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Paul McFedries

Microsoft® Excel® PivotTables and PivotCharts

2nd Edition

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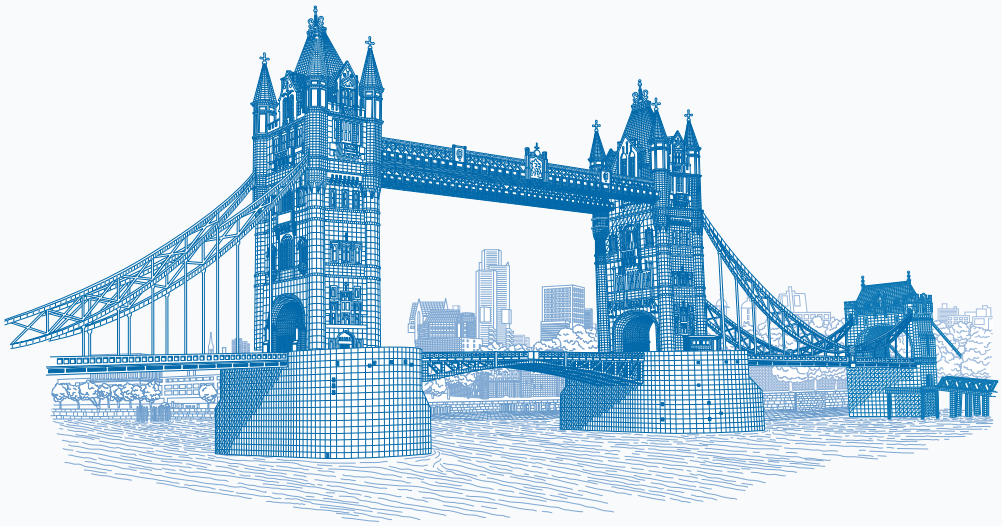
Your visual blueprint™ for creating dynamic spreadsheets

Excel® PivotTables and PivotCharts

Your visual blueprint™ for creating dynamic spreadsheets, 2nd Edition



by Paul McFedries

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In order to get this information to you in a timely manner, this book was based on a pre-release version of Microsoft Office 2010. There may be some minor changes between the screenshots in this book and what you see on your desktop. As always, Microsoft has the final word on how programs look and function; if you have any questions or see any discrepancies, consult the online help for further information about the software.

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Paul McFedries is a full-time technical writer. Paul has been authoring computer books since 1991 and he has more than 70 books to his credit. Paul's books have sold more than three million copies worldwide. These books include the Wiley titles *Teach Yourself VISUALLY Excel 2010; Excel 2010 Visual Quick Tips; Teach Yourself VISUALLY Windows 7;* and *Teach Yourself VISUALLY Office 2008 for Mac*. Paul is also the proprietor of Word Spy (www.wordspy.com and twitter.com/wordspy), a Web site that tracks new words and phrases as they enter the language. Paul invites you to drop by his personal Web site at www.mcfedries.com or to follow him on Twitter at twitter.com/paulmcf.

Author's Acknowledgments

It goes without saying that writers focus on text, and I certainly enjoyed focusing on the text that you'll read in this book. However, this book is more than just the usual collection of words and phrases. A quick thumb-through of the pages will show you that this book is also chock full of images, from sharp screen shots to fun and informative illustrations. Those images sure make for a beautiful book, and that beauty comes from a lot of hard work by Wiley's immensely talented group of designers and layout artists. They are all listed in the Credits section on the previous page, and I thank them for creating another gem. Of course, what you read in this book must also be accurate, logically presented, and free of errors. Ensuring all of this was an excellent group of editors that included project editor Kristin DeMint, copy editor Kim Heusel, and technical editor Namir Shammas. Thanks to all of you for your exceptional competence and hard work. Thanks, as well, to acquisitions editor Jody Lefevere for asking me to write this book.

How to Use This Visual Blueprint Book

Who This Book Is For

This book is for advanced computer users who want to take their knowledge of this particular technology or software application to the next level.

The Conventions in This Book

1 Steps

This book uses a step-by-step format to guide you easily through each task. Numbered steps are actions you must do; bulleted steps clarify a point, step, or optional feature; and indented steps give you the result.

2 Notes

Notes give additional information — special conditions that may occur during an operation, a situation that you want to avoid, or a cross reference to a related area of the book.

3 Icons and Buttons

Icons and buttons show you exactly what you need to click to perform a step.

4 Extra or Apply It

An Extra section provides additional information about the preceding task — insider information and tips for ease and efficiency. An Apply It section takes the code from the preceding task one step further and allows you to take full advantage of it.

5 Bold

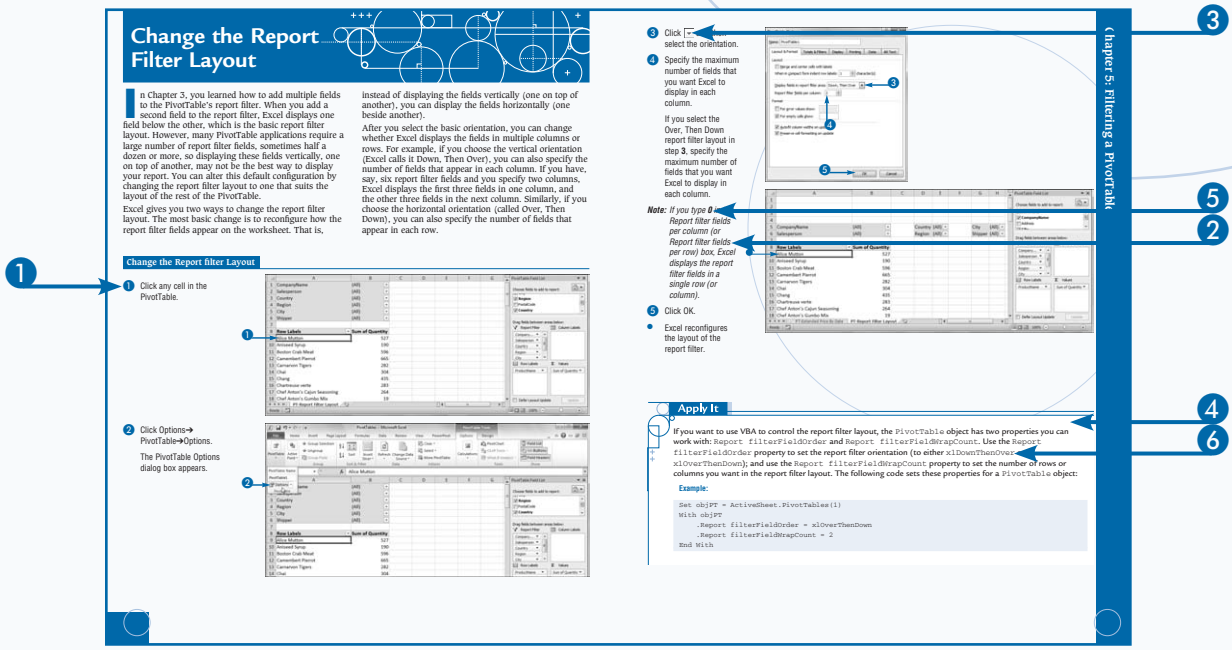
Bold type shows text or numbers you must type.

6 Italics

Italic type introduces and defines a new term.

7 Courier Font

`Courier font` indicates the use of scripting language code such as statements, operators, or functions, and code such as objects, methods, or properties.



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Understanding Data Analysis

The PivotTables and PivotCharts that you learn about in this book are part of the larger category of *data analysis*. You can get the most out of these tools if you have a broader understanding of what data analysis is, what its benefits are, and what other tools are available to you.

Data analysis is the application of tools and techniques to organize, study, reach conclusions and sometimes also make predictions about a specific collection of information. A sales manager might use data analysis to study the sales history of a product, determine the overall trend, and produce a forecast of future sales. A scientist might use data analysis to study experimental findings and determine the statistical significance of the results. A family might use data analysis to find the maximum mortgage it can afford or how much it must put aside each month to finance retirement or the kids' education.

The point of data analysis is to understand information on some deeper, more meaningful level. By definition, *raw data* is a mere collection of facts that by themselves tell you little or nothing of any importance. To gain some understanding of the data, you must manipulate it in some meaningful way. This can be something as simple as finding the sum or average of a column of numbers or as complex as employing a full-scale regression analysis to determine the underlying trend of a range of values. Both are examples of data analysis, and Excel offers a number of tools — from the straightforward to the sophisticated — to meet even the most demanding needs.

Data

The "data" part of data analysis is a collection of numbers, dates, and text that represents the raw information you have to work with. In Excel, this data resides inside a worksheet and you get it there in one of two ways: You enter it by hand or you import it from an external source. You can then either leave the data as a regular range, or you can convert it into a table for easier data manipulation.

Data Entry

In many data analysis situations, the required data must be entered into the worksheet manually. For example, if you want to determine a potential monthly mortgage payment, you must first enter values such as the current interest rate, the principal, and the term. Manual data entry is suitable for small projects only, because entering hundreds or even thousands of values is time consuming and can lead to errors.

Imported Data

Most data analysis projects involve large amounts of data, and the fastest and most accurate way to get that data onto a worksheet is to import it from a non-Excel data source. In the simplest scenario, you can copy the data — from a text file, a Word table, or an Access datasheet — and then paste it into a worksheet. However, most business and scientific data is stored in large databases, and Excel offers tools to import the data you need into your worksheet. See Appendixes B and C for more about these tools.

Table

After you have your data in the worksheet, you can leave it as a regular range and still apply many data analysis techniques to the data. However, if you convert the range into a *table*, Excel treats the data as a simple flat-file database and enables you to apply a number of database-specific analysis techniques to the table. To learn how to do this, see Chapter 2.

Data Models

In many cases, you perform data analysis on worksheet values by organizing those values into a *data model*, a collection of cells designed as a worksheet version of some real-world concept or scenario. The model includes not only the raw data, but also one or more cells that represent some analysis of the data. For example, a mortgage amortization model would have the mortgage data — interest rate, principal, and term — and cells that calculate the payment, principal, and interest over the term. For such calculations, you use formulas and Excel's built-in functions, as described in Appendix A.

Formulas

A *formula* is a set of symbols and values that perform some kind of calculation and produce a result. All Excel formulas have the same general structure: an equals sign (=) followed by one or more *operands* — which can be a value, a cell reference, a range, a range name, or a function name — separated by one or more *operators*, which are the symbols that combine the operands in some way, such as the plus sign (+) and the multiplication sign (*). For example, the formula `=A1+A2` adds the values in cells A1 and A2.

Functions

A *function* is a predefined formula that is built in to Excel. Each function takes one or more inputs — called *arguments,* such as numbers or cell references — and then returns a result. Excel offers hundreds of functions and you can use them to compute averages, determine the future value of an investment, compare values, and much more.

What-If Analysis

One of the most common data analysis techniques is *what-if analysis*, where you set up worksheet models to analyze hypothetical situations. The what-if part comes from the fact that these situations usually come in the form of a question: "What happens to the monthly payment if the interest rate goes up by 2 percent?" "What will the sales be if you increase the advertising budget by 10 percent?" Excel offers four what-if analysis tools: data tables, Goal Seek, Solver, and scenarios.

Data Tables

A *data table* is a range of cells where one column consists of a series of values, called *input cells*. You can then apply each of those inputs to a single formula, and Excel displays the results for each case. For example, you can use a data table to apply a series of interest rate values to a formula that calculates the monthly payment for a loan or mortgage.

Goal Seek

You use Excel's Goal Seek tool when you want to manipulate one formula component — called the *changing cell* — in such a way that the formula produces a specific result. For example, in a *break-even analysis*, you determine the number of units of a product that you must sell for the profit to be 0. Given a formula that calculates profit, you can use Goal Seek to determine the break-even point.

Solver

You use Excel's Solver tool when you want to manipulate multiple formula components — called the *changing cells* — in such a way that the formula produces the optimal result. For example, you can use Solver to tackle the so-called *transportation problem*, where the goal is to minimize the cost of shipping goods from several product plants to various warehouses around the country.

Scenarios

A *scenario* is a collection of input values that you plug into formulas within a model to produce a result. The idea is that you make up scenarios for various situations — for example, best-case, worst-case, and so on — and Excel's Scenario Manager saves each one. Later you can apply any of the saved scenarios, and Excel automatically applies all the input values to the model.