the other cells (see Figure 10-34).

	A	B	C	D	E	F	G	H	I	J	K
1											
2											
3	**Sum of Incide**	**Colum** ▾									
4		⊟ **2006**				**2006 Total**	⊟ **2007**				**2007 Total**
5	**Row Label** ▾	**18-24**	**25-34**	**35-49**	**50+**		**18-24**	**25-34**	**35-49**	**50+**	
6	Abdomen	$0	$21,365	$14,944	$4,383	$40,692	$1,269	$12,604	$4,921	$5,769	$24,563
7	Arms	$6,317	$3,551	$6,124	$4,848	$20,840	$9,126	$5,016	$5,175	$5,294	$24,611
8	Back	$9,217	$10,595	$17,218	$5,953	$42,983	$3,689	$13,129	$4,682	$4,253	$25,753
9	Eye	$6,378	$733	$3,717	$1,935	$12,763	$2,376	$12,239	$1,698	$556	$16,869
10	Feet	$4,607	$2,344	$19,255	$1,392	$27,598	$8,518	$8,471	$634	$6,674	$24,297
11	Hands	$4,076	$6,393	$9,724	$7,219	$27,412	$3,003	$6,310	$7,419	$4,719	$21,451
12	Head	$9,188	$25,194	$2,790	$0	$37,172	$5,502	$8,176	$8,145	$6,964	$28,787
13	Legs	$875	$7,151	$563	$0	$8,589		$9,884	$14,602	$7,008	$31,494
14	Multiple	$652	$2,397	$15,902	$338	$19,289	$6,553	$12,201	$1,421	$3,170	$23,345
15	N/A	$4,491	$14,786	$8,249	$15,010	$42,536		$9,651		$12,608	$22,259
16	Neck	$13,938	$4,872	$3,013	$5,847	$27,670	$8	$6,723	$0	$4,160	$10,891
17	Trunk	$4,726	$2,901	$6,221	$5,611	$19,459	$7,625	$4,727	$9,778	$819	$22,949
18	**Grand Total**	**$64,465**	**$102,282**	**$107,720**	**$52,536**	**$327,003**	**$47,669**	**$109,131**	**$58,475**	**$61,994**	**$277,269**

Figure 10-34. *The conditional formatting does not adjust correctly.*

Instead of having conditional formatting on the entire block of cells, you want the subtotals to be excluded and only the individual values to be formatted. You'll edit the rules to ensure that the subtotals are ignored:

1. Select one of value cells in the pivot table. For example, select cell C8, which is the value for Back in 2006 for the 25–34 age group.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting. Then click Manage Rules.

   The Conditional Formatting Rules Manager dialog box opens, where you can see the two rules that exist for this pivot table. For each rule, the conditional formatting is applied to cells $B$6:$K$17. You'll change this setting in each of the rules, starting with the Above Average rule.

3. In the list of rules, click the Above Average rule.

4. Click the Edit Rule button to open the Edit Formatting Rule dialog box.

   In the Apply Rule To section at the top, there are three options, and the Selected Cells option is currently selected. The range of cells, $B$6:$K$17, is shown (see Figure 10-35).
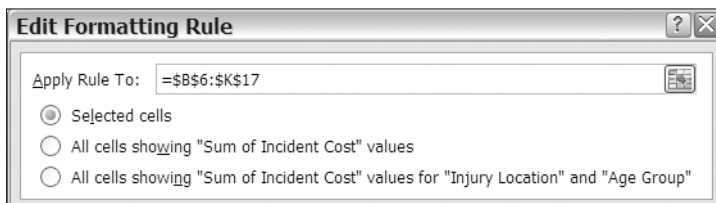
Figure 10-35. *Apply Rule To options in the Edit Formatting Rule dialog box*

The Selected cells option works in many cases, but when you rearrange the pivot table, the conditional formatting may not adjust correctly. In your pivot table, the subtotals are being formatted because they are within the range of cells to which the rule is applied.

The second option, All Cells Showing "Sum of Incident Cost" Values, would also include too many cells. It would not only include the year subtotals but also the grand totals, because they are also Sum of Incident Cost values.

The third option, All Cells Showing "Sum of Incident Cost" Values for "Injury Location" and "Age Group," will be the best option for this pivot table. It will restrict the formatting to cells where the Age Group and Injury Location values appear and will exclude the year subtotals and the grand totals.

5. Select the third option, All Cells Showing "Sum of Incident Cost" Values for "Injury Location" and "Age Group."

6. Click OK to close the Edit Formatting Rule dialog box.

In the Conditional Formatting Rules Manager dialog box, the Above Average rule shows the revised option in the Applies To column. Next, you'll make the same change to the Top 3 rule:

7. In the list of rules, click the Top 3 rule.

8. Click the Edit Rule button to open the Edit Formatting Rule dialog box.

9. In the Apply Rule to section, select the third option, All Cells Showing "Sum of Incident Cost" Values for "Injury Location" and "Age Group."

10. Click OK to close the Edit Formatting Rule dialog box, and click OK to close the Conditional Formatting Rules Manager dialog box.

The conditional formatting is now applied correctly to the individual value cells. The year subtotals and the grand totals are not formatted, and their values are not included in the average calculation. You can send the completed report to the safety director and go for a well-earned lunch break.

Deleting a Rule

When you return to your desk, there's a message from the safety director, who likes the report but thinks it would look better without the Above Average highlighting. You'll delete that rule so only the Top 3 rule will be applied in the pivot table:

1. Select a cell in the pivot table.

2. On the Ribbon, click the Home tab, and in the Styles group, click Conditional Formatting. Then click Manage Rules.

3. In the list of rules, click the Above Average rule.

4. Click the Delete Rule button (see Figure 10-36).
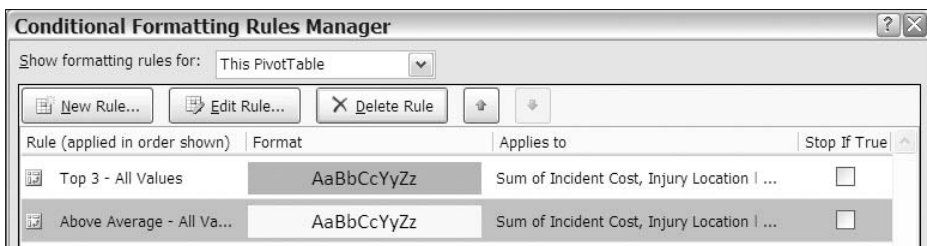
Figure 10-36. *Delete a conditional formatting rule.*

5. Click OK to close the Conditional Formatting Rules Manager dialog box.

The Above Average conditional formatting is removed from the pivot table, and only the Top 3 rule formatting remains. You can send the revised report to the safety director and start on the next report on your list.

Setting Format Options

The safety director wants one more report before you leave for the day. Safety meetings will be held in the Illinois and Ohio plants next week, and the safety director wants to take a report that shows the number of Lost Time incidents per month at these locations and the cost of the incidents per year. The pivot table doesn't need any conditional formatting but should be clearly organized and labeled.

You'll clear the existing pivot table and then add the fields you need for the new report. In addition to the standard formatting you have used in other pivot tables, you'll change the pivot table options and some field settings to create an attractive pivot table for distribution at the meetings.

To start, you'll clear the pivot table to remove the current fields and conditional formatting. Then you'll add the fields you need for the new report.

1. Select a cell in the pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the Actions group, click Clear, and then click Clear All to remove all the fields and formatting from the pivot table layout.

3. Add the Plant field to the Row Labels area, and select only Illinois and Ohio from the Row Labels filter list.

4. Add the Year field to the Column Labels area, and add the Month field to the Row Labels area below the Plant field.

5. Add the Report Type field to the Report Filter area, and select Lost Time from the drop-down list.

6. Add the Incident Cost field to the Values area, and add the Date field to the Values area as Count of Date.

7. Format the Incident Cost field as Currency, with zero decimal places.

The pivot table data is all in place, and the numbers are formatted correctly, but a few things need improvement (see Figure 10-37). Some of the months are missing for each plant, because no lost time incidents occurred in those months. The pivot table is too wide, because the column headings for the value fields are too long. You also want to clean the pivot table up by hiding some of the features that won't be needed during the meeting, such as the drop-down arrows.

First you'll change the column headings to make them shorter:

1. Click cell B5, which contains the heading Sum of Incident Cost.

2. Type **Cost**, and then press the Enter key to complete the change.

3. Click cell C5, which contains the heading Count of Date.

4. Type **Incidents**, and then press the Enter key to complete the change.

	A	B	C	D	E	F	G
1	Report Type	Lost Time					
2							
3		Column Labels					
4			2006		2007		2008
5	Row Labels	Sum of Incident Cost	Count of Date	Sum of Incident Cost	Count of Date	Sum of Incident Cost	Count of Date
6	⊟Illinois	$22,741	7	$8,433	5	$1,449	1
7	Feb	$3,417	1	$2,437	1		
8	Apr	$4,731	1	$3,287	2		
9	May					$1,449	1
10	Jul	$8,143	2				
11	Aug			$1,902	1		
12	Sep	$1,230	1				
13	Nov			$807	1		
14	Dec	$5,220	2				
15	⊟Ohio	$20,814	9	$11,750	5	$6,064	2
16	Jan					$1,919	1

Figure 10-37. *The pivot table needs formatting improvements.*

Controlling Column Width

All the column headings have changed, and already the pivot table is easier to read and understand. However, when you changed the headings, the columns did not automatically adjust to fit the narrower headings. You'll refresh the pivot table to autofit the columns.

1. Right-click a cell in the pivot table, and in the context menu, click Refresh.

   The pivot table was refreshed, and the columns have adjusted to fit the narrower headings. As you work on this pivot table, you might make adjustments to the columns widths, and you want to prevent further automatic adjustments if the pivot table is refreshed again. You'll change one of the pivot table options to prevent automatic changes to the column widths.

2. Right-click a cell in the pivot table, and in the context menu, click PivotTable Options.

3. In the PivotTable Options dialog box, on the Layout & Format tab, remove the check mark from Autofit Column Widths on Update (see Figure 10-38).
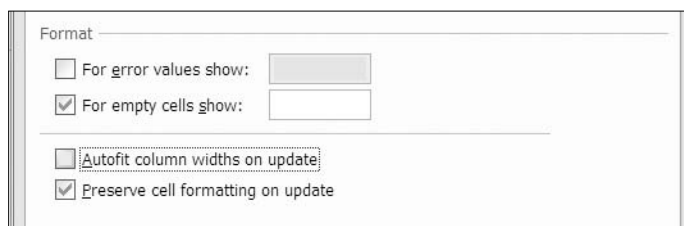
Figure 10-38. *Autofit Column Widths on Update option*

4. Click OK to close the PivotTable Options dialog box.

Now, if you manually adjust the column width and then refresh the pivot table, the column width won't change.

Showing Items with No Data

Next, you'll change a setting for the Month field to ensure that all the months are showing for each plant, even if there were no incidents in that month.

1. Right-click a Month label in the pivot table. For example, right-click cell A8, which contains the Apr label for Illinois.

2. In the context menu, click Field Settings.

3. In the Field Settings dialog box, on the Layout & Print tab, add a check mark to Show Items with No Data (see Figure 10-39).
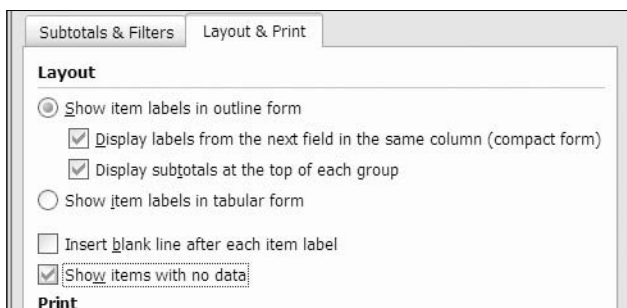
Figure 10-39. *Show Items with No Data option*

4. Click OK to close the Field Settings dialog box.

All the months are now listed for each plant, even where there were no incidents in any of the years for that month. This makes it easier to compare the data, since the list of months is consistent between plants.

Hiding Buttons and Labels

As a final step in cleaning up the pivot table, you'll hide the buttons and labels that aren't needed during the meeting. You have applied filters to the Row Labels, and you'll hide that button to prevent any changes during the meeting. You'll also hide the buttons to the left of the Plant labels and you'll remove the Row Labels and Column Labels captions in cells A5 and B3.

1. Right-click a cell in the pivot table, and in the context menu, click PivotTable Options.

2. On the Display tab, remove the check mark from Show Expand/Collapse Buttons. This will hide the buttons to the left of the plant names.

3. Also remove the check mark from Display Field Captions and Filter Drop Downs (see Figure 10-40). This will hide the filter buttons and the Row Labels and Column Labels captions.
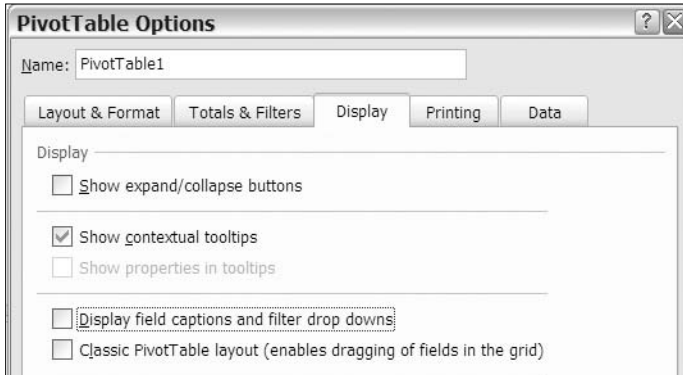
Figure 10-40. *Display options*

4. Click OK to close the PivotTable Options dialog box.

The buttons and labels have been removed from the pivot table, giving it a cleaner look. You can make minor adjustments to the column widths so the numbers are well spaced. Because the numbers are right-aligned, you can right-align the column headings, so it's clear which heading is associated with which column of numbers (see Figure 10-41).

The revised pivot table is much improved over the initial version, and you can proudly send it to the safety director for use at the safety meetings in Illinois and Ohio.

	A	B	C	D	E	F	G
1	Report Type	Lost Time 🔽					
2							
3		**2006**		**2007**		**2008**	
4		**Cost**	**Incidents**	**Cost**	**Incidents**	**Cost**	**Incidents**
5	**Illinois**	**$22,741**	**7**	**$8,433**	**5**	**$1,449**	**1**
6	Jan						
7	Feb	$3,417	1	$2,437	1		
8	Mar						
9	Apr	$4,731	1	$3,287	2		
10	May					$1,449	1
11	Jun						
12	Jul	$8,143	2				
13	Aug			$1,902	1		
14	Sep	$1,230	1				
15	Oct						
16	Nov			$807	1		
17	Dec	$5,220	2				
18	**Ohio**	**$20,814**	**9**	**$11,750**	**5**	**$6,064**	**2**
19	Jan					$1,919	1
20	Feb	$6,599	2				

Figure 10-41. *Formatted pivot table*

Summary

In this chapter, you used conditional formatting to highlight the best and worst results in your safety data. There are many built-in conditional formatting options, and you applied the following types:

- Color Scale

- Icon Set

- Data Bars

- Top 10 Items

- Above Average

- Date Range

In addition to the built-in conditional formatting options, you created custom formats to apply the fill color, font, and other formatting you preferred. You also edited the formatting rules and the order of the rules, so the conditional formatting would work correctly on your pivot table data.

To create a cleaner looking pivot table, you changed the pivot table options to hide buttons and labels when appropriate and to control column width. You also changed the field settings to show items that have no data, such as sales reports where some months have no activity to report.

By using enhanced formatting, you help ensure that your pivot tables are easy to read and understand and that the important information is highlighted in your reports.

■ ■ ■

Creating a Pivot Chart

In this chapter, you'll create pivot charts using the food sales data you worked with in Chapters 8 and 9. A *pivot chart* paints a picture of the data in a pivot table and can make the data easier to understand. Instead of a table full of numbers, a pivot chart can use columns, bars, or pie slices to illustrate the numbers, and a pivot chart lets you easily compare results between years, regions, or products. Or, a pivot chart can use lines to show how results change over time (see Figure 11-1).
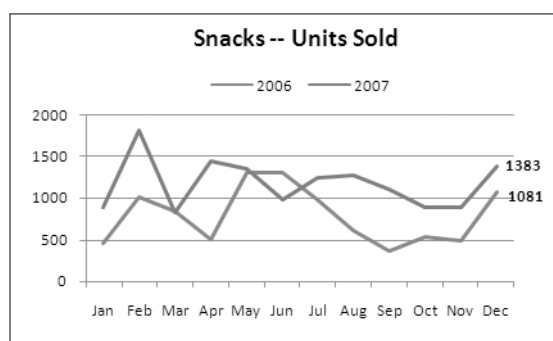
Figure 11-1. *Pivot chart comparing 2006 vs. 2007 sales*

To start, you'll create a simple column chart with the default chart settings. You'll modify that chart's layout, change its appearance, and move the pivot fields to produce a custom-tailored chart that presents your data effectively. Then, you'll create a line chart from the pivot table data to compare sales over two years. You'll add labels, titles, and trend lines to the chart to ensure that your chart is easy to understand.

Finally, you'll see how easy it is to use the pivot chart filters to instantly create a chart that shows results for a different product or region. With one click of the mouse, your chart can focus on cookie sales instead of snacks or on the east instead of the north. What might take hours to achieve with regular charts will take seconds to create with a pivot chart.

Creating a Default Pivot Chart

The sales manager at your food sales company is preparing for a regional sales meeting and wants a chart that compares each region's sales for each product type. You'll create a pivot chart with the default settings, and then you'll modify the chart to improve its appearance.

To start, you'll open the sample food sales workbook and prepare the pivot table:

1. Download and open the sample file `RegionSales_03.xlsx`, available from the Apress web site.

2. Activate the Pivot_Regions worksheet, which contains an empty pivot table.

The pivot table is based on sales data for the East and North regions for 2006 and 2007. The chart should compare sales in the two regions for all the product types, so you'll add the Region, ProdType, and TotalPrice fields to the pivot table layout and then create a pivot chart from the pivot table.

At this point, you aren't sure how the fields should be arranged for the pivot chart, so you'll add the fields where they'd make sense in a pivot table report. After you create the pivot chart, you can change the layout, if required.

1. Select a cell in the empty pivot table, and in the PivotTable Field List pane, add the Region field to the Row Labels area, add the ProdType field to the Column Labels area, and add the TotalPrice field to the Values area.

   This creates a concise summary of the data, and you can compare the sales between regions for each product type.

2. To create a pivot chart, select a cell in the pivot table, and on the keyboard, press the F11 key.

3. A chart sheet, Chart1, is inserted in the workbook, with a pivot chart based on the current pivot table (see Figure 11-2).
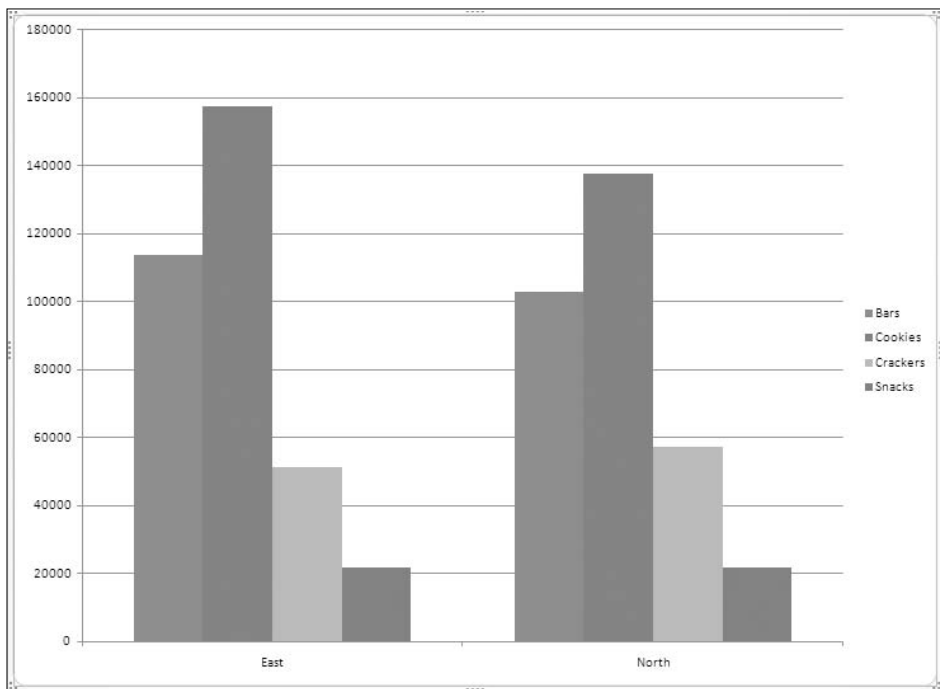
Figure 11-2. *A default pivot chart*

Exploring the Pivot Chart

The chart that was created is the default chart type, a clustered column chart. In the PivotTable Field List pane, the Row Labels area has changed to the Axis Fields (Categories) area, and the Column Labels area is now called the Legend Fields (Series) area (see Figure 11-3).
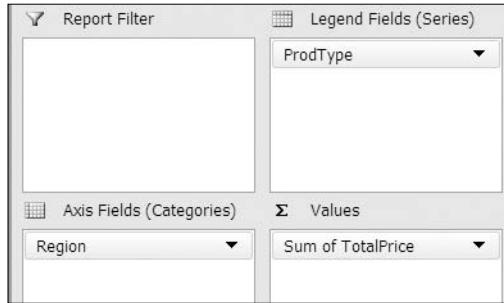
Figure 11-3. *The area names have changed in the PivotTable Field List pane.*

The region names are shown on the category axis, which is the horizontal axis across the bottom of the chart. Above each region name on the axis is a cluster of colored columns.

The product types from the ProdType field are shown in the legend at the right of the chart. The ProdType items are series in the chart, and there is a column that represents the total sales for each product type in each region. The colored square beside the ProdType name in the legend indicates which color its columns are. For example, the two blue columns represent the bar sales, one for the East region and one for the North region.

1. Point to one of the blue columns, and a tool tip will appear to show the name of the series (Bars), the region, and the value that column represents (see Figure 11-4).
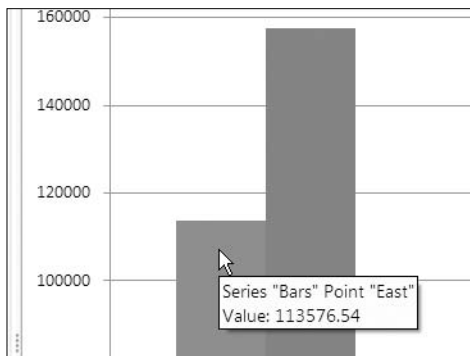
Figure 11-4. *A tool tip shows information about the column.*

■**Tip** You can point to any element in the active chart and see its name in a tool tip, if tool tips are enabled.

The red column in the East region is the tallest column in the chart. The legend shows that red columns represent sales of cookies, so cookies in the East region are the best-selling product type per region. Snacks in the East and North regions have the smallest columns, indicating that sales of snacks are the lowest, and they look very close in sales for the two regions.

2. Point to each of the purple Snacks columns to see the value each column represents and to determine whether the values are the same. The value for the North region is slightly higher than the value for the East region.

Using the PivotChart Filter Pane

In addition to the PivotTable Field List pane, when the pivot chart is active, a PivotChart Filter Pane becomes available (see Figure 11-5). This lets you sort and filter the fields, just as you can in a pivot table, and you can use the row labels, column labels, and report filters.
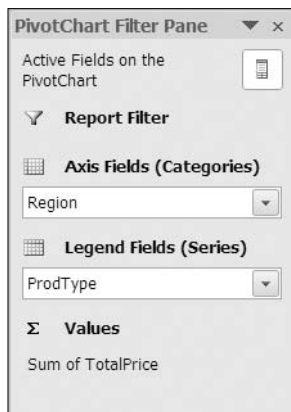
Figure 11-5. *The PivotChart Filter Pane*

You'll use the PivotChart Filter Pane to temporarily filter the product types to show only the snacks. This will remove the product types with more sales and will let you focus on snacks and see the small difference between the values those columns represent.

1. In the PivotChart Filter Pane, click the drop-down arrow for ProdType in the Legend Fields list.

2. In the Filter list, remove the check marks from Bars, Cookies, and Crackers, and then click OK.

The color for the Snacks column changes to blue, because that is the color used for the first column in the chart. The scale in the vertical axis at the left changes and shows a much smaller range of numbers. Previously, it went from 0 to 180000, and it now goes from 21500 to 21720. This magnifies the difference between the two columns, and you can clearly see that the North region had more sales (see Figure 11-6).
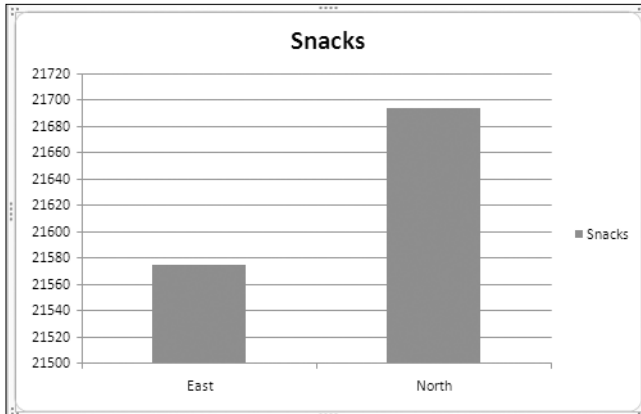
Figure 11-6. *Pivot chart filtered to show only snacks*

Now that you've focused on the snacks sales, you'll remove the filter from the pivot chart so it shows all the product types:

1. In the PivotChart Filter Pane, click the drop-down arrow for ProdType in the Legend Fields list.

2. In the Filter list, click Clear Filter from "ProdType."

All the product types are visible again, and the vertical axis scale starts at zero and goes to 180000.

On the PivotChart Filter Pane is a Field List button that lets you show or hide the PivotTable Field List pane. You'll hide the PivotTable Field List pane temporarily to see how the pivot chart looks when it's hidden:

1. Click the Field List button (see Figure 11-7) at the top right of the PivotChart Filter Pane to hide the PivotTable Field List pane.

Figure 11-7. *Field List button on the PivotChart Filter Pane*

This creates more room on the screen for the pivot chart, so you may want to hide the PivotTable Field List pane after you have finished the pivot chart layout and are formatting the pivot chart. For now, you'll turn the PivotTable Field List pane back on.

2. Click the Field List button at the top right of the PivotChart Filter Pane to show the PivotTable Field List pane.

Moving Fields in the Pivot Chart

Currently, the chart shows all the product types for the East region in one column cluster at the left of the chart. At the right of the chart is another column cluster that shows all the product types for the North region. This is an ideal arrangement for comparing the product type sales within each region.

To make it easier for the sales manager to compare the results for each product type between regions, you want the related product type columns displayed side by side. Instead of a cluster for each region, you want a cluster for each product type (see Figure 11-8).
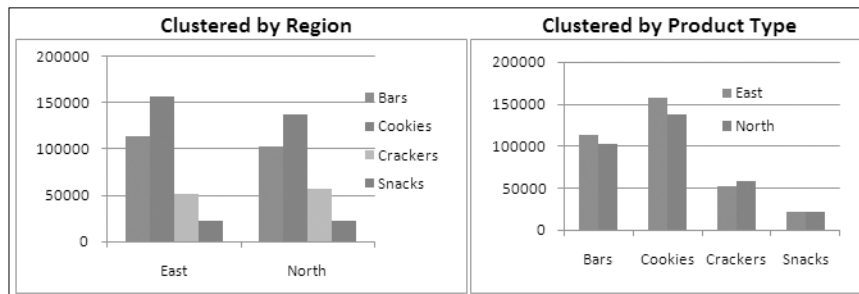
Figure 11-8. *Cluster columns by region or by product type*

Just as you can move fields in a pivot table, you can also move fields in a pivot chart. You'll change the position of the ProdType and Regions fields to create the layout you want for the chart:

1. At the bottom left of the PivotTable Field List pane, add a check mark to Defer Layout Update. This will allow you to make changes to the field layout, without immediately changing the pivot chart.

■**Note** If the PivotTable Field List pane is not visible, you may have clicked outside the pivot chart. Click in the pivot chart to activate it, and the PivotTable Field List pane should become visible. If it is still not visible, click the Field List button at the top right of the PivotChart Filter Pane.

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2. In the PivotTable Field List pane, move the ProdType field from the Legend Fields (Series) area to the Axis Fields (Categories) area.

3. Move the Region field from the Axis Fields (Categories) area to the Legend Fields (Series) area.

4. In the PivotTable Field List pane, click the Update button to update the pivot chart.

5. In the PivotTable Field List pane, remove the check mark from Defer Layout Update.

The pivot chart now shows the product type names along the category axis and the region names in the legend. The East region's sales are represented by blue columns, and the North region's sales are represented by red columns. It's easier to compare the product type sales between regions when the columns are side by side (see Figure 11-9).
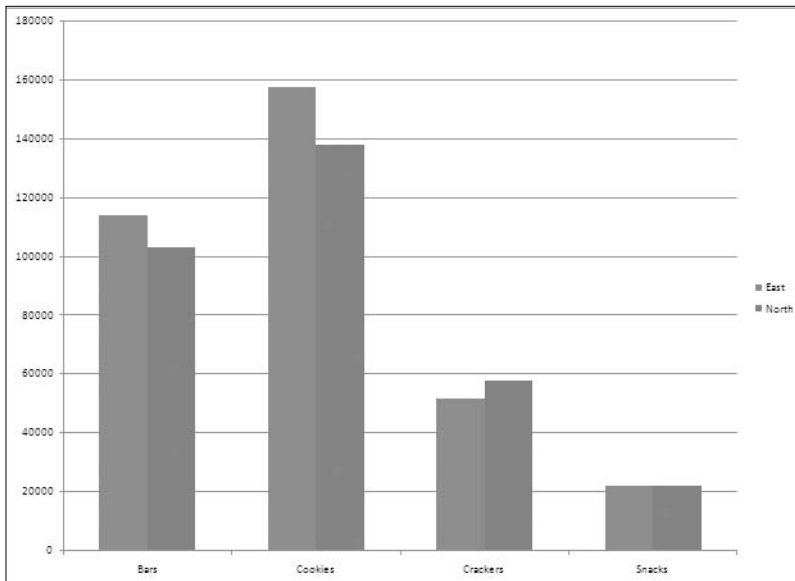
Figure 11-9. *The product type names on the category axis*

With the columns clustered by product type, it's easy to see that sales of bars and cookies are greater in the East, cracker sales are higher in the North, and snack sales are almost equal in the two regions.

Changing the Pivot Chart Layout

Before you send the pivot chart to the sales manager, you want to make it a bit more visually appealing. A title could explain the chart contents, and the legend might be easier to read in a different position in the chart.

When you create a pivot chart, a chart layout is automatically applied. The current layout has the legend at the right, grid lines running horizontally across the chart, and no chart title. You'll select a different layout to quickly give the chart a different appearance.

On the Ribbon, under PivotChart Tools, there are four tabs—Design, Layout, Format, and Analyze—that contain commands you can use when working with a pivot chart. You'll use these commands as you work with the pivot charts in this chapter.

1. Select the pivot chart, and on the Ribbon, under PivotChart Tools, click the Design tab.

2. In the Chart Layouts group, click the More arrow to open the Chart Layouts gallery (see Figure 11-10).

   The Chart Layouts gallery shows miniature representations of the layouts that are available. For example, Layout 1 looks similar to the current layout, with grid lines and a legend at the right, but it includes a chart title. Layout 4 has the legend at the bottom, no grid lines, and numbers at the top of each column. You'll choose Layout 2, which has a chart title and legend at the top, no grid lines, and numbers at the top of each column. It also shows that the columns will be slightly separated.

Figure 11-10. *The Chart Layouts gallery*

3. In the Chart Layouts gallery, click Layout 2 to apply that layout to the active pivot chart.

The chart layout you clicked is applied to the pivot chart. This layout has a chart title, and the legend is displayed at the top of the chart, where it's easier to see. The grid lines have been removed from the chart, as has the value axis that was at the left side of the chart. Instead, the values are displayed at the top of each column, and the columns are slightly separated in each cluster.

Next, you'll change the chart title so it shows information about the food sales instead of the generic text.

1. Click the Chart Title to select it. When it is selected, the chart title has a small round handle in each corner (see Figure 11-11).

Figure 11-11. *The chart title is selected.*

2. In the chart title, select the existing text, Chart Title, and press the Delete key to remove the text.

3. Type the new text, **Food Sales 2006-2007**, and then click outside the chart title to complete the change.

Changing the Chart Style

Now that the chart layout is the way you want it, you'll change the chart style, which controls the colors and effects that are used in the chart. When you create a pivot chart, a default chart style is automatically applied. You'll select a different chart style to quickly give the chart a more dramatic appearance.

1. Select the pivot chart, and on the Ribbon, under PivotChart Tools, click the Design tab.

2. In the Chart Styles group, click the More arrow to open the Chart Styles gallery.

In the Chart Styles gallery, Style 2 is selected, because that is the style currently applied to the pivot chart. The sales manager has asked for blue coloring in the pivot chart, so you'll select one of the options in the third column of styles.

3. In the Chart Styles gallery, click Style 27, which is the fourth style in the third column to apply that style to the active pivot chart (see Figure 11-12).
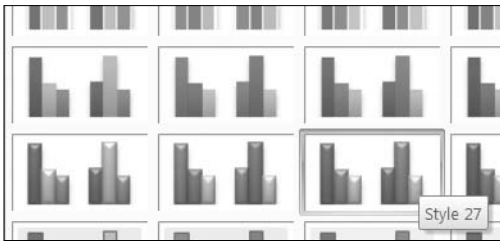
Figure 11-12. *Select a chart style.*

The chart style you clicked is applied to the pivot chart. This style uses light and dark blue tones to color the columns, and the columns have a beveled appearance. There is good contrast between the column colors for the two regions, and the chart is clean and easy to read (see Figure 11-13).
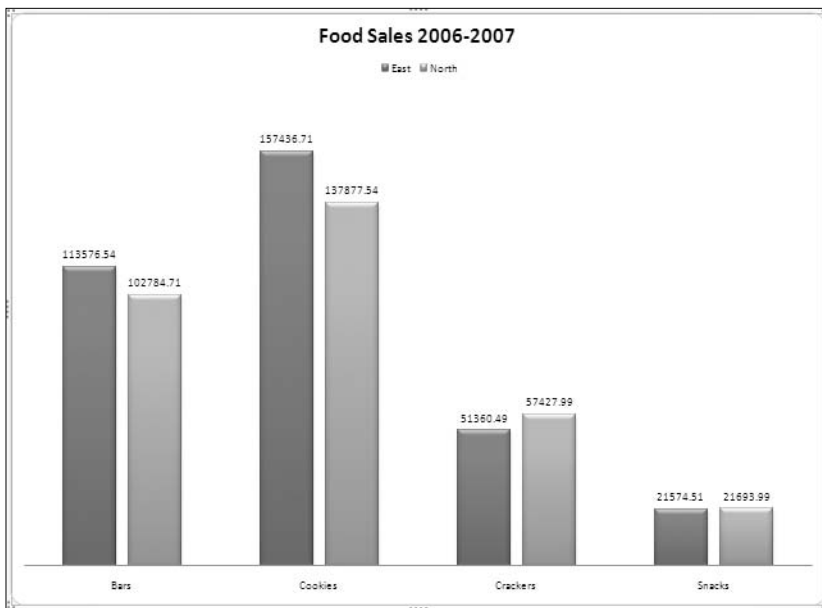
Figure 11-13. *The completed pivot chart*

Now that it's ready, you can send the pivot chart to the sales manager.

Adding Fields to the Pivot Chart

The sales manager thinks the pivot chart will be a helpful tool for the sales meeting and asks whether you can create another chart showing the same information but with the region totals broken down by city. For example, in the column that shows sales of cookies in the East, how much was sold in Boston and how much was sold in New York?

You'll add the City field to the pivot chart layout so the chart will show the amount per city for each product type. You'll also change the chart type so the cities for each region will be displayed in a single column in the chart.

1. Select the pivot chart, and in the PivotTable Field List pane, add a check mark to the City field.

   The City field is added to the Axis Fields (Category) area, and the cities are displayed along the category axis in the pivot chart, within each product type. The columns for the cities are colored according to region, but the chart is crowded and difficult to read. The city totals for each product type are displayed, but the chart no longer shows a direct comparison of the totals per region for each product type.

   On the category axis, you want the product type to remain where it is, and above that, you want the region names as they were before. The legend should show the city names so you can identify the cities in the chart's data. To create this layout, you'll change the position of the Region and City fields in the chart layout.

2. In the PivotTable Field List pane, move City to the Legend Fields area, and move Region to the Axis Fields area, below the ProdType field.

The chart layout is now close to what you need, but instead of a cluster of cities for each region, you want a single column for each region. In the next step you'll change the chart type, and this will achieve the layout you need.

Changing the Chart Type

When you create a pivot chart by pressing the F11 key, the default chart style is used. Unless you have changed the settings, the default chart style is a clustered column chart. In this chart, you want the cities for each region stacked in a single column for each product type. You'll change the chart type so the columns are stacked instead of clustered.

1. Select the pivot chart, and on the Ribbon, under PivotChart Tools, click the Design tab.

2. In the Type group, click Change Chart Type (see Figure 11-14).
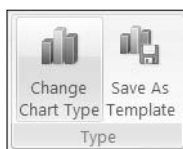
Figure 11-14. *Change Chart Type command on the Ribbon*

The Change Chart Type dialog box opens and shows a list of chart types at the left. At the right are the subtypes available for each chart type. You can point to a subtype and see its name in a tool tip.

You'll continue to use the Column chart type for this chart, but you can see the other chart types that are available in Excel:

- Column and bar charts are almost the same, except that bars are displayed horizontally across the chart and columns are vertical. Both of these chart types work well for comparing specific values, as you're doing in your chart.

- Line charts and area charts connect the points that represent values and are good for illustrating changes over time. The charts are the same, except that the area charts are filled with color.

- Pie charts and doughnut charts show the percentage that each value comprises in the overall total. The pie chart type works well when there is a single series and value, such as total quantity per region. A doughnut chart can show multiple series.

- Surface charts and radar charts are specialized chart types that you can use to show differences in the data or aggregated data.

■**Note** Although they are available in the list of chart types, you cannot use the XY (Scatter), Bubble, or Stock chart types when creating a pivot chart.

In the Change Chart Type dialog box, the current chart type, Column, is selected, and in the Column section at the right, the current chart subtype, Clustered Column, is selected. You'll select Stacked Column instead so the city data is stacked in a single column instead of being displayed in multiple columns.

■**Tip** Avoid using the three-dimensional chart subtypes, because they will distort the representation of the data in your charts.

3. In the Column chart subtypes, click Stacked Column to select it (see Figure 11-15).
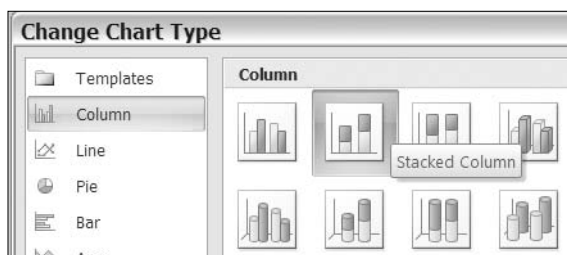
Figure 11-15. *Select the Stacked Column chart type.*

4. Click OK to close the Change Chart Type dialog box.

   With stacked columns, the chart is now easier to read, but it's difficult to distinguish the cities, since the legend colors are so similar. You'll change the chart layout and style to make it easier to identify the cities.

5. On the Ribbon, under the PivotChart Tools tab, click the Design tab.

6. In the Chart Layouts group, click the More button to open the Chart Layouts gallery.

7. Click Layout 3 to apply a layout with the legend at the bottom of the chart and numbers on the Values axis at the left of the chart instead of crowded numbers on the columns.

■**Note** If you select a layout that includes a chart title, the existing title will be retained.

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8. On the Ribbon, in the Design tab, click the More button to open the Chart Styles gallery.

9. Click Style 10 in the second row and the second column to apply a multicolored style, with fine white borders around the column segments (see Figure 11-16).
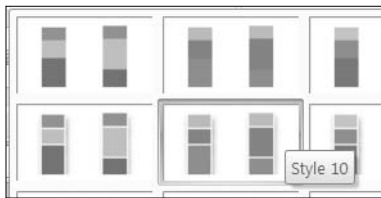
Figure 11-16. *Select Style 10 in the Chart Styles gallery.*

With the different colors in the chart, it's easier to identify each city's sales in the stacked columns (see Figure 11-17). You can send the revised chart to the sales manager.
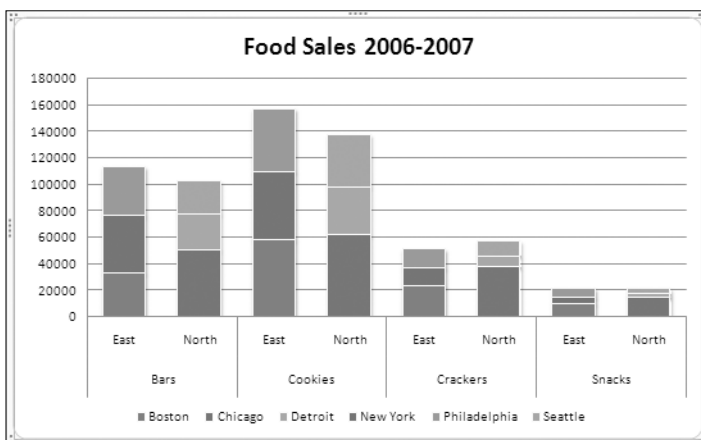
Figure 11-17. *The completed stacked column chart*

Viewing the Pivot Table

Now that you've finished working on the pivot chart, you'll return to the pivot table on which the pivot chart is based to see the effect that these changes to the pivot chart have had:

1. Activate the Pivot_Regions worksheet to return to the pivot table.

2. The City field is in the Column labels area of the PivotTable Field List pane and in the pivot table layout on the worksheet because it was added to the Legend Fields (Series) area of the pivot chart.

3. The ProdType and Region fields are in the Row Labels area because they were both in the Axis Fields (Categories) area of the pivot chart.

The pivot table and pivot chart are connected, and the changes you make to one will affect the other. In some cases, this won't be a problem, and you can lay out the pivot table and pivot chart as you require. However, sometimes you've spent a considerable amount of time setting up a pivot table or pivot chart and want it to stay in that layout for your weekly or monthly reports.

In these situations, you can create a second pivot table from the source data and create a pivot chart from that pivot table. Use the first pivot table for your printed reports, and when you make changes to the pivot chart, it will affect the second pivot table, which isn't used for your printed reports.

Creating a Line Pivot Chart

The sales manager has asked you to create another report for the sales meetings. In this chart, you should show the monthly quantities of bars sold in 2006 and 2007. At the meeting, this chart can show whether bar sales are going up or down and will show the strong and weak sales months for each year.

When you created the first chart, you used the F11 key to create a default chart. This time, you'll use a Ribbon command to create the chart so you'll have more control over the chart setup.

You don't want to affect the existing pivot chart, so you'll create a copy of the pivot table and base the new chart on the pivot table copy. First you'll copy the pivot table, and then you'll change its layout to include the fields you'll need in the new pivot chart:

1. Make a copy of the Pivot_Regions worksheet, and rename the copied worksheet **Pivot_Years**.

2. In the pivot table on the Pivot_Years worksheet, change the pivot table layout so OrderDate is in the Row Labels area, Qty is in the Values area, and ProdType is in the Report Filter area.

3. In the report filter, select Bars so only its data is summarized in the pivot table.

4. In the Row Labels area, group the OrderDate field by Years and Months. By grouping the dates by year, you will be able to show the years separately in the pivot chart.

Now that the pivot table layout includes the fields you need, you can create the pivot chart.

1. Select a cell in the pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the Tools group, click PivotChart (see Figure 11-18).
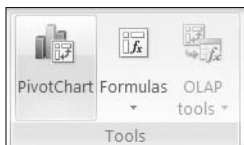
Figure 11-18. *PivotChart command on the Ribbon*

In the Insert Chart dialog box, the default chart type is selected. Unless you have changed the setting, this is the Clustered Column chart type. A column or bar chart works well when comparing specific values, as you did in the previous chart. Because the new chart will show changes over time, a line chart will be best, so you'll select that chart type for your new pivot chart.

3. In the Insert Chart dialog box, in the list of Chart Types at the left, click Line.

In the chart subtypes at the right, the default line type, Line with Markers, is selected. For this chart, you prefer a line without markers, so you'll select a different line chart subtype.

4. In the line chart subtypes, click Line, which is the first subtype shown, and then click OK to create the pivot chart.

A line chart appears on the Pivot_Years worksheet, showing the bar sales for 2006 and 2007 (see Figure 11-19).
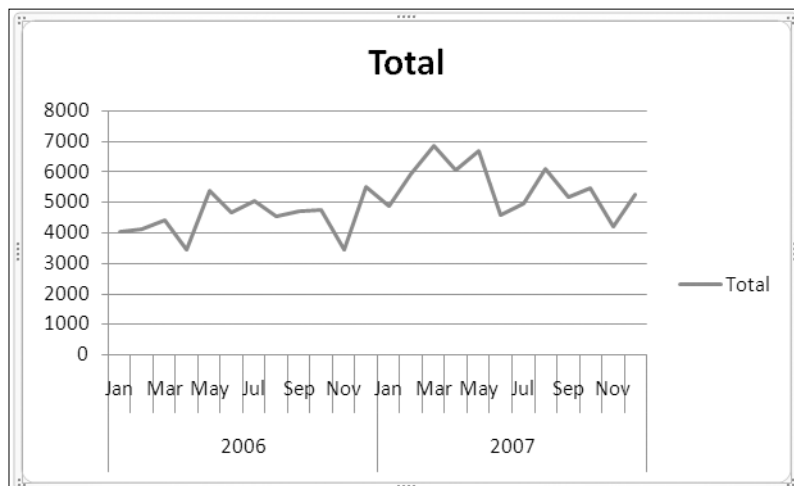
Figure 11-19. *Pivot chart with Line chart type*

The pivot chart contains the data you need for the sales manager, but it needs a few improvements before it's ready to send.

Creating Multiple Series

In the pivot chart, the two years are shown in a single line, with the dates stretching across the axis at the bottom. The legend shows a line for this series, with its name of Total. Instead of this layout, with a single series, you want each year shown as a separate line, and the legend should show an entry for each year. The Category Axis should show the months but not separated into years.

To create a series for each year, instead of a single series, you'll change the field layout in the PivotTable Field List pane. You want the years in the legend, so you'll move the Years field there.

1. Select the pivot chart.

2. In the PivotTable Field List pane, move the Years field from the Axis Fields area to the Legend Fields area.

This layout change creates two series, one for each year, and both show up in the legend. The category axis shows the 12 months, and the lines show the quantity of bars sold each month. However, when the 2006 series was created, it received the default formatting of a line with markers, so you'll change its formatting.

Formatting a Series

In the pivot chart, the 2006 series is formatted as a line with markers. You'll change it so its formatting is the same as the 2007 series. To format any element in the chart, you can select the element and then apply the formatting.

1. Select the pivot chart.

2. On the Ribbon, under the PivotChart Tools tab, click the Layout tab.

3. In the Current Selection group, click the drop-down arrow to see a list of elements in the pivot chart (see Figure 11-20).
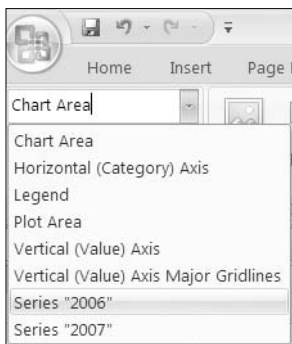
Figure 11-20. *Chart Elements list on the Ribbon*

The Chart Elements list shows all the elements in the active chart, and you can click any element's name to select that element in the chart. Using this list is an easy way to select the elements and to ensure you're selecting the element you intended to select.

4. In the Chart Elements list, click Series "2006."

In the pivot chart, the line for the 2006 series is selected, and now you can format it.

5. Just below the Chart Elements list, in the Current Selection group, click Format Selection.

The Format Data Series dialog box opens, with a list of formatting options for the selected data series. When you click an option in the list, the formatting options appear at the right. For example, you could click Line Style and change the line width and dash type. You want to remove the markers from the selected series, so you'll change the marker options.

6. In the Format Data Series dialog box, click Marker Options.

7. For Marker Type, click None, and then click Close (see Figure 11-21).
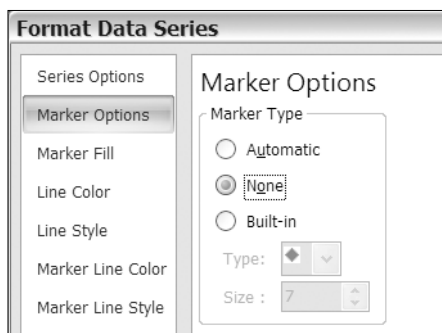
Figure 11-21. *Marker Options command*

In the pivot chart, the markers in the line for the 2006 series have been removed.

Adding a Chart Title

Currently, the pivot chart does not have a title, so you'll add one to explain the contents of the chart. In the previous chart, you applied a chart layout that included a chart title, but in this chart you don't want a package of chart formatting. You want to keep the formatting that already is applied and just add a chart title at the top of the chart.

Instead of using a chart layout, you'll use a different command from the Ribbon:

1. Select the pivot chart.

2. On the Ribbon, under the PivotChart Tools tab, click the Layout tab.

3. In the Labels group, click Chart Title to see a list of options for the chart title (see Figure 11-22).
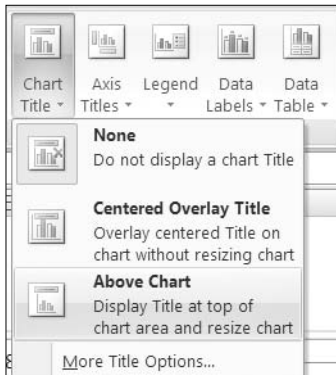
Figure 11-22. *Chart Title options*

If the chart had a title you wanted to remove, you could use the first option, None. Since you want to add a title, you'll use one of the other two options. The second option, Centered Overlay Title, adds a title at the top of the chart on top of whatever elements are already there. This option is ideal if there is plenty of blank space at the top of the chart and you can display the title there without blocking the other elements.

The third option, Above Chart, will make the chart area smaller and add the chart title in the newly created blank space above the chart area. This option is best if there are other elements at the top of the chart and you don't want to cover them. For your chart, this will be the best option, since the lines are near the top of the chart.

4. Click Above Chart to add the default chart title.

5. In the pivot chart's chart title, select the existing text, and type **Bars -- Units Sold**, and then click outside the chart title to complete it.

Changing the Pivot Chart Legend

You can also use the Ribbon commands to change the legend position. Currently the legend is at the right of the chart. If you move it to the top, there will be more space for the 12 months that are displayed on the category axis at the bottom of the chart.

1. Select the pivot chart, and on the Ribbon, under the PivotChart Tools tab, click the Layout tab.

2. In the Labels group, click Legend, and then click Show Legend at Top.

■**Tip** You can click the legend to select it, point to the legend's border, and drag it to any position in the chart area.

Resizing a PivotChart

When you create a pivot chart, it is automatically sized. You can change the chart size by manually adjusting it or by setting an exact width and height. You'll make the pivot chart a bit smaller so it doesn't overlap the pivot table:

1. Select the pivot chart.

2. On the chart area border, point to one of the sizing handles.

3. When the pointer changes to a double-headed arrow shape, press the left mouse button, and drag toward the center of the chart to make the chart area smaller (see Figure 11-23).
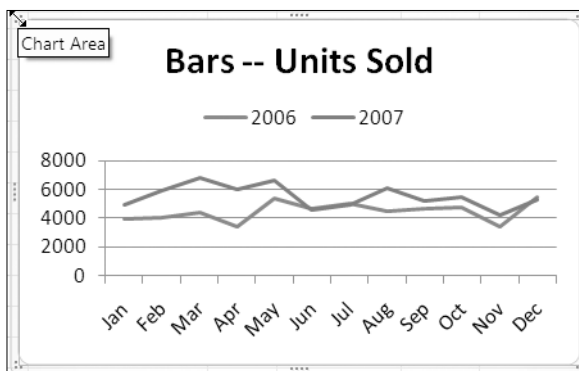
Figure 11-23. *Manually resizing the pivot chart*

■**Tip** To make the pivot chart a specific height or width, enter a value in the Shape Height or Shape Width box in the Size group on the Ribbon's Format tab.

Moving a Pivot Chart

When you use the Ribbon command to insert a pivot chart, it is inserted in the center of the worksheet window. You can drag the pivot chart to a new location on a worksheet or cut it and paste it onto a different worksheet.

You can also use a command to move the chart to a different location. You'll use a command to move the pivot chart to its own chart sheet. This will make the chart larger, and it will be easier for the sales manager to see the details in the chart.

1. Select the pivot chart.

2. On the Ribbon, under the PivotChart Tools tab, click the Design tab.

3. In the Location group, at the far right, click the Move Chart command.

■**Tip** You can right-click the chart area of a pivot chart and choose Move Chart.

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4. In the Move Chart dialog box, click New Sheet, and type **Chart_Years** as the name for the new sheet.

5. Click OK to move the pivot chart.

The pivot chart is moved to a new sheet, where there is more room to display all the elements without crowding.

Adding Data Labels to a Series

When you create a pivot chart, there are no labels on the data to show the values that the lines or bars represent. In some charts, you may want to add labels to some or all of the points on the line or to the columns or bars in the chart.

Before you send this chart to the sales manager, you'll add data labels to the lines. First you'll add data labels to all the points in both lines to see how that looks:

1. Select the pivot chart, and on the Ribbon, under the PivotChart Tools tab, click the Layout tab.

2. In the Labels group, click Data Labels.

3. In the list of Data Label options, click Above to add a data label above each point in each of the lines.

Adding the data labels has cluttered the pivot chart, and where the lines overlap, it's hard to read the numbers and to tell which number belongs to which line (see Figure 11-24).
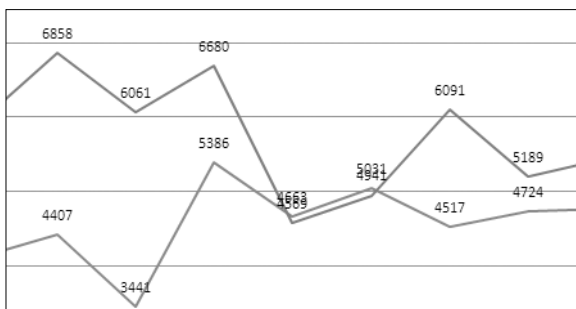
Figure 11-24. *Overlapping data labels*

Instead of having each point labeled, you want to label just the last point on each line. You'll remove the data labels and then label just the last points to show the final value for each year.

Tip To quickly add a label with the series name and value to the last point of each line, click the Design tab on the Ribbon, and in the Chart Layouts, click Layout 6. However, this layout will apply other formatting options in addition to the last point label. You could apply the layout first and then finish formatting the chart.

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1. Select the pivot chart, and on the Ribbon, under the PivotChart Tools tab, click the Layout tab.

2. In the Labels group, click Data Labels.

3. In the list of Data Label options, click None to remove the data labels.

4. Click the 2007 line to select that series. Each point in the series will be selected and will show handles.

5. Click the last point at the far right of the 2007 line. Now that point is the only one selected and is the only one that has handles (see Figure 11-25).
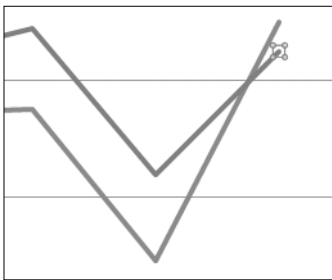
Figure 11-25. *The last point on the line is selected.*

6. On the Ribbon's Layout tab, in the Labels group, click Data Labels.

7. In the list of Data Label options, click Right to add a data label to the right of the selected data point.

8. Select the last point on the 2006 line, and add a data label to its right.

Tip You can select each data label and format it with a font color that matches the data series line.

Adding a Trend Line

Next, you'll add a trend line to each year's line to see whether sales are going up or down over the year:

1. Select the pivot chart, and click the 2006 line to select it.

2. On the Ribbon, click the Layout tab.

3. In the Analysis group, click Trendline, and then click Linear Trendline.

4. Select the 2007 line, and add a trend line to it.

The trend line for 2006 rises slightly over the year, and the 2007 trend line is downward. The trend lines have also been added to the legend as Linear (2006) and Linear (2007). To make the trend lines stand out a bit more in the chart, you can make the lines thicker and format each with a different color:

1. In the Chart Elements list on the Ribbon, select Series "2006" Trendline 1.

2. On the Ribbon, click the Format tab, and in the Shape Styles group, click Shape Outline.

3. Click Weight, and then click the 1.5-point line.

4. Click Shape Outline again, and click a color for the trend line.

5. Select the 2007 trend line, and format it with a thicker line and a different color (see Figure 11-26).
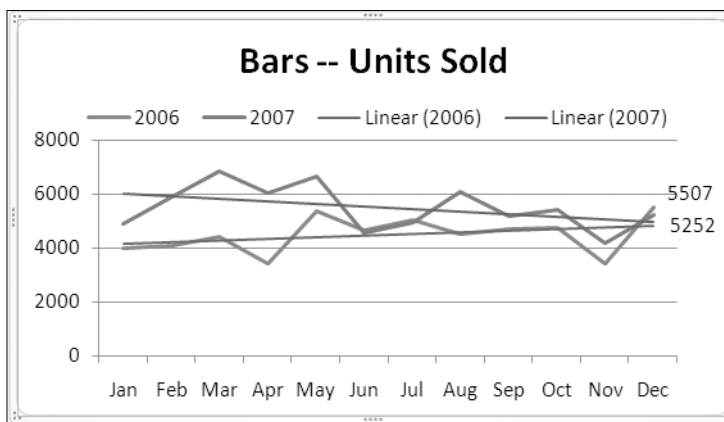
Figure 11-26. *Trend lines added to the pivot chart*

You send the updated chart to the sales manager for discussion at the sales meeting. Perhaps a plan can be devised to increase the bar sales in 2008.

Creating a Variable Chart Title

Soon after you send the chart, the sales manager calls to ask whether you can create a similar chart for each of the product types. Perhaps the other product types also have declining sales and should be discussed at the sales meeting.

Instead of creating separate charts, you'll show the sales manager how to select a different product type during the meeting. You'll change the chart title so it will show the name of the selected product type. To make the chart title variable, you'll create a formula on the pivot table worksheet, and then you'll link the chart title to that cell.

1. On the Pivot_Years worksheet, select cell F1. You'll use this cell to create a formula that shows the name of the selected product type and the rest of the text for the chart title.

2. Type an equal sign, and then click cell B1, which contains the product type name.

3. Type the rest of the formula, which is **& " -- Units Sold"**, as shown in Figure 11-27.
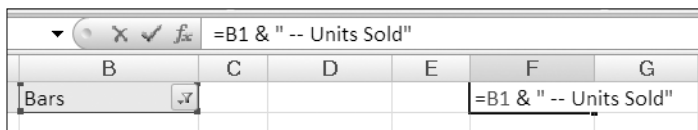
Figure 11-27. *Formula for variable chart title*

4. Press the Enter key to complete the formula, and activate the Chart_Years sheet.

5. In the pivot chart, select the chart title.

6. Type an equal sign, then activate the Pivot_Years sheet, and finally click cell F1, which contains the formula.

7. Press the Enter key to complete the link in the chart title.

   The chart title will remain the same, because Bars is still selected as the product type. The title will change when a different product type is selected.

8. To select a different product type, click the Report Filter drop-down on the PivotChart Filter Pane, and click Cookies.

The chart title changes to show that Cookies is the selected product type, and the lines show the monthly quantities of cookies sold. During the meeting the sales manager will be able to select any product type from the PivotChart Filter Pane and lead a discussion on that product type's sales results.

Instead of creating four separate charts, one for each product type, you were able to create a dynamic chart that can be changed with the click of the mouse during the meeting. It will be easier for the sales manager to work with one chart, instead of several, and you saved considerable time in preparation.

Exploring Other Pivot Chart Features

When you select a pivot chart, four tabs with pivot chart commands are available on the Ribbon on the PivotChart Tools tab. In the examples in this chapter you used some of these commands to format and design the pivot charts, and many others are left for you to explore on your own.

When you create a pivot table, experiment with the options and features that are available, and see what works best to enhance your pivot charts. For example:

- On the Layout tab, use the Data Table command to show the values that are represented in the chart in a table format. This works best if there are very few values and the table is not too crowded to be legible.

- On the Format tab, use the Shape Styles and WordArt Styles to add color, effects, and font formatting to the pivot chart. You can use these features in moderation to highlight a specific part of the pivot chart or add an eye-catching brief comment.

- On the Layout tab, use the Axes and Gridlines commands to change the appearance of these elements. You can make the grid lines a lighter color so they are less intrusive on the chart, or you can format the text and numbers on the axes to use the space effectively.

Try to keep the chart's message clear, though, and not buried under a load of unnecessary formatting and frills.

Summary

In this chapter, you created pivot charts to illustrate the data in a pivot table. This can make the data easier to understand and provides a visual comparison of the data.

First, you created a default pivot chart by pressing the F11 key. Then, you used the Chart Styles gallery and the Chart Layout gallery options to change the appearance of the pivot chart. You changed the chart type to show related items in a single column, instead of multiple columns. After making the changes, you viewed the pivot table to see that the pivot chart changes had also affected the pivot table on which it was based.

You also created a pivot chart by using the Ribbon commands and modified it to show multiple series, instead of a single series. You formatted the series to remove the markers and added a chart title. You moved the chart legend and then resized and moved the pivot chart. You added data labels to show the numeric value of the last points in each of the series lines and added trend lines to show whether sales were increasing or decreasing over each year.

Finally, you entered a formula on the worksheet and linked the chart title to that cell. This created a dynamic chart title, which will change when the chart filter is changed. With these tools, you have a powerful tool for data analysis that can be changed with one click of the mouse.

Printing and Extracting Data from a Pivot Table

In this chapter, you'll explore different ways to extract and print the data in a pivot table. These techniques can help you drill into the data and solve problems, create an attractively printed document, and pull key pieces of data from a large pivot table.

- First, you'll use the Show Details feature to extract the data that's summarized in a cell in the Values area. This may help you when troubleshooting or trying to understand the data behind the numbers.

- Next, you'll use the Show Report Filter Pages feature to create a copy of the pivot table on a separate sheet for each of the items in a selected report filter. This feature can provide a quick way to produce personalized copies of the pivot table for viewing or printing.

- Next, you'll prepare the pivot table for printing. While working with pivot tables, you may want to print the results for historical record or for distribution to others. You can adjust the pivot table print settings to ensure you achieve the best results.

- Finally, you'll use the GetPivotData function to extract a specific value from the pivot table and show that value in a summary report on another worksheet.

Using the Show Details Feature

Each number in the pivot table's Values area summarizes data from one or more records in the data source. When working with the pivot table, you may have questions about the data and want to see more detail from the records that are summarized. To see the underlying records, you can use the Show Details feature.

In Chapter 10, you created pivot table reports for the company's safety director, and you have been asked to provide further help. You'll open the file that contains the safety data and a pivot table, and then you'll assist the safety director by extracting data from the pivot table:

1. Download and open the sample file named `SafetyData12.xlsx` that is available at `www.apress.com`.

On Sheet1 there is an Excel table that contains safety data, listing the incidents that occurred at each location from January 2006 to June 2008. On the Pivot worksheet is a pivot table that summarizes the safety data.

The pivot table shows a count of lost time incidents at each location for each year (see Figure 12-1).

	A	B	C	D	E
1	Report Type	Lost Time ▾			
2					
3	**Incidents**	Column La ▾			
4	**Row Labels** ▾	**2006**	**2007**	**2008**	**Grand Total**
5	Alabama	5	5	4	14
6	California	8	6	2	16
7	Florida	7	7	5	19
8	Georgia	3	8	1	12
9	Illinois	7	5	1	13
10	Iowa	6	4	4	14
11	Montana	9	2	2	13
12	Ohio	9	5	2	16
13	Texas	8	5	3	16
14	**Grand Total**	**62**	**47**	**24**	**133**

Figure 12-1. *Lost time incidents per location per year*

The safety director will be visiting the Florida location and wants details on the five lost time incidents that have occurred at that location in 2008. To provide the information, you'll use the pivot table's Show Details feature. First you'll extract the records, and then you'll format them.

Extracting Records with the Show Details Feature

You can use the Show Details feature to quickly extract the records that are summarized in a cell in the pivot table's Values area. You'll extract the lost time incident records for Florida that were reported in 2008, then you'll format the extracted data, and finally you'll send the detailed list to the safety director:

1. In the pivot table, right-click cell D7, which contains a 5. This is the number of lost time incidents that were reported at the Florida plant in 2008.

2. In the context menu, click Show Details (see Figure 12-2).

Figure 12-2. *Show Details command*

3. The lost time incident records for 2008 in Florida are extracted to a new worksheet in the workbook (see Figure 12-3).

Figure 12-3. *Records extracted to a new worksheet*

The extracted records are copies of the original records that are in the Excel table on Sheet1. They are not connected to the original records or to the pivot table.

■**Note** If you make changes in the exported records, it will have no effect on the pivot table, and the changes will not be reflected in the original records.

Formatting the Extracted Records

The exported records are automatically formatted as an Excel table. Look at the Ribbon—you'll see that the Design tab under TableTools is active, and you'll see the table's name in the Properties group at the left end of the Ribbon. To prepare the report before sending it to the safety director, you'll improve the formatting:

1. Some of the columns may be too narrow, such as Column A in Figure 12-3, which shows number signs instead of dates. Widen the columns, if necessary, to see the data.

2. The default table style for the workbook is automatically applied when the table for the extracted records is created. To make the table easier to read, you can select a different table style from the Table Styles gallery. For example, select Table Style Light 1, and turn off the Banded Rows setting.

■**Tip** You can rename the Excel table that contains the extracted records using a descriptive name such as FloridaLostTime.

---

3. To send the extracted records to the safety director, you can move the worksheet to a new workbook. Right-click the Sheet4 sheet tab, and in the context menu, click Move or Copy.

4. In the Move or Copy dialog box, from the drop-down list at the top, select (new book), and then click OK (see Figure 12-4).
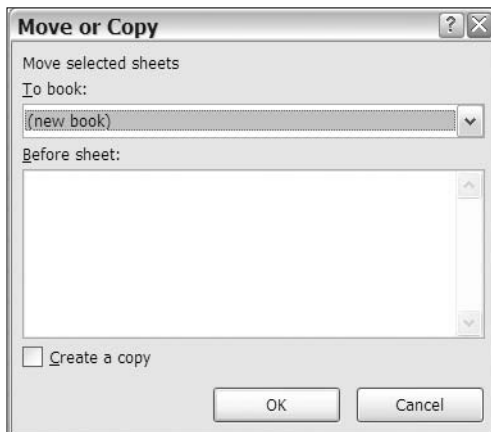
Figure 12-4. *Move or Copy dialog box*

5. Save the new workbook, and then close it and send your report to the safety director.

Changing the Default Table Style

The safety director thanked you for the report on the Florida 2008 lost time incidents and asked whether you can extract another set of records. This time, your report should include all the records for medical claim reports in 2007.

You noticed that the default table style for the workbook was automatically applied when you extracted the Florida records. You would prefer a different table style for any future extracts, so you'll change the default table style before you create the next report:

1. Activate Sheet1, and select a cell in the Excel table.

2. On the Ribbon, under the Table Tools tab, click the Design tab, and click the More button to open the Table Styles gallery.

3. Right-click Table Style Light 1, and click Set As Default (see Figure 12-5).
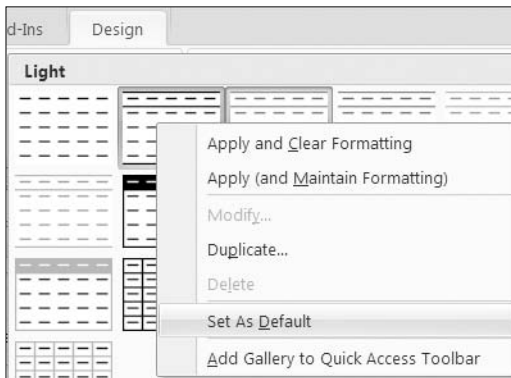
Figure 12-5. *Change the default table style.*

Now that you have changed the default table style for the workbook, you'll create the next report to show the medical claim records for 2007.

This time you try a different technique to extract the records. Instead of using the context menu command, you'll double-click the cell that summarizes the records you want to extract.

1. In the pivot table, change the report filter so the pivot table shows medical claims.

2. Double-click cell C14, which contains a 56. This is the number of medical claims incidents reported in 2007.

■**Tip** If you accidentally delete a pivot table's source data, you may be able to re-create it by using the Show Details feature. Remove any filters from the pivot table, and then double-click the Grand Total cell.

The 56 extracted records are listed in an Excel table on a new worksheet, and the new default table style has been applied (see Figure 12-6). You can move the worksheet to a new workbook and send the medical claims report to the safety director.

	Date	WkDay	Month	Year	Injury Locatio
53	2007-04-20	Fri	Apr	2007	Hands
54	2007-04-09	Mon	Apr	2007	N/A
55	2007-03-22	Thu	Mar	2007	Legs
56	2007-03-12	Mon	Mar	2007	Back
57	2007-01-26	Fri	Jan	2007	Trunk
58					

Sheet5

Figure 12-6. *Extracted records in a new workbook*

Disabling Show Details

In some pivot tables, you may want to disable the Show Details feature so you won't accidentally extract records if you double-click a cell in the Values area. You can follow these steps to turn off the feature:

1. Right-click a cell in the pivot table, and in the context menu, click PivotTable Options.

2. On the Data tab, in the PivotTable Data section, remove the check mark from Enable Show Details (see Figure 12-7), and then click OK.

PivotTable Options

Name: PivotTable1

Layout & Format	Totals & Filters	Display	Printing	Data

PivotTable Data

☑ Save source data with file
☐ Enable show details
☐ Refresh data when opening the file
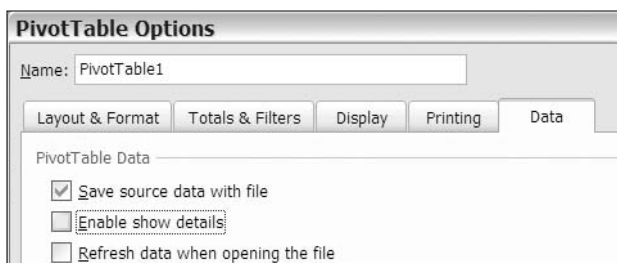
Figure 12-7. *Turn off the Enable Show Details feature.*

Using Show Report Filter Pages

Next, the safety director wants you to print a report for each plant. The report should show the number of lost time incidents per year, listed by age group, for the selected plant. First you'll modify the pivot table layout so it shows the information you need in the report. Then you'll use the pivot table's Show Report Filter Pages feature to quickly create the plant reports. In the next section, you'll prepare the reports for printing.

1. In the pivot table, move Plant to the Report Filter area, and add Age Group to the Row Labels area. The Date field is still in the Values area, showing a count of incidents, and Year is in the Column Labels area.

2. In the Report Type filter drop-down, select Lost Time (see Figure 12-8).

	A	B	C	D	E
1	Report Type	Lost Time ⫪			
2	Plant	(All) ▾			
3					
4	**Incidents**	Column L⁝ ▾			
5	**Row Labels** ▾	2006	2007	2008	Grand Total
6	18-24	12	7	4	23
7	25-34	20	18	8	46
8	35-49	21	10	8	39
9	50+	9	12	4	25
10	**Grand Total**	62	47	24	133

Figure 12-8. *Lost time incidents per age group per year*

To print the reports that the safety director needs, you could select a plant from the report filter, print the pivot table worksheet, and then select the next plant, continuing until you had printed them all. This process would take a few minutes, and it would be easy to miss one plant in the list and forget to print its report.

To make the printing process easier, you can use the Show Report Filter Pages feature. This feature automatically creates a worksheet from each item in the selected report filter. Then, you can select all the worksheets that were created and print them.

You'll use the Show Report Filter Pages feature to create the plant worksheets, and then you'll view the results.

1. Select a cell in the pivot table, and on the Ribbon, under the PivotTable Tools tab, click the Options tab.

2. In the PivotTable group, click the drop-down arrow on the Options command.

3. Click Show Report Filter Pages (see Figure 12-9).
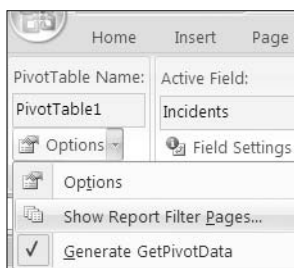
Figure 12-9. *Show Report Filter Pages command*

4. In the Show Report Filter Pages dialog box, all the report filters are listed. You want a worksheet for each plant, so select the Plant field, and then click OK (see Figure 12-10).
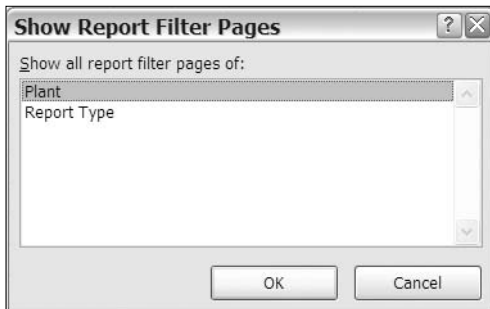
Figure 12-10. *Show Report Filter Pages dialog box*

A worksheet is created for each plant, with its name on the sheet tab. On each worksheet is a copy of the original pivot table, with the plant's name selected in the Report Type filter.

Printing a Pivot Table

Now that you have created the worksheets you need to print, you'll preview them and make any final adjustments required before printing them.

You can format and print worksheets individually or as a group, as you'll do in this section. All the sheets need the same formatting, and this will be quicker than changing each sheet individually.

1. You want to print all the plant reports together, so you'll select all the plant sheets. Click the Alabama sheet tab to select it.

2. Scroll through the sheet tabs until the Texas sheet tab is visible. Hold the Shift key, and click the Texas sheet tab. This selects, or groups, all the worksheets from the Alabama sheet to the Texas sheet.

When two or more sheets are selected, the title bar at the top of the Excel window shows [Group] at the end of the file name. The grouped sheets have white tabs, and the active sheet has bold font in its tab name (see Figure 12-11).

Figure 12-11. *The plant sheets are grouped.*

■**Caution** While the sheets are grouped, any changes you make to the active sheet are also made to the other sheets in the group.

3. You'll add a header to the worksheet, which will appear when the sheets are printed. To add this, you'll switch to Page Layout view, where you can see the header area. At the bottom of the Excel window, click the Page Layout button (see Figure 12-12).
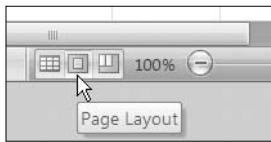
Figure 12-12. *Page Layout button*

4. To add the text for the header, click in the middle section in the header above the grid lines on the worksheet (see Figure 12-13), and type **Lost Time Incidents**.
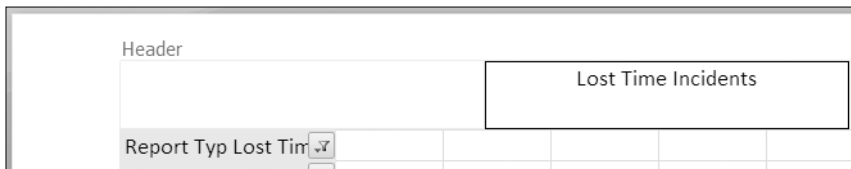
Figure 12-13. *Adding text to the header*

■**Tip** While working in the header, a Design tab is activated on the Ribbon. You can use the commands there to format the header or to add special features, such as the date or file name.

---

5. Before you print the reports, you'll use the Print Preview feature to see how the sheets will look when printed. Click the worksheet to exit the header, click the Microsoft Office Button, point to Print, and click Print Preview.

6. In the Print Preview window, click the worksheet to zoom in or out. At the bottom left of the window you can see the page count is Page 1 of 9, and at the top left of the window you can click Next Page or Previous Page to view the plant reports.

■**Tip** Use the Page Up and Page Dn keys on the keyboard to navigate through the pages in Print Preview. If you have clicked the Zoom command on the Ribbon or clicked the page to zoom in, the Page Up and Page Dn keys will move you up and down on the current page.

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7. In the Print Preview window, click Print to open the Print dialog box where you can select a printer and set any other print options, such as the number of copies or the range of pages to print. Then, click OK to print the reports, or click Cancel to close the dialog box without printing.

8. Now that you have printed the plant reports and sent them to the safety director, you can delete the grouped sheets and return to the original pivot table. To delete the grouped sheets, right-click the sheet tab for one of the grouped sheets, and click Delete. Read the warning message, and click Delete to delete the sheets that are no longer required.

Changing the Print Options

The safety director wants you to print another report for distribution. In this report, data will be shown for 2006 and 2007, showing a count of incidents for each plant per incident type for each age group.

1. Modify the pivot table so Plant and Incident Type are in the Row Labels area, Year is in the Report Filter area with 2006 and 2007 selected, Age Group is in the Column Labels area, and Date is in the Values area as count of incidents (see Figure 12-14).

	A	B	C	D	E	F	
1							
2	Year	(Multiple Items)					
3							
4	**Incidents**	Column Labels					
5	**Row Labels**		18-24	25-34	35-49	50+	Grand Total
6	⊟Alabama		10	12	11	10	43
7	Burn		1	1	1	1	4
8	Crush & Pinch			3	2	3	8
9	Cut				2		2
10	Equipment		1	3	1	1	6
11	Fall		2	2	1	2	7

Figure 12-14. *Incidents per age group and incident type at each plant*

2. Before you print the report, you'll use the Print Preview feature to see how the report will look when printed. Click the Microsoft Office Button, then point to Print, and finally click Print Preview.

3. At the bottom left of the Print Preview window you can see the page count. To see how the pages are laid out, click Next Page twice to view the entire report, and then click Close Print Preview to return to Normal view of the worksheet.

In Print Preview, a few problems were visible:

• The report was spread over three pages, but the column headings were visible only on the first page.

• When a plant's list was continued on another page, such as the Illinois list, the plant name was not repeated at the top of the second page.

• The pivot table headings show Row Labels and Column Labels, instead of the field names.

You'll change the pivot table options to fix these problems before you print the pivot table:

1. Right-click a cell in the pivot table, and in the context menu, click PivotTable Options.

2. On the Printing tab, add a check mark to Repeat Row Labels on Each Printed Page (see Figure 12-15). This will cause the labels to repeat when an item's list continues on a second page, as the Illinois list does in your pivot table.

Figure 12-15. *Printing options*

3. Also on the Printing tab, add a check mark to Set Print Titles. This will ensure that the labels at the top of the pivot table, such as the Age Groups, repeat if the pivot table is longer than one printed page.

■Tip You won't use the third option, Print Expand/Collapse Buttons When Displayed on PivotTable, in this report. However, you could use it when printing a pivot table with some items collapsed to alert readers to the hidden items.

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4. Click the OK button, and then preview the report again to see the changes.

At the top of the second page in the print preview, the Age Group labels are visible, so the Set Print Titles option had the effect you wanted. However, the Illinois label isn't repeated on the second page, although its items started on the first page and continue on the second page (see Figure 12-16).

Figure 12-16. *Top of the second page in Print Preview view*

The option, Repeat Row Labels on Each Printed Page, doesn't have any effect if the pivot table is in Compact Form layout. You'll change the report layout, and that should solve the problem.

5. Click Close Print Preview to return to Normal view of the worksheet.

6. On the Ribbon, under the PivotTable Tools tab, click the Design tab, and in the Layout group, click Report Layout. Then click Show in Outline Form.

This will create a report that's similar to the Compact Form but has the Plant and Incident Type row labels in separate columns. Also, the Row Labels and Column Labels headings have been removed from the top of the pivot table, and the field names, Plant, Incident Type, and Age Group, are now visible (see Figure 12-17).

	A	B	C	D	E	F	G
1							
2	Year	(Multiple Items)					
3							
4	**Incidents**		**Age Group**				
5	**Plant**	**Incident Type**	**18-24**	**25-34**	**35-49**	**50+**	**Grand Total**
6	⊟ **Alabama**		10	12	11	10	43
7		Burn	1	1	1	1	4
8		Crush & Pinch		3	2	3	8

Figure 12-17. *Field names visible in Outline Form*

7. Adjust the width of column A so it's just wide enough to fit the Incidents label in cell A4, and adjust the other column widths, if necessary.

8. Preview the report again to see the changes. The heading for Illinois is now shown on the second page (see Figure 12-18), because the option, Repeat Row Labels on Each Printed Page, has an effect when the report is in Outline Form.

Year	(Multiple Items)					
Incidents		**Age Group**				
Plant	**Incident Type**	**18-24**	**25-34**	**35-49**	**50+**	**Grand Total**
Illinois	Crush & Pinch		1		1	2
	Cut		1	3	2	6
	Equipment	1	1	2	1	5

Figure 12-18. *Row labels repeating in outline form*

Now that the report is set up the way you want it, you can print a copy and send it to the safety director for distribution at the upcoming meeting.

Adding Page Breaks After Items

The safety director likes the report but wants each plant's report to start on a new page. That will make it easier to focus on each plant's performance individually during the meeting. To achieve this layout, you'll change a setting in the Plant field, and you'll also hide the grand total so it won't print with the final plant report.

1. Right-click one of the plant labels, such as Alabama in cell A6, and in the context menu, click Field Settings.

2. On the Layout & Print tab, in the Print section, add a check mark to Insert Page Break After Each Item (see Figure 12-19), and then click OK.
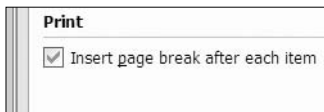
Figure 12-19. *Inserting page break after each item*

3. To remove the Grand Total row, select a cell in the pivot table, and on the Ribbon, click the Design tab.

4. In the Layout group, click Grand Totals, and click On For Rows Only. This will remove the grand total row at the bottom of the pivot table, which contains the grand totals for all the columns.

5. Preview the report again to see the changes. Each plant's report starts on a new page, and the grand total has been removed from the end of the report.

The revised report is finished, and you can print a copy and send it to the safety director.

Using the GetPivotData Function

Next, the safety director wants you to complete an incident cost report in the workbook. On Sheet 2, there is a list of plants and the number of employees at each plant. To calculate the incident cost per employee at each plant, you will extract the incident costs from the pivot table. This will create a report that combines incident costs from the pivot table with employee numbers that are not available in the pivot table.

First, you'll change the pivot table layout to show the number of incidents at each plant in 2007. Next, you'll complete the summary report by using the GetPivotData function.

1. In the pivot table, remove the Incident Type, Incidents, and Age Group fields, and add Incident Cost to the Values area.

2. In the Report Filter, select 2007 as the year (see Figure 12-20).

	A	B
1		
2	Year	2007
3		
4	**Plant**	**Sum of Incident Cost**
5	Alabama	28129
6	California	17497
7	Florida	28558
8	Georgia	52670
9	Illinois	27378
10	Iowa	32979
11	Montana	30857
12	Ohio	22248
13	Texas	36953

Figure 12-20. *Incident cost per plant in 2007*

3. Select Sheet 2 to view the summary report, where you'll fill in the incident numbers.

■**Tip** To extract data from a cell in a pivot table, you can enter a normal cell link, such as **=B5**, or you can use the GetPivotData function, which is specially designed to extract data from a pivot table. The advantage of using the GetPivotData function is that it uses criteria to ensure that the correct data is returned, even if the pivot table layout is changed.

You'll create a GetPivotData formula to extract the number of incidents at the Alabama plant. When you use a GetPivotData formula, it will continue to provide the correct information, even if the pivot table values are sorted or if more fields are added to the pivot table layout.

4. On Sheet 2, select cell D5, and type an equal sign to start the formula.

5. Activate the Pivot sheet, and click cell B5, which contains the incident cost for Alabama. Then press the Enter key to complete the formula.

A GetPivotData formula was automatically created in cell D5 (see Figure 12-21), and it returns the 2007 incident cost for Alabama from the pivot table.

	A	B	C	D	E	F	G	H
1								
2		**2007 Safety Report**						
3								
4		**Plant**	**Employees**	**Total Cost**	**Cost Per Employee**			
5		Alabama	464	=GETPIVOTDATA("Incident Cost",Pivot!$A$4,"Plant","Alabama")			
6		California	403		$ -			
7		Florida	202		$			

Figure 12-21. *GetPivotData formula in cell D5*

The first argument in the GetPivotData function is Incident Cost; this is the Value field being extracted. The second argument is Pivot!$A$4, which is a cell in the pivot table. The next argument is the field name, Plant, and the name of the selected item in that field, Alabama.

■**Caution** If the fields or items used in the GetPivotData formula's arguments are removed from the pivot table layout, the formula will return a #REF! error.

Using Cell References in GetPivotData Formulas

When GetPivotData formulas are automatically created, the formulas contain text strings that refer to the field names and item names in the pivot table. In cell D5, the formula refers to the Plant field and the Alabama item. You could complete the incident cost report by linking each plant's costs individually, but you'll change the formula so it's more flexible.

In the formula, you can replace the text strings with references to cells that contain field or item names. You'll change the formula so it refers to the plant name in column B of the incident cost report. Then, you will be able to copy the formula down, and it will show the incident cost for each plant.

1. Select cell D5, and in the formula bar, select "Alabama" in the formula, including the quotation marks.

2. Click cell B5 to add a reference to that cell in the formula (see Figure 12-22), and then press the Enter key to complete the change.
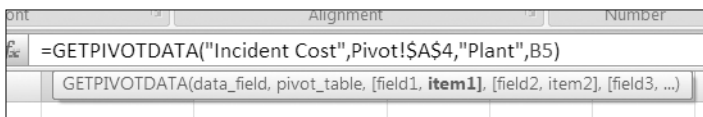
Figure 12-22. *Adding a cell reference to a GetPivotData formula*

3. Select cell D5, point to the fill handle at the bottom right of the cell (see Figure 12-23), and drag down to cell D13 to copy the formula.

Figure 12-23. *Dragging the fill handle to copy the formula down*

By changing the formula so it refers to the plant names in column B, instead of the text string Alabama, you were able to complete the incident report quickly.

The worksheet title, in cell B2, contains a formula that refers to the year selected in the pivot table's report filter. The safety director will be able to select a different year in the pivot table and see the incident costs summary with the correct title.

■**Note** A GetPivotData formula will return a #REF! error if it refers to a pivot table in another workbook and that workbook is closed.

Turning Off the Generate GetPivotData Feature

In some cases, you may want to link to a cell in a pivot table and not create a GetPivotData formula. You can turn off the feature that creates the formulas automatically, and a simple link will be created when you click a pivot table cell.

1. To turn off the Generate GetPivotData feature, select a cell in the pivot table.

■**Note** This is an application-level setting and will affect all the workbooks you open.

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2. On the Ribbon, under the PivotTable Tools tab, click the Options tab.

3. In the PivotTable group, click the arrow on the Options command, and then click Generate GetPivotData to remove the check mark (see Figure 12-24).
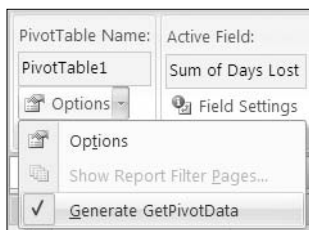
Figure 12-24. *Turning off the Generate GetPivotData feature*

■**Tip** To create a simple link to a pivot table cell without turning off the Generate GetPivotData feature, you can type an equal sign and the cell reference.

Summary

In this chapter, you used a variety of tools to extract data from your pivot tables for analysis or for printing.

You used the Show Details feature to drill into the details behind a number in the pivot table. To format the extracted records automatically, you changed the default table style for the workbook. The sheet with the extracted records can be moved to a new workbook and saved.

By using the Show Report Filter Pages feature, you created a separate pivot table for each item in a report filter. You grouped and printed the worksheets and then deleted them.

You adjusted the pivot table print settings and the field settings to achieve the best results when printing your pivot tables.

Finally, you used the GetPivotData function to extract a specific value from the pivot table and used a cell reference in the formula to make it flexible. Instead of creating individual formulas to refer to the different plants, you were able to use a single formula in all the rows.

Key Skills

The appendix contains instructions for downloading the sample files from the Apress web site and for key Excel 2007 skills. If you're new to Excel or to Excel 2007, you can follow these steps to perform the tasks that are not described in detail in the book's chapters.

Downloading the Sample Files

In each chapter, one or more sample files are provided for you to use while doing the exercises. To download the sample files from the Apress web site, go to www.apress.com, and search for the title of this book or for the ISBN: 1-59059-890-3. On the web page for this book, in the Book Extras section, click the link Source Code (see Figure A-1), and then click the link Download Source Code File.
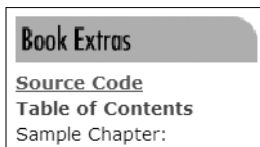
Figure A-1. *Source Code link*

The download will be a zipped file that contains the sample Excel 2007 files and other files used in the chapter instructions.

Saving a File

Follow these steps to save a workbook for the first time using the default file format for Excel 2007:

1. In Excel, click the Microsoft Office Button at the top left of the Excel window (see Figure A-2).

Figure A-2. *Microsoft Office Button*

2. Point to Save As, and then click Excel Workbook (see Figure A-3) to open the Save As dialog box.
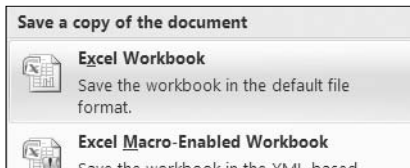
Figure A-3. *Excel Workbook format*

3. In the Save As dialog box, select a folder from the Save In drop-down list.

4. Name the file, and then click the Save button.

Converting a File from an Earlier Version

If you open a file you created in an earlier version of Excel, the file will open in Compatibility Mode, and you will see [Compatibility Mode] in the Excel title bar after the file name. Any pivot tables in the workbook that were created in the earlier version of Excel, or in Compatibility Mode, will not be fully functional with all the Excel 2007 features, such as label or date filters.

Follow these steps to convert the file to Excel 2007 format:

1. Make a backup copy of the file. When you use the Convert feature, the original workbook is deleted and cannot be restored.

2. Open the file in Excel 2007, and click the Microsoft Office Button.

3. Click Convert (see Figure A-4).
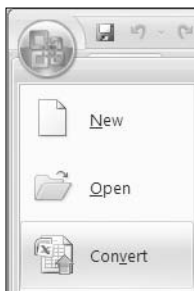
Figure A-4. *Convert command*

4. If a message about converting the workbook appears, read it, and then click OK to convert the workbook or click Cancel.

5. After the workbook as been converted, a message appears to tell you that the conversion was successful. Read the message, and then click Yes to close and reopen the workbook or click No.

After the file has been closed and reopened, it is in Excel 2007 format, and [Compatibility Mode] has disappeared from the title bar. The pivot tables will have full functionality, with all the Excel 2007 features available.

Sharing Files with Users of Earlier Versions

You may need to send your files to someone who is using an earlier version of Excel. So that they can open the file, you can save the file in a format they can use, or the person with the earlier version can download and install a converter from the Microsoft web site.

To save the file in an earlier version of Excel, follow these steps:

1. Open the file in Excel 2007, and click the Microsoft Office Button.

2. Point to Save As, and then click Excel 97-2003 Workbook (see Figure A-5).
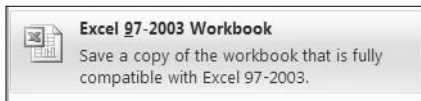
Figure A-5. *Excel 97-2003 Workbook command*

3. In the Save As dialog box, select a folder from the Save In drop-down list.

4. Name the file, and then click the Save button.

To download the file converters, visit the Microsoft web site at www.microsoft.com, and search for the Microsoft Office Compatibility Pack for Word, Excel, and PowerPoint 2007 File Formats. Follow the instructions there to download and install the converters.

Turning On the ScreenTips Feature

If ScreenTips do not appear when you point to commands in the Ribbon, the feature may have been turned off. Follow these steps to turn the feature on:

1. Click the Microsoft Office Button, and then click Excel Options.

2. In the list of categories, click Popular.

3. In the Top Options for Working with Excel section, click the drop-down list for ScreenTip Style (see Figure A-6).
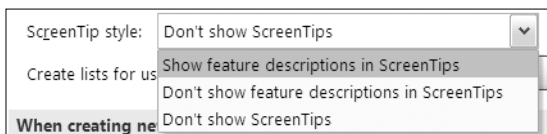
Figure A-6. *ScreenTip Style drop-down list*

4. Click Show Feature Descriptions in ScreenTips to see the command names and descriptions in the tips, or click Don't Show Feature Descriptions in ScreenTips to see only the command names.

5. Click OK to close the Excel Options dialog box.

Turning On Contextual Tips

If contextual tips do not appear when you point to a cell in a pivot table, the feature may have been turned off for that pivot table. Follow these steps to turn the contextual tips feature on:

1. Right-click a cell in the pivot table, and click PivotTable Options.

2. On the Display tab, add a check mark to Show Contextual Tooltips.

3. Click OK to close the PivotTable Options dialog box.

Adjusting Regional Options

The Regional options on your computer may be different from those on the computer used for the examples in this book. This could affect settings such as date format, currency symbols, and digit grouping in numbers.

Follow these steps to view the Regional options on your computer with a Windows XP operating system:

1. On the Windows taskbar, click the Start button, and click Control Panel.

2. Double-click Regional and Language Options.

3. Click the Regional Options tab to view the settings.

4. Click Customize to view the detailed settings.

Adjusting Security Settings

The security settings on your computer may be different from those on the computer used for the examples in this book. This could affect the messages you see, especially when connecting to external data.

Follow these steps to view the security settings on your computer:

1. In Excel, click the Microsoft Office Button, and click Excel Options.

2. In the list of categories, click Trust Center.

3. Click Trust Center Settings to open the Trust Center dialog box. Click a category in the list at the left to view the settings for that option. For more information on the settings, click the question mark button at the top right of the dialog box.

4. Click the Trusted Locations category to see the trusted locations on your computer. These are folders that are treated as secure sources, and the Trust Center security features won't check them. You can add folders to this list by clicking the Add New Location button.

■**Tip** Store the sample files for this book in a trusted location, and you won't receive security warnings when you open or connect to these files.

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5. Click OK to close the Trust Center dialog box, and click OK to close Excel Options.

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