Microsoft

Inside OUT

The ultimate, in-depth reference
Hundreds of timesaving solutions
Supremely organized, packed
with expert advice
Companion eBook

Microsoft Office:
2013 Edition

Ed Bott *Award-winning technology author and journalist* | **Carl Siechert** *Microsoft Office and Windows expert*

Microsoft Office: 2013 Edition

Inside OUT

Conquer Microsoft Office—from the inside out!

You're beyond the basics, so dive right into Microsoft Office—and really put these productivity tools and services to work! This supremely organized reference packs hundreds of timesaving solutions, troubleshooting tips, and workarounds. It's all muscle and no fluff. Discover how the experts tackle Office—and challenge yourself to new levels of mastery.

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- Organize and edit complex documents with Microsoft Word
- Enhance Microsoft PowerPoint presentations with rich media
- Handle data with the Microsoft Excel Quick Analysis tools
- Get organized with Microsoft OneNote using expert techniques
- Save, share, and sync documents and settings with SkyDrive
- Use Microsoft Access, Publisher, and Lync in smarter ways

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Microsoft Office

For Intermediate and Advanced Users

About the Authors

Ed Bott has written more than 25 books on Microsoft Office and Windows, including *Windows 7 Inside Out* and *Microsoft Office 2010 Inside Out*. He's an award-winning journalist for leading industry publications.

Carl Siechert specializes in writing and producing product documentation for the personal computer industry. He's coauthored dozens of books, including *Windows 7 Inside Out* and *Microsoft Windows XP Networking and Security Inside Out*.

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- Office 365 Home Premium
- Office 365 Small Business Premium
- Office 365 ProPlus
- Office Professional 2013
- Office Home and Business 2013
- Office Home and Student 2013

Microsoft

Microsoft Office Inside Out: 2013 Edition

Ed Bott
Carl Siechert

To Claudette Moore, "The Hammer"

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Part 5: Outlook

Part 6: PowerPoint

Part 7: OneNote

Part 8: Other Office programs

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Introduction

MICROSOFT OFFICE is the most popular collection of application software ever, and for good reason. The programs in the Office family allow you to perform just about any task that involves words, numbers, charts and graphs, slide decks, email, and more.

With Office 2013, Microsoft has polished the entire collection and introduced tight connections to cloud-based services, which allow you to sync settings between multiple devices just by signing in with an Office account and using the SkyDrive and SkyDrive Pro services from Microsoft.

Office 2013 introduces one new wrinkle that might confuse some longtime Office veterans. In addition to the conventional one-copy-per-PC license, Office 2013 is available as a subscription product, which includes the rights to install and use the full suite of Office software on multiple devices. We encourage you to read Chapter 1 carefully for a full overview of what's new and changed in this version.

Who this book is for

We wrote this book with a broad audience in mind: students, small business owners, professionals, information workers, and anyone else who's interested in maximizing their productivity at home or at work. Our goal is to help you become productive with the core applications in Office 2013—Word, Excel, Outlook, PowerPoint, and OneNote. In addition, we provide thorough introductions to three additional Office programs—Access, Publisher, and Lync.

Assumptions about you

We assume that most of our readers have already used at least one previous version of Office and are proficient (or at least comfortable) in one or two Office programs. For each program, we provide a quick overview that helps you understand its core concepts, and we concentrate on explaining the similarities between the products so that you can transfer skills you learn in one Office program to another.

This book does not cover advanced topics of interest to IT professionals and developers, so you won't find detailed discussions of deployment and macros.

How this book is organized

This book gives you a comprehensive look at features that are common to all the Office programs and then moves through each of the individual programs for a more detailed examination.

Part 1, "Office fundamentals," describes the various Office editions and explains how to install the program. After that, we explain features and procedures that are common to all Office programs: the ribbon and other user interface components, working with text, and working with pictures and other graphics.

Part 2, "Office on the desktop and in the cloud," shows you how to manage your Office files, whether you store them on a local hard drive, on a network drive, or in the cloud. We then show how Office integrates with SkyDrive and other online services, and how to get the most out of an Office 365 subscription.

Part 3, "Word," begins our detailed looks at individual Office programs. In this part, we cover essential Word information and then dive deeper into topics such as working with long documents, using templates and themes, using tables, tracking changes and review comments, creating blog posts, and combining documents and data with mail merge.

Part 4, "Excel," shows how to navigate around a worksheet and how to perform calculations. But it's not just numbers on a grid: we explain how to create compelling charts and how to use tables, PivotTables, slicers, and the new Quick Analysis tool to view numeric data in new and useful ways.

Part 5, "Outlook," describes the program that some people spend most of their day using. Outlook sends and receives email, manages your contacts database, maintains a calendar of meetings and other activities, and keeps track of your tasks and other to-do list items. We explain how to use each of these features to the fullest.

Part 6, "PowerPoint," explains how to create captivating slide presentations. We describe the various views in PowerPoint and explain how to use slides to show pictures, videos, animations, transitions, and other objects as well as tried-and-true bulleted lists. We show how to present a slide show on a single computer, with a second monitor or projector, or over the Internet.

Part 7, "OneNote," describes the underappreciated program for collecting all manner of notes in a freeform (yet easily searchable and retrievable) style. We show how to fill a notebook with information, tag it, and search for it. We explain how to integrate OneNote and

Outlook for managing messages, contacts, meetings, and tasks. We also show how to use shared notebooks stored in the cloud, an incredibly useful capability whether you're sharing with others or with your various devices.

Part 8, "Other Office programs," introduces three other programs included with Office 2013. First up is Publisher, a desktop publishing program for creating brochures, catalogs, and other printed materials. Then we take a look at Lync, a unified communications program with which you can connect to others via instant messages, audio and video messaging, and shared desktops. We wrap up with an overview of Access, the database program that now creates Access web apps.

Acknowledgments

Producing a book of this size requires teamwork and coordination, and meeting our quality standards takes time and concentration. For this edition, we were fortunate to work with a familiar team made up of total pros.

We were delighted when the publishers told us we could work with our longtime collaborator Curtis Philips of Publishing.com, who performed the production and layout tasks for this book. He and his team of experts, including technical reviewer and copy editor John Pierce and proofreader Andrea Fox, made invaluable improvements to the manuscript.

Our good friend and literary agent Claudette Moore did her usual magic with contracts and bookkeeping. Thanks to her efforts, we were able to concentrate on the content without being distracted by business details.

Carl's colleagues at LittleMachineShop.com endured his extended absences and grouchier-than-usual demeanor. Their support, along with that of our long-suffering wives, made it possible to bring you this book and keep a bit of our sanity.

A big thank you to the Microsoft Office team for producing a new version that was solid enough for us to use in writing this book. And we tip our hat to the team responsible for SkyDrive, which we used to share files and notes throughout the production process.

Most importantly, thanks to you for buying this book. We're grateful for your support.

—Ed Bott and Carl Siechert, April 2013

Support and feedback

The following sections provide information on errata, book support, feedback, and contact information.

Errata & support

We've made every effort to ensure the accuracy of this book and its companion content. Any errors that have been reported since this book was published are listed on our Microsoft Press site:

http://aka.ms/Office2013InsideOut/errata

If you find an error that is not already listed, you can report it to us through the same page.

If you need additional support, email Microsoft Press Book Support at *mspinput@microsoft.com*.

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Inside Office 2013

Microsoft Office is, without question, the single most widely used piece of productivity software in the world today. More than 1 billion (that's billion with a b) people actively use one of the many versions of Office that Microsoft has released in the past two decades.

If you're one of those longtime Office users, you'll find that Office 2013 feels new and greatly improved but without feeling dramatically different. That's both reassuring and somewhat puzzling.

At first glance, Office 2013 looks slightly different, with a flatter user interface than in previous editions. Also, most actions in individual programs are accompanied by subtle animations. Beyond that, you'll find little that's obviously new. There are no new desktop programs or web apps—Word, Excel, PowerPoint, Outlook, OneNote, and the rest of the Office family are still around. File formats have changed in only minor ways between Office 2010 and 2013. A few rarely used utilities have been retired and will not be missed.

The most important new feature, which seamlessly connects you to online file storage, builds on the familiar SkyDrive and SharePoint products. The utility that syncs local and cloud-based files is a retooled version of the venerable Groove utility, rebranded as SkyDrive Pro. Microsoft's well-established App-V and Click-to-Run technologies power the web-based installer that is at the heart of the new subscription-based Office.

And yet…

With Office 2013, Microsoft has taken its cloud services, desktop programs, and browser-based apps and fused them into a product that feels unified and natural. Small but significant improvements are scattered through the individual Office programs. Collectively, they add up to a greatly improved experience, all without altering the fundamental character of Office.

The basic challenge of Office 2013 remains, however. Depending on which edition you purchase, you have at your fingertips as many as eight full-featured programs with a sweeping range of capabilities. You have to use both sides of your brain (the analytical and the artistic), sometimes in the same program at the same time. And you're expected to remember the ins and outs of a program you might use only once every few weeks or months.

It's little wonder that most of us are comfortable with one or two Office programs and flail around in frustration when we need to use one of the others. When you're using a program that's less familiar to you, you're so busy trying to figure out how to accomplish basic tasks that you don't even think about time-saving strategies and advanced features and capabilities.

That's where we come in. Our goal in this book is to deliver exactly what you need to become productive with the core applications in Office 2013—Word, Excel, Outlook, PowerPoint, and OneNote. We provide a cram course in each program, covering the essential features and technologies and suggesting productivity-enhancing expert tips to help you work smarter. We cover three additional Office programs—Publisher, Lync, and Access—in fewer pages, but with enough detail, we hope, to propel you firmly ahead on the road to productivity.

We're confident that most of our readers have at least a passing familiarity with Office, so we won't waste your time with trivial details. In this introductory chapter, we offer a whirlwind tour of what's new and what's changed from your previous Office edition, along with a basic road map to this book.

What's new? What's changed?

The single biggest change in Office 2013 involves the decision you must make when you upgrade: will you opt for a traditional perpetual license, which allows you to pay a single price and install the software on a single device? Or will you choose a more flexible Office 365 annual subscription, which allows you to use the same Office 2013 programs on up to five devices and includes additional cloud-based services?

The economics and logistics of that decision are not obvious, which is why we break the decision down in as much detail as possible in "Choosing an Office edition" in Chapter 2, "Installing and updating Office 2013."

Although the installation and update processes are different in the subscription and installer-based Office 2013 versions, the programs themselves are functionally identical.

In this release, the Office ribbon continues its evolution. This interface element was introduced in Office 2007 (for every program except Outlook). It was refined (and added to Outlook) in Office 2010 and is now a part of every program in the Office family, with the exception of the difficult-to-categorize Lync communications suite.

The ribbon replaces the drop-down menus and icon-laden toolbars in earlier Office editions with tabs that stretch horizontally across the top of the program window. Each tab contains commands that are organized into groups. Figure 1-1, for example, shows the Home tab in Word 2013.
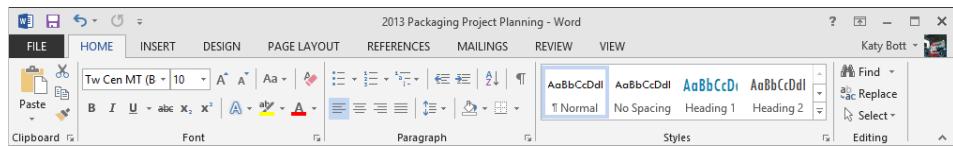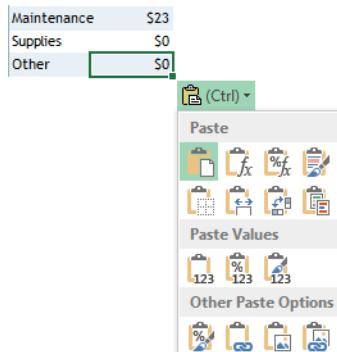

Figure 1-1 The ribbon interface combines menus and toolbars into a single horizontal arrangement.

Two other elements in Figure 1-1 are worth calling out. The Quick Access Toolbar, above the ribbon at the left, is a row of shortcuts that you can customize easily. At the right of the tab headings is the name of the currently signed-in user, which lets you know at a glance which SkyDrive accounts and other Office-connected services you'll see when you click File to open or save a document.

Other additions to the Office interface allow you to choose formatting options from a gallery and preview their effect on your live data before committing to a change.

In all Office programs, paste options allow you to adjust formatting on the fly rather than using Undo in a series of trial-and-error attempts.

If you skipped Office 2010, you'll notice significant improvements in the ribbon. For starters, it's customizable. Using the dialog box shown in Figure 1-2, you can remove command groups from the ribbon, create your own custom command groups and tabs, rename existing groups and tabs, and export your custom settings for reuse on a different Office 2013 installation.
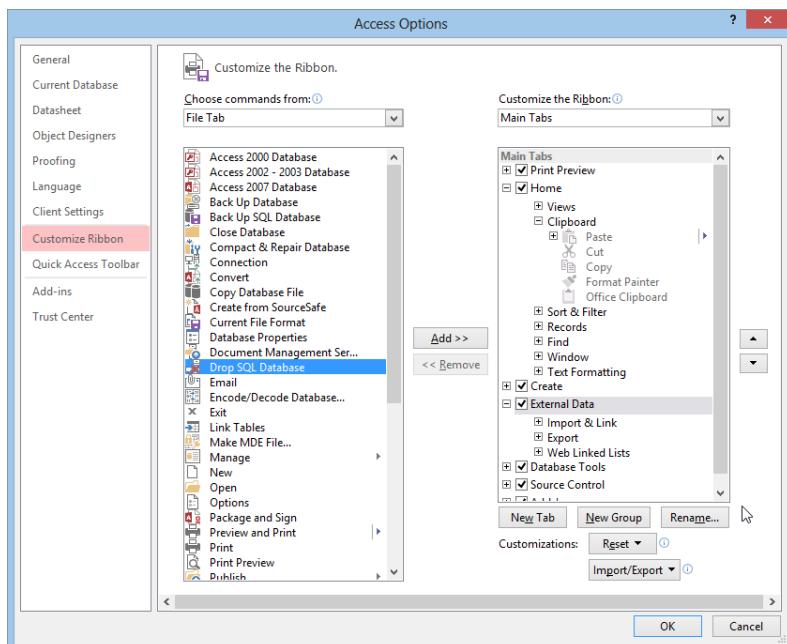

Figure 1-2 If you don't like the default ribbon in an Office program, change it by adding, removing, and rearranging tabs and individual commands.

With one exception, clicking a heading on the ribbon displays the tab of the same name, a horizontal strip of commands and options related to that task. The exception is File, which always appears in the first position on the left side and is distinguished by a color background that matches the color of the program's icon.

In Office 2013, clicking File opens the Office Backstage view, which occupies the entire program window and consolidates multiple tasks into a single location without forcing you to open multiple dialog boxes. This feature was introduced in Office 2010 and is significantly enhanced in Office 2013.

Click any of the options that appear, menu-style, along the left side of the window to fill Backstage view with the details for that task. Figure 1-3, for example, shows the Share tab

in PowerPoint 2013, with options to share a slide show by attaching it to an email message, by creating a link to a SkyDrive folder, or by posting it to a social network that you've connected to your Office account (Facebook, in this example).
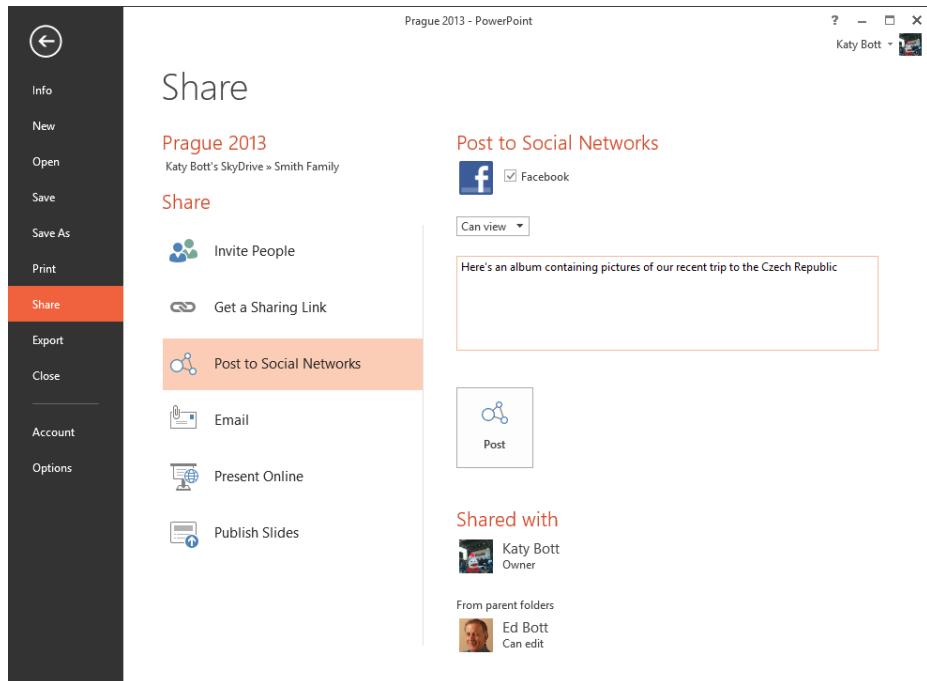

Figure 1-3 Clicking the File heading opens Backstage view, which consolidates common options and previews in a single location using the entire Office window.

For a detailed look at the Office 2013 ribbon, Backstage view, Live Preview, and other interface elements, see Chapter 3, "Using and customizing the Office interface."

All of the Office programs we cover in this edition (with the exception of OneNote) include significant improvements for inserting and editing graphics and online videos. The picture-editing tools are noteworthy, especially for anyone who skipped over Office 2010. You can use them to crop a photo, remove distracting background elements, and add artistic effects without having to leave the document window. Figure 1-4 shows an original photograph transformed by applying the Light Screen effect.
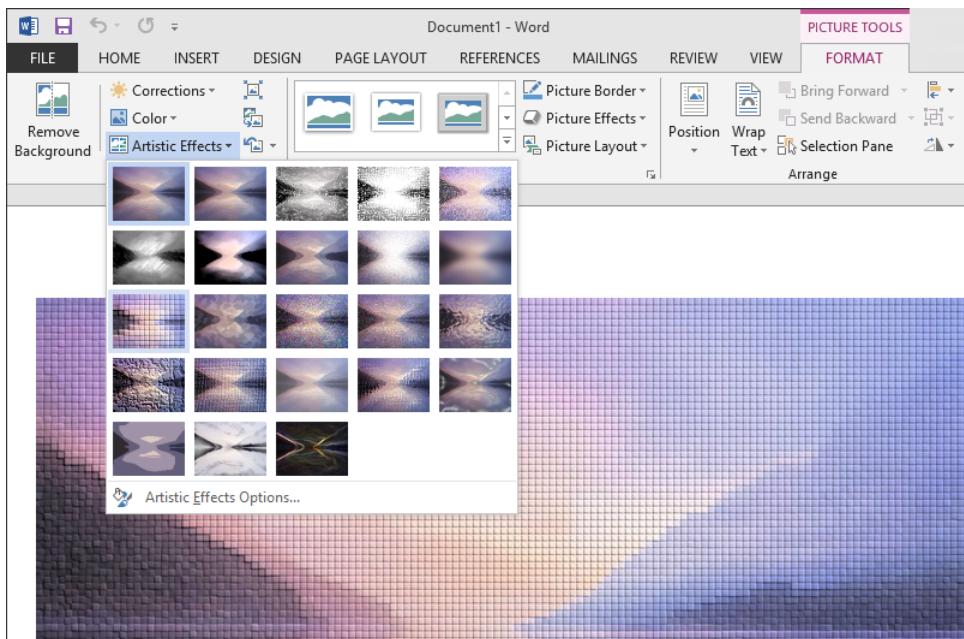
Figure 1-4 Image-editing tools available throughout Office 2013 allow you to crop and transform pictures without leaving the document window.

You'll find comprehensive instructions on how to insert and edit photos, screen shots, Smart-Art graphics, and other visual elements in Chapter 5, "Working with graphics and pictures."

Using Office Web Apps

Some (but not all) of the programs in Office 2013 have corresponding online versions that allow you to create, save, view, share, and collaborate on documents, workbooks, presentations, and notebooks.

You don't need to own Office 2013 or have an Office 365 subscription to use these Office Web Apps; all you have to do is sign in with a free SkyDrive account. You can create, view, and edit files in the default formats associated with document-centric programs in Office 2013—Word, Excel, PowerPoint, and OneNote. You can do simple edits using the web app associated with a document format; the option to open the file in the full program works easily if Office 2013 is already installed; you can "stream" the program to run on any computer running Windows 7 or Windows 8 without permanently installing it. Figure 1-5 shows the two editing options for a PowerPoint presentation stored in a SkyDrive folder.
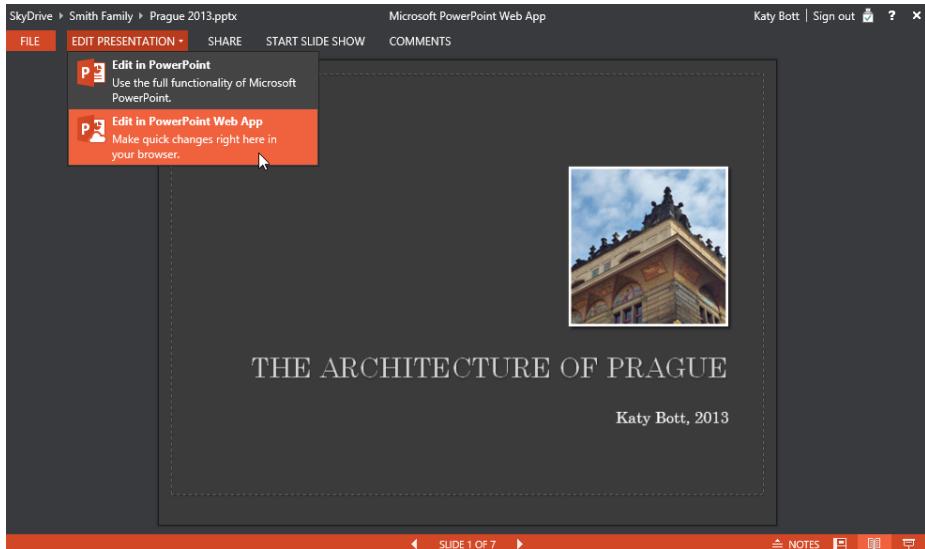
Figure 1-5 Documents stored in a SkyDrive folder can be opened for editing directly in the browser or in the associated Office program, if it's installed.

Two or more users can edit documents simultaneously when those files are stored on Sky-Drive or a SharePoint server; this capability is also available with SkyDrive Pro when used with an Office 365 Small Business Premium subscription.

You'll find more details about these tools and techniques in Chapters 7 and 8, which document the SkyDrive and SkyDrive Pro/SharePoint options, respectively.

A field guide to Office 2013 editions

If you want to install Office on a new PC or upgrade an earlier Office version on an existing PC, you have an impressive—and potentially confusing—array of options. The prices, licensing terms, and features for each edition vary significantly. Making the right choice is more complicated than simply selecting a retail box.

Subscription editions

Subscribing to Office 365 provides access to the following Office 2013 desktop applications: Word, Excel, PowerPoint, OneNote, Outlook, Access, and Publisher, as well as Lync in business editions. These programs, which are available in their desktop versions on Windows 7 and Windows 8, are installed and updated online but run from your local hard disk, with or without an Internet connection, exactly like the Office desktop programs you use today.

The biggest difference between Office 365 and the traditional installer-based versions of Office 2013 is that the subscription-based Office programs are licensed on a per-user basis rather than on a per-device basis. That's an important distinction in a world where you are likely to use multiple computing devices: a desktop PC, a notebook, a tablet, and a smartphone.

Office 365 is available in two new editions intended for consumers and small businesses:

- **Office 365 Home Premium** is intended for use by families. A single annual subscription payment covers all family members. The primary user manages the subscription and can assign Office 2013 rights to up to five devices (Windows PCs or Macs). Those devices can then be used by any family member who signs in with his or her individual Microsoft account to install and run Office 2013 programs. The primary user also gets an additional 20 GB of SkyDrive storage and 60 minutes of worldwide Skype calling.

- **Office 365 Small Business Premium** is intended for use by businesses with up to 10 employees (although it actually supports up to 25 users). The annual subscription payment covers a single user, who in turn is allowed to install and run Office 2013 programs on up to five PCs or Macs. The subscription also includes a 25 GB mailbox (on a Microsoft-hosted server running Microsoft Exchange), shared file storage of 10 GB (plus 500 MB per user), and online communications using Lync.

Businesses with more than 10 employees can acquire Office 2013 Professional Plus as part of enterprise-class Office 365 subscriptions. Students, faculty, and staff at universities can get Office 365 University, which is identical to Home Premium but allows installation on only two devices.

For a full list of features and pricing for all available Office 365 plans, see *http://bit.ly/ Office365plans*.

Retail editions

Through traditional retail distribution channels (in brick-and-mortar stores or online), you can choose from three editions:

- **Office Home and Student 2013** includes Word, Excel, OneNote, and PowerPoint. The license agreement allows you to install and activate a retail copy of this edition on a single PC. (That's a significant change from this edition of Office 2010, which included the right to install the software on up to three PCs.) The license agreement

specifically prohibits using this edition "for commercial, nonprofit or revenue-generating activities."

● **Office Home and Business 2013** includes all the programs from the Home and Student edition and adds Outlook. Here, too, licensing options allow installation on a single PC.

● **Office Professional 2013** is the top-of-the-line retail Office edition, intended for consumers and small businesses. It includes the programs in the Home and Business edition and adds Publisher and Access.

For instructions on how to install and activate a retail copy of Office 2013, see Chapter 2.

Any of the preceding editions may also be sold by a PC manufacturer and preinstalled on a new computer.

> **What's happened to Office Starter Edition?**
> With Office 2010, Microsoft experimented with a free Starter Edition, available only with new PCs. This edition was considerably more limited than any retail Office edition and included only two ad-supported, limited-feature programs, Word Starter and Excel Starter. This edition was unceremoniously dumped with the introduction of Office 2013.

Volume-license editions

Businesses that have volume-license agreements with Microsoft can choose from two available Office editions:

● **Office Standard** includes Word, Excel, OneNote, PowerPoint, Outlook, and Publisher.

● **Office Professional Plus** is the high-end enterprise offering, containing the same set of programs as Office Standard and adding Access and Lync.

INSIDE OUT   **How to check which Office edition is installed on a Windows PC**

If you're not certain which Office edition is installed on your PC, here's how to check.

Open any Office program (this example uses Microsoft Word, but the steps are identical for other programs). Click File, and then click Account. At the right side of the window you'll see a block of information like the one shown here.

Product Information

Office

Product Activated
Microsoft Office Professional Plus 2013
This product contains

About Word
Learn more about Word, Support, Product ID, and Copyright information.

In addition to information about your edition and the programs in it, this display also allows you to see whether your installation has been activated. Click the About *Program Name* button to see more detailed information about the program you're currently using, including the full version number and whether you're running a 32-bit or 64-bit copy. This dialog box also includes links to support resources and allows you to read the license agreement associated with your edition.

Note

In this book we do not cover stand-alone programs such as Microsoft Project and Microsoft Visio, which are part of the Office family but aren't included in any packaged Office edition. We also do not cover the enterprise-only InfoPath program.

Word 2013

Word is arguably misnamed. Yes, after all these years it still processes words with alacrity, allowing you to enter and edit blocks of text and check your spelling and grammar as you go. But modern versions of Word include design and page-layout tools that make it suitable for medium-strength desktop publishing and web design jobs. We cover the full range of Word features in the three chapters devoted to Word in this book.

The Navigation pane, an optional interface element that appears at the left side of the Word editing window when enabled, continues to evolve. As in previous versions, you can use headings in your document to quickly move between sections. The search box at the top of the Navigation pane allows you to find words and phrases easily, especially in long documents. Figure 1-6 shows search results using the page browser; an alternate view allows you to see the same results organized as snippets of text so that you can see them in context.
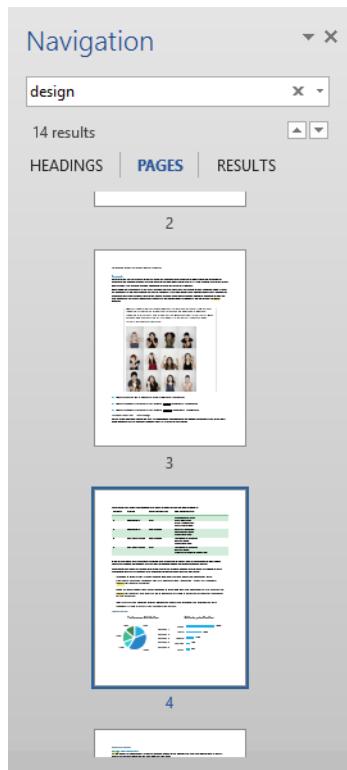
Figure 1-6 When you use the Navigation pane to search for a word or phrase, you can view the results as thumbnail pages (shown here) or as text snippets.

The most significant change in Word 2013 is the new Design tab on the ribbon, which consolidates colors, fonts, and document formatting options in a single location. The most welcome addition, shown in Figure 1-7, is the Set As Default button, which allows you to save a group of options for use with all new documents you create.
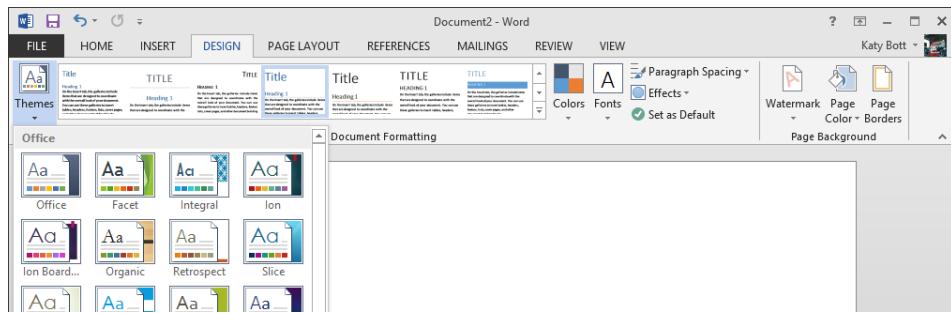
Figure 1-7 The Design tab, new in Word 2013, consolidates an assortment of document formatting options and allows to save them for reuse.

Like its Office-mates, Word also includes an assortment of document recovery features that allow you to roll back to one of five previous AutoSaved versions or recover from an unexpected crash.

You can also restore a draft version of a document even if you close Word without saving it.

Excel 2013

Shockingly, many Office users have no idea that Excel can be used for many things other than budgets and simple lists. If your only exposure to Excel is the monthly ritual of adding your department's numbers to the corporate budget template, we have some surprises for you. In the three chapters we devote to Excel, we cover the fundamentals of formulas, formatting, and filtering data; we also help you unlock the magic of PivotTables, which sound intimidating but are easy to master and incredibly useful once you learn how they work.

The most obvious improvement in Excel 2013 is a Quick Analysis tool that allows you to quickly choose data analysis and presentation options for a selection. You can apply conditional formatting, create charts, or use visualizations to add a graphic dimension to an otherwise impenetrable mass of raw numbers. Figure 1-8 shows this tool in action.
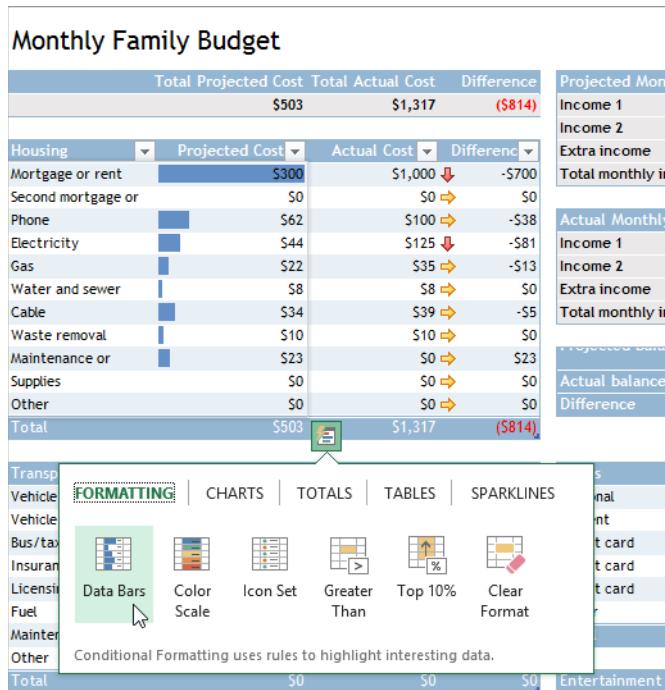
Figure 1-8 Clicking the Quick Analysis icon in the lower-right corner of a selection allows you to instantly preview and apply any of these analytical options.

For cutting large data sets into manageable workloads, Excel 2013 offers several useful tools: use PivotTables, for example, to quickly and easily create crosstabs and summaries of even very large data sets with just a few clicks. In traditional lists or PivotTables, you can create search filters to help find relevant items.

Outlook 2013

For many Office users (especially those in corporations that live and die by email), Outlook is the first program they open in the morning and the last one they shut down at night. In between, Outlook helps you juggle email, meetings, appointments, tasks, and contact information for friends, family, clients, coworkers, and anyone else. In this release, Outlook

is significantly less cluttered than its predecessors. The comparison is especially striking if you've skipped over Outlook 2010.

First and foremost, Outlook is an email client program that helps you compose, send, receive, and manage messages using most standard email protocols. You can combine multiple accounts into a single set of folders. As with its predecessor, Outlook 2013 supports up to 15 Microsoft Exchange accounts in a profile; in Outlook 2007 and earlier, each Exchange account required a separate profile.

Beneath the typographically refreshed navigation pane on the left are four large labels representing the most common Outlook views: Mail, Calendar, People, Tasks. Clicking any of those targets changes the view to display the selected type of information.

But those targets also have a second function. Allow the mouse pointer to hover over Calendar, for example, to display what Microsoft's designers call a "peek" at your upcoming appointments. Figure 1-9 shows an example.
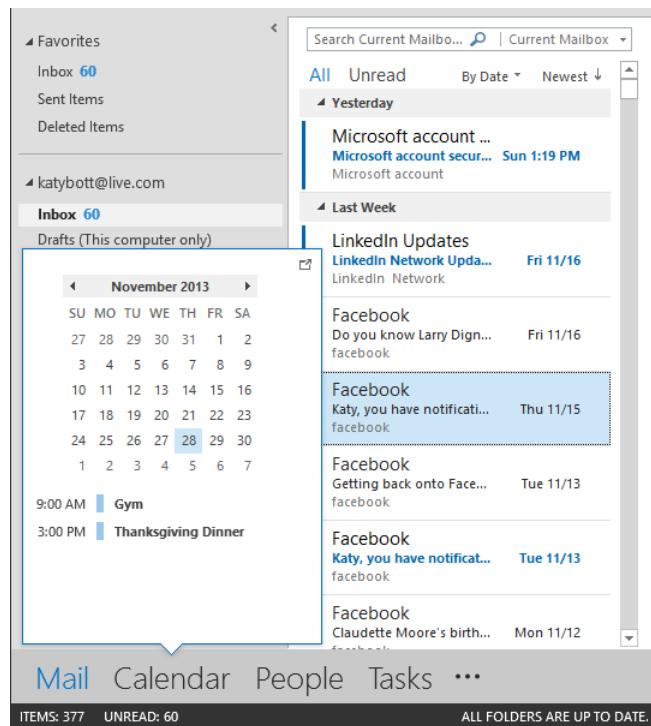
Figure 1-9 Allowing the mouse pointer to hover over Calendar displays this "peek," where you can scroll through upcoming appointments without leaving Mail.

You can scroll through the calendar, looking at events for individual days, and open any event for editing without leaving your email window. The People peek lets you pin favorite contacts to the peek list, so you can look up an address or compose an email with a click or two. The peek goes away shortly after you move the mouse away, although you can dock any or all of the three panes to the right of the Outlook window.

Outlook 2013 includes some refinement on the conversation view that debuted in Outlook 2010, most notably the animations that create a sliding effect when threaded conversations open and close. Use the Ignore button to automatically delete conversations (including future responses) in which you're an uninterested bystander trapped on the Cc line.

To manage the deluge of email, you can create rules that fire automatically when a new incoming message meets certain conditions. We'll also explain how to create Quick Steps, which automate repetitive message-handling tasks. These "macros" appear by default as buttons on the Message tab and can also be assigned to keyboard shortcuts, as shown in Figure 1-10.
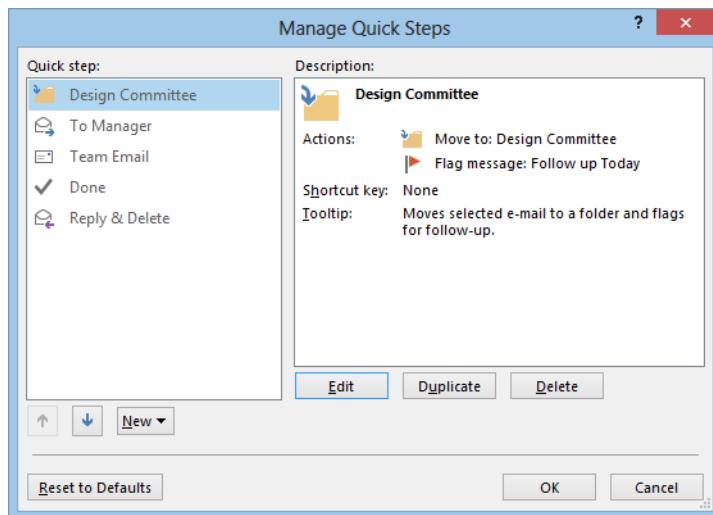
Figure 1-10 Quick Steps are an effective way of taking the drudgery out of routine message-management tasks.

Outlook 2013 also recognizes the increasing importance of keeping track of interactions with friends, family, and coworkers over time. The People pane at the bottom of every email message and contact displays a complete message history for the message sender or contact, along with connections to social networking sites, RSS feeds, status updates, meetings, and so on.

PowerPoint 2013

Most audiences groan when they realize you're about to launch into a PowerPoint presentation. But slide shows don't have to be deadly or dull—in fact, as we demonstrate, they don't even have to be slide shows, in the traditional sense. Using PowerPoint 2013, you can create photo albums and web-based presentations that don't include a single bullet point.

PowerPoint 2013 contains a new set of tools that allow you to find video clips online or in your SkyDrive account and embed them into a slide. Figure 1-11 shows these tools in action.
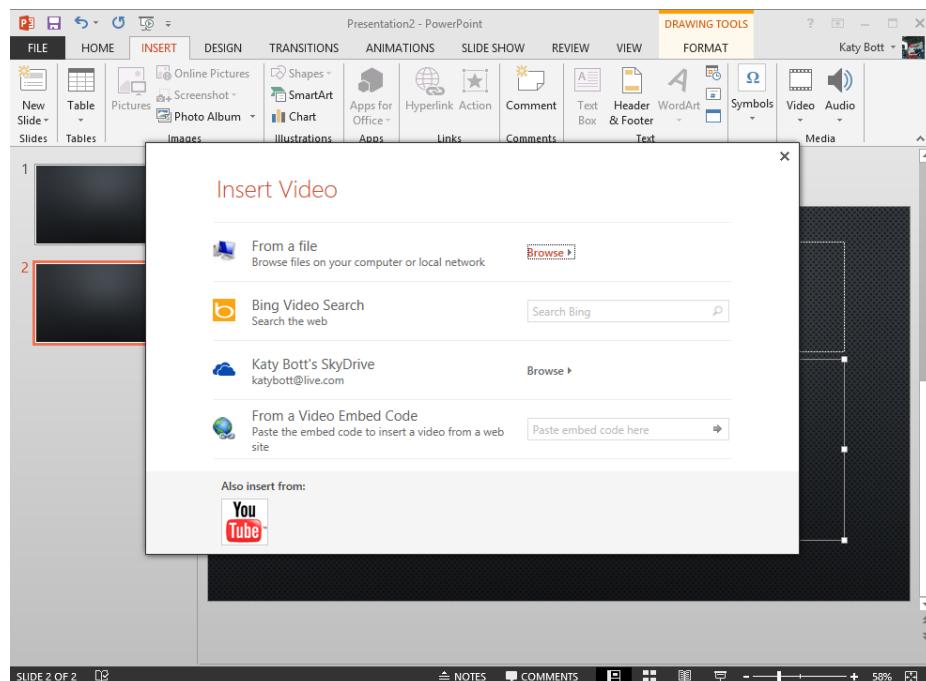
Figure 1-11 New video-editing tools in PowerPoint 2013 allow you to embed clips from online storage, including your SkyDrive account.

If you already have a solid background in building presentations with PowerPoint, we'll show you the subtle (and, in some cases, dramatic) changes in familiar tools. You can now open multiple presentations in separate windows, for example, making it easier to copy slides in one presentation for use in another. You can also divide complex presentations into sections for easier management. We'll also demonstrate how to use animations and slide transitions to best effect.

OneNote 2013

Although OneNote has been a part of Office since the 2003 release, many experienced Office users are unlikely to have spent even a minute with it. That's because for its first seven years, OneNote was included only with the Home and Student and Ultimate editions of Office. Beginning with Office 2010, OneNote was reassigned as one of the core programs installed with every retail and enterprise Office edition.

If you've never seen OneNote, we strongly recommend that you spend some time with this incredibly useful and versatile free-form note-taking program. If you're already familiar with OneNote, you'll want to pay special attention to its connections with SkyDrive. When you open a notebook from SkyDrive, OneNote syncs its contents automatically to your PC so that changes you make on one device are available on every other device you use.

Figure 1-12 shows a group of notebooks open from SkyDrive with the option to share a notebook readily available.
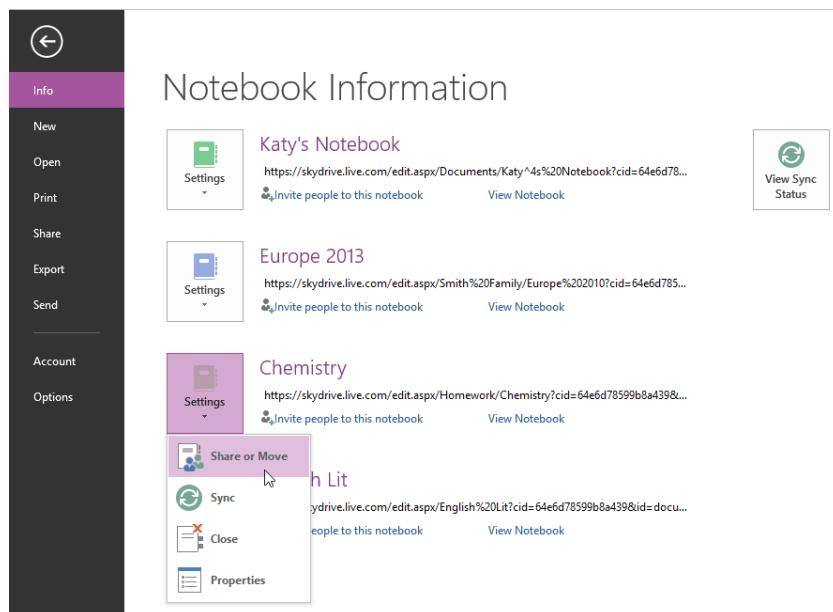
Figure 1-12 Storing a notebook on SkyDrive gives you fail-safe backups as well as the ability to share a notebook with others.

And yes, to use a bit of Microsoft jargon, we eat our own dog food. The authors and editors who worked on this book kept notes, ideas, links to outside websites, reference information, formatting instructions, and more in a shared notebook stored on SkyDrive.

Your familiarity with Word pays off in OneNote as well: you can apply formatting for headings and body text in OneNote by using the same keyboard shortcuts that work in Word. OneNote also offers excellent tools for searching and organizing information in your notebooks. That capability is invaluable when your collection of notebooks becomes too big for you to find random bits of information simply by flipping through pages.

In this book, we devote three chapters to OneNote. If you're new to the program, we recommend that you start at the beginning and read all the way through to learn some of the subtleties of this unusual but powerful program.

Other Office 2013 programs

Planning this book involves some trade-offs. Our emphasis is on the four core applications that are common to all Office editions, as well as Outlook, which is in all of the business editions.

That leaves three "lesser" applications fighting for attention. Our solution is to devote a chapter to each of these three programs, with enough information to help you get started with each one:

- **Publisher 2013** is a design tool that's specialized for creating things that don't fit neatly into Word's page-based model: invitations, brochures, flyers, cards, and so on.

- **Lync 2013** allows you to communicate with coworkers using voice, video, and messaging, with the option to share screens and collaborate on projects in real time.

- **Access 2013** manages data, big and small, in applications that keep simple lists as well as front ends to large Microsoft SQL Server databases on server farms.

Analyzing data with tables and charts

E XCEL is no one-trick pony. Yes, the program works wonders with number-crunching tasks, but its rows and columns are also tailor-made for managing data that goes beyond basic bean counting. With minimal effort, you can keep address lists and membership rosters, track temperatures and rainfall, monitor stock prices, and record your performance in whatever sport or hobby you happen to fancy.

In this chapter, we look at the many options you have for entering, storing, sorting, filtering, cross-tabulating, and summarizing that data.

We also explain how to highlight trends and patterns in a sea of gray data to make it more interesting. You can use conditional formatting to add colors and custom text treatments, and you can make at-a-glance analysis easier by inserting tiny trend lines and markers called *sparklines*.

When that's not enough to tell a story, you can turn a collection of data into an elegant, information-based graphic and let *it* do the talking. In this chapter, we look at Excel's extraordinarily versatile charting engine and explain how to communicate a situation or a series of events in a single visual impression, with only a few well-chosen words required.

Building a visually compelling, information-rich chart from a series of numbers and dates is part science, part art. The science involves recognizing which series of data on a worksheet represent the patterns you're trying to describe. The art is in arranging and fine-tuning the colors, shading, shapes, labels, and other pieces of your chart so that they tell the story most effectively.

Sorting out your data analysis options

The single most important new feature of Excel 2013 is the Quick Analysis tool, which puts formatting, charting, tables, and other options in an easy-to-access place. You can still create charts, insert tables, and add totals manually, but this tool dramatically simplifies the process.

To get started, select a range (at least two cells containing data) and click the Quick Analysis tool that appears in the lower-right corner of the selection. (You can also press Ctrl+Q, or right-click and click Quick Analysis on the shortcut menu. If you choose the latter option, you can select a single cell and Excel will expand the selection to include the current region.)

Figure 13-1 shows the Quick Analysis tool in action. Each of the five headings at the top of the box leads to a selection of options that vary slightly depending on the selection.

Figure 13-1 The Quick Analysis tool consolidates five common options in one place and offers live previews of their effects.

To use the Quick Analysis tool, choose a category and then move your mouse pointer over any of the options available beneath the headings. When you let the pointer hover over an option, the selection changes to preview the effect of that option. If you like what you see,

click to apply the selected option; otherwise, move the mouse pointer to another option (or click a different category).

The following list briefly describes each of your options and what you should and shouldn't expect from each one using Quick Analysis. We provide in-depth details about these analytical options in the remainder of this chapter.

- **Formatting**   The options available here depend on whether your selection contains only text or whether it also includes numbers. For all-text ranges, the options allow you to identify duplicates, unique values, or entries that include a specific text string. If you've included even a single number, you'll see the choices shown earlier in Figure 13-1, which allow you to add data bars, color scales, and icons or highlight specific values.

- **Charts**   Excel offers a selection of one-click charts based on the type of selection you make. The list of available chart types is determined by whether you've chosen a single column of values or multiple columns with labels. The preview chart appears above the Quick Analysis tool, as shown in this example, based on a selection that includes a column of labels and a column of data.

- **Totals**   Assuming you've selected a range that includes numbers, you can add automatically calculated totals in the row beneath your selection, or in the column to its

right. For numbers, the list of options scrolls to the right, with row-wise choices listed first, followed by their column-wise equivalents.

- **Tables** This category is a bit of a catch-all; it includes regular tables and PivotTables (we cover the former in much more detail shortly, and the latter in Chapter 14, "Excel inside out"). What you see beneath the Tables heading will always include the Table option and, depending on the arrangement of data, one or more buttons allowing you to preview various PivotTable layouts. Note that in this example, because the Excel window extends to the bottom of the screen, the Quick Analysis tool appears above its launcher.

- **Sparklines**   These clever little analytical elements are mini-graphs that appear in a single cell to summarize the trend in a row of data. They're most useful when you want an at-a-glance comparison of a series of numbers in multiple dimensions. We'll discuss sparklines in more detail shortly.

The Quick Analysis tool offers a useful starting point, but it's far from perfect. For anything but the simplest tasks, you'll need to fine-tune the settings and formatting for tables and charts.

Using tables to organize and analyze data

You can create a simple database just by entering data into rows, with or without headings to indicate what's in each column. For example, you can enter a list of names in column A and then, in column B, enter a phone number alongside each name. As long as that list remains short and simple enough to scan quickly, you don't need to do anything more.

But lists have a way of growing, and even moderately long lists can benefit from sorting, searching, filtering, outlining, and summarizing. When you turn a range into a table, Excel provides several tools that simplify the way you work with even long, detail-rich collections of data.

Microsoft introduced the concept of tables (not to be confused with data tables, which are a rarely used relic of Excel's distant past) in Excel 2007. Tables are roughly equivalent to the feature known as *lists* in Excel 2003, but with more sophisticated formatting options. If you open a worksheet originally created in Excel 2003 that contains one or more lists, you'll need to manually convert those lists to tables.

The quickest way to turn a range into a table is to click Table in the Tables group on the Quick Analysis tool, which applies the default table format to the current selection or region immediately. If you want more control over the process, select the range (or select any cell within the range if the list is in a self-contained region), and then click Table in the Tables group on the Insert tab. (You can also use the keyboard shortcut Ctrl+T or Ctrl+L.) You'll see the Create Table dialog box shown in Figure 13-2.

Had we instead clicked Format As Table, in the Styles group on the Home tab, we would have been required to select a table style before seeing the Format As Table dialog box (which is identical to the Create Table dialog box shown in Figure 13-2). Using either keyboard shortcut applies the default table style. (We discuss table styles in much greater detail in the next section, "Formatting tables with table styles.")

	A	B	C	D	E	F	G	H
1	Date	Open	High	Low	Close	Volume	Adj Close	
2	26-Dec	12.31	12.79	12.31	12.79	140267200	12.79	
3	24-Dec	11.67	12.4	11.67	12.4	91734900	12.4	
4	21-Dec	11.55	11.86	11.47	11.86	94489300	11.86	
5	20-Dec	11.74	11.8	11.58	11.77	47750100	11.77	
6	19-Dec	11.79	11.85	11.62	11.73	54884700	11.73	
7	18-Dec	11.48	11.68	11.4	11.67	61810400	11.67	
8	17-Dec	11.16	11.41	11.14	11.39	46983300	11.39	
9	14-Dec	11.27	11.27	11.03	11.1	36933500	11.1	
10	13-Dec	11.46	11.5	11.21				
11	12-Dec	11.52	11.56	11.43		Create Table	? ×	
12	11-Dec	11.51	11.58	11.4		Where is the data for your table?		
13	10-Dec	11.41	11.53	11.41		=$A$1:$G$18		
14	7-Dec	11.27	11.5	11.26		☑ My table has headers		
15	6-Dec	11.26	11.31	11.19				
16	5-Dec	11.32	11.4	11.18		OK	Cancel	
17	4-Dec	11.4	11.44	11.23				
18	3-Dec	11.56	11.7	11.4	11.41	47746300	11.41	
19								

Figure 13-2 Even though we selected only a single cell, Excel expands the selection to include the entire data-containing region, as defined by blank rows and columns.

If the selected range contains a header row with labels for each column, you should select the My Table Has Headers check box. (For the most part, Excel correctly detects the presence of headers, but it can be confused by some configurations, so check this setting before you proceed.) Clicking OK applies the default table style to the range and makes a few other changes. The end result looks like this:

	A	B	C	D	E	F	G
1	Date ▾	Open ▾	High ▾	Low ▾	Close ▾	Volume ▾	Adj Close ▾
2	26-Dec	12.31	12.79	12.31	12.79	140267200	12.79
3	24-Dec	11.67	12.4	11.67	12.4	91734900	12.4
4	21-Dec	11.55	11.86	11.47	11.86	94489300	11.86
5	20-Dec	11.74	11.8	11.58	11.77	47750100	11.77
6	19-Dec	11.79	11.85	11.62	11.73	54884700	11.73
7	18-Dec	11.48	11.68	11.4	11.67	61810400	11.67
8	17-Dec	11.16	11.41	11.14	11.39	46983300	11.39
9	14-Dec	11.27	11.27	11.03	11.1	36933500	11.1
10	13-Dec	11.46	11.5	11.21	11.27	35443200	11.27
11	12-Dec	11.52	11.56	11.43	11.47	31099900	11.47
12	11-Dec	11.51	11.58	11.4	11.49	36326900	11.49
13	10-Dec	11.41	11.53	11.41	11.47	26025200	11.47
14	7-Dec	11.27	11.5	11.26	11.48	38404500	11.48
15	6-Dec	11.26	11.31	11.19	11.24	31065800	11.24
16	5-Dec	11.32	11.4	11.18	11.31	33152400	11.31
17	4-Dec	11.4	11.44	11.23	11.31	37760200	11.31
18	3-Dec	11.56	11.7	11.4	11.41	47746300	11.41

Defining a range as a table makes the following changes, some of which are not immediately apparent. (We explain these changes in more detail shortly.)

- Column widths expand as needed to display header text in full. If column headers are not included, Excel adds generic headers—Column1, Column2, and so on.

- A down arrow appears to the right of each column heading, allowing quick sort and filter operations.

- When any cell or range within the table is selected, a Design tab with customization options appears on the ribbon, under the Table Tools heading.

- A default name is assigned to the table; you can change the name to a more descriptive one by using the Table Name box in the Properties group on the Table Tools Design tab.

- Any cell addresses used in formulas you add within the table are automatically converted to structured references. (For an explanation of how structured references work, see "Adding formulas and totals to a table," later in this chapter.)

- A triangular handle in the lower-right corner of the table allows you to quickly add rows or columns to the table, preserving formatting and copying formulas automatically.

Tables offer a tremendously versatile way to work with large and small amounts of data. In fact, as we explain in Chapter 14, a table can serve as the source of data for a PivotTable report. You can also export a table to a SharePoint list or to a PivotDiagram in Visio (a member of the Office family we don't discuss in this book), using the Export command in the External Table Data group on the Table Tools Design tab.

After you convert a range into a table, you can fine-tune its appearance with custom formatting, expand its size in either direction, and add totals.

What if you change your mind and want to remove the table features, turning the data back into a plain ol' range? Easily done: Click to select any cell within the table and then click Convert To Range, in the Tools group on the Table Tools Design tab. Or right-click any cell in the table and then click Table, Convert To Range on the shortcut menu. This option removes the special treatment of header rows and converts formulas back to ordinary cell references. Any special formatting (such as banded rows) remains in place and must be changed manually unless you remove the formatting first, using the Clear option at the bottom of the Table Styles gallery on the Design tab.

INSIDE OUT   **Don't lose track of headings when you scroll**

**One of the hidden advantages of creating a table from a range is a small but signifi-
cant improvement in scrolling. If your list is long enough that scrolling through the
list causes the Header row to scroll up and off the screen, Excel has an elegant fix. The
headings from the table replace the column headings in the worksheet frame, com-
plete with the arrow that allows you to sort and filter, as shown here.**

	Date	Open	High	Low	Close	Volume	Adj Close	H
10	13-Dec	11.46	11.5	11.21	11.27	35443200	11.27	
11	12-Dec	11.52	11.56	11.43	11.47	31099900	11.47	
12	11-Dec	11.51	11.58	11.4	11.49	36326900	11.49	
13	10-Dec	11.41	11.53	11.41	11.47	26025200	11.47	
14	7-Dec	11.27	11.5	11.26	11.48	38404500	11.48	

**The effect is similar to what happens if you freeze the top row of the table, but it
requires no effort from you beyond creating the table in the first place.**

Formatting tables with table styles

Table styles apply formatting—colors, fonts, borders, and shading—to the region that
makes up a table. Excel offers a selection of 60 options in the Table Styles gallery (plus a
None option that removes table formatting). These options are divided into Light, Medium,
and Dark groups that correspond to the intensity of the colors used. You can choose from
the entire list in either of two ways:

- Click Format As Table in the Styles group on the Home tab. If the current range or
  region has not already been defined as a table, this option displays the Format As
  Table dialog box after you make a selection.

- Click the arrow to the right of the Table Styles gallery (or below the Quick Styles but-
  ton) in the Table Styles group on the Table Tools Design tab.

Figure 13-3 shows the Table Styles gallery in operation. As with other Office galleries, allow-
ing the mouse pointer to rest over an option in the gallery previews the formatting in the
table. (It also shows the name of the style in a ScreenTip.)
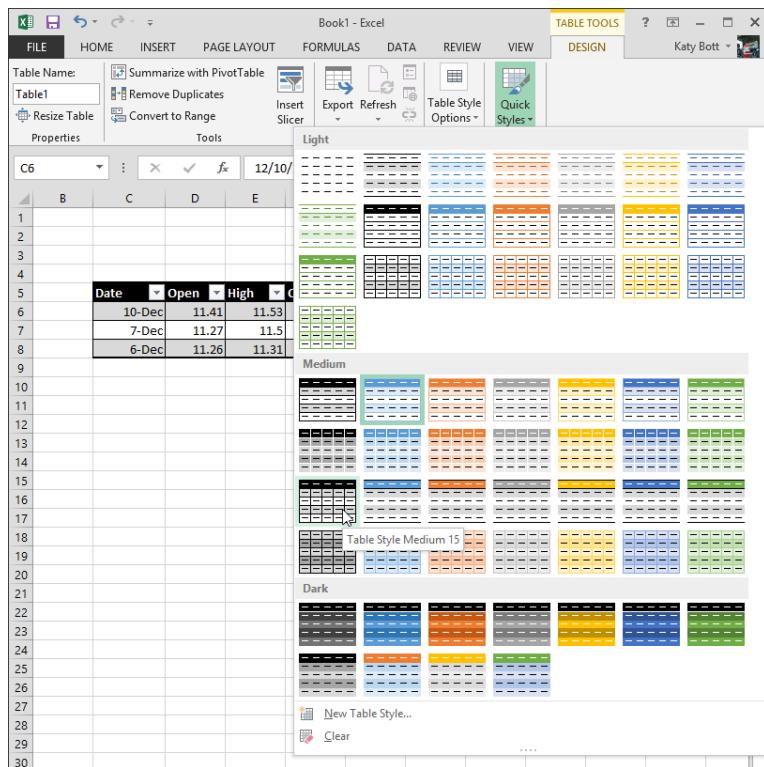
Figure 13-3 Colors and fonts associated with each of these built-in table styles adjust to match the current theme.

The colors and fonts associated with a style vary depending on the theme used for the current worksheet. If you change the theme, any existing table formats change to pick up the color schemes and fonts from the new theme.

For more on how themes allow you to apply consistent formatting, even in different Office programs, see "Using Office themes" in Chapter 5, "Working with graphics and pictures."
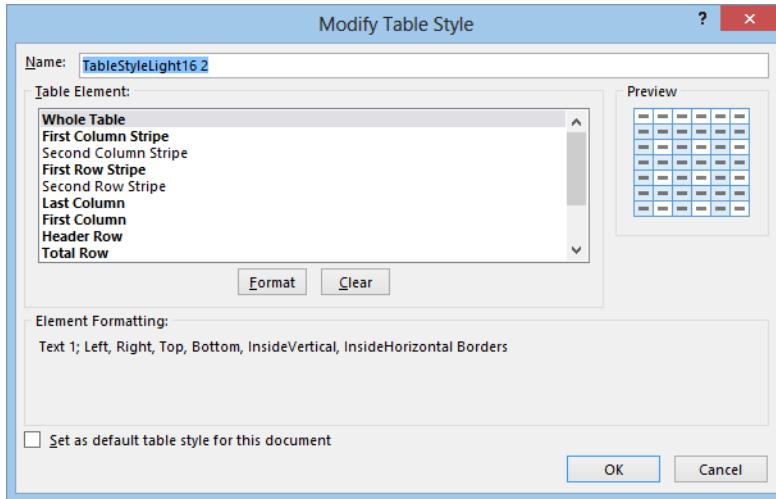
If you've applied manual formatting to fonts, font colors, cell shading, and so on within a table region, your formatting is preserved when you apply a table style. To clear any manual formatting and use only the formatting specified in the table style, right-click the style in the Table Styles gallery, and then click Apply And Clear Formatting.

Many of the built-in table styles include formatting that adds shading to alternate rows, which makes reading across wide tables easier. The seven check boxes in the Table Style Options group on the Design tab allow you to fine-tune the following format settings:

- **Header Row**   Clear this check box to hide all column headings. Doing so also hides the down arrow used to access sort and filter options for each column. Note that Excel remembers the name assigned to any column and continues to use it in structured references within formulas.

- **Total Row**   Select this check box to add a row beneath the table, with options to automatically subtotal the contents of one or more columns. If the table contains more than one column, the word *Total* appears in the first column. If you expand the table, this row remains at the bottom of the new range. You can customize the formulas beneath each column by using a drop-down list, as we explain shortly.

- **Banded Rows**   Apply different background colors to alternating rows to make reading across a wide table easier.

- **First Column**   Click to apply special formatting to the first column in the table. Use this option to highlight labels that identify each row.

- **Last Column**   Click to apply special formatting to the last column in the table. This option is especially useful if the last column contains totals for each row.

- **Banded Columns**   Apply different background colors to alternating columns.

- **Filter Button**   Remove the arrow to the right of a column heading that allows you to filter, sort, or search using the contents of that column.

In effect, these check boxes allow you to provide very specific customizations to the current table style. When you combine these options with the 60 entries in the built-in Table Styles gallery, each of whose color palette and font can in turn be reset using any of 21 built-in themes, you have literally thousands of possible looks to choose from. That's not enough? Then build your own table style by clicking the New Table Style link at the bottom of the Table Styles gallery. Doing so brings up the New Table Style dialog box, where you can set the properties for each part of the table individually.

Starting from scratch to create a custom table style is difficult and potentially confusing. In our experience, you'll find it much simpler to duplicate an existing table style and then modify the style you copied. In the Table Styles gallery, right-click the style you want to use as your starting point, and then click Duplicate. That opens the Modify Table Style dialog box shown next.

In the Name box, replace the default name with a descriptive name. Then select individual table elements from the list in the center of the dialog box and adjust their definition as needed. Click the Format button to change font style (bold, italic, and so on), cell borders, and shading. The four stripe options allow you to set how many rows are in each stripe that makes up a band. The default is 1, which means that shading alternates from one row to the next. If you choose 2 for First Row Stripe and Second Row Stripe, each band of shading is applied to two rows at a time.

Custom styles appear at the top of the Table Styles gallery. If you right-click on a saved custom table style, you'll notice that Modify and Delete options are available on the menu; you can't modify or delete any of the predefined table styles.

TROUBLESHOOTING

Fonts and colors in custom table styles behave unexpectedly in Excel

Although the Format Cells dialog box for each table element includes a Font tab, most of the options on that tab are unavailable. You can change the font style and color, but the actual font and font size are determined by the current theme. To apply a table font that is not part of the current theme, you must select the entire table and apply the font formatting manually. In addition, if you choose a background or fill color from the selections on the Fill tab, these colors change when you change the theme. To apply a specific color to part of the table and ensure that the color remains unchanged when the theme changes, you must use the More Colors option and define that color manually.

Expanding (or shrinking) a table

Although you can define a table by selecting a range of any size, the most common and useful scenario defines a table using the current region, which is demarcated by blank cells (or the worksheet's edge) on the top, bottom, and sides. To add a row to the table, click in the cell in the lower-right corner of the table range (if your table has a Total row, use the row above it), and then press Tab. Excel adds a new row using the colors, fonts, and shading from the current table style and moves the active cell to the first column in the newly created row. If your table includes a Total row, it shifts down to accommodate the new row as well.

To expand a table manually, look in the lower-right corner of the table for a small triangular handle. Make sure that that cell is not selected, and then aim the mouse pointer at the handle until the pointer turns into a two-sided diagonal arrow. Drag down to add rows to the table, shifting the Total row down if necessary. Drag the handle to the right to add one or more columns (each new column gets a generic heading that you can change later when you're ready to enter data).

You can also drag the table sizing handle up or to the left to remove rows or columns from the defined table range. Any data currently contained in those cells remains, but loses its table formatting.

CAUTION !

If your table contains a Total row and you move the sizing handle up to remove rows that currently contain data, you create a circular reference. To avoid this, first delete (or move) the contents of any cells that you plan to remove from the table range.

You can add a reference to any table by using its name, as defined in the Table Name box in the Properties group on the Design tab. The range defined by this name automatically expands when you add rows or columns to the table. (It does not, however, include the Header and Total rows.) If you use the current table as the basis for a PivotTable, any new rows or columns you create are automatically available for use in the PivotTable. Likewise, when you use data from rows or columns in a table to define data series, labels, or other elements in a chart, those elements are automatically updated when you expand the table.

Adding totals and formulas to a table

When you create a table, Excel allows you to perform a few tricks with formulas that aren't available within a normal range. The most obvious is the Total row, which you can use to quickly add summaries of table data. As we explained earlier in this chapter, you can

manually enable the Total row by selecting its check box in the Table Styles Options group on the Design tab.

Figure 13-4 shows the Total row for a table containing a month's worth of stock prices. Note that Excel automatically added a formula that totals the rightmost column in the table.

	A	B	C	D
1	Date	Open	Close	Volume
2	26-Dec	12.31	12.79	140,267,200
3	24-Dec	11.67	12.4	91,734,900
4	21-Dec	11.55	11.86	94,489,300
5	20-Dec	11.74	11.77	47,750,100
6	19-Dec	11.79	11.73	54,884,700
7	18-Dec	11.48	11.67	61,810,400
8	17-Dec	11.16	11.39	46,983,300
9	14-Dec	11.27	11.1	36,933,500
10	13-Dec	11.46	11.27	35,443,200
11	12-Dec	11.52	11.47	31,099,900
12	11-Dec	11.51	11.49	36,326,900
13	10-Dec	11.41	11.47	26,025,200
14	7-Dec	11.27	11.48	38,404,500
15	6-Dec	11.26	11.24	31,065,800
16	5-Dec	11.32	11.31	33,152,400
17	4-Dec	11.4	11.31	37,760,200
18	3-Dec	11.56	11.41	47,746,300
19	Total			891,877,800

Figure 13-4 Excel uses its own internal logic to decide which columns are summarized in the Total row. You can add or change these formulas with a few clicks.

Although the result is functionally the same as if you had clicked the AutoSum button, the formula itself uses the SUBTOTAL function. You can change the results for an existing formula by selecting the cell and clicking the arrow just to its right. In this example, we're about to change the current formula, which shows the total share volume for the month, to one that shows the average volume per day:

D19	⋮	×	✓	f_x	=SUBTOTAL(109,[Volume])		
	Date	Open	Close	Volume		E	F
16	5-Dec	11.32	11.31	33,152,400			
17	4-Dec	11.4	11.31	37,760,200			
18	3-Dec	11.56	11.41	47,746,300			
19	Total			891,877,800	▼		
20				None			
21				Average			
22				Count			
23				Count Numbers			
24				Max			
25				Min			
26				Sum			
				StdDev			
				Var			
				More Functions...			

In a Total row, you can add a summary formula to any cell. Click that cell to reveal an arrow that you can click to display a drop-down list of available formulas.
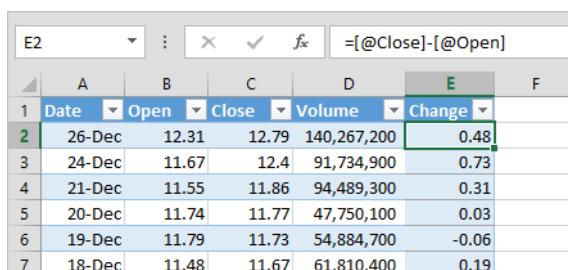
What if you want to create a calculated column that displays totals, averages, or other summaries on a per-row basis? Excel can do that automatically. In the previous example, click any cell in any column to the right of the table range and begin entering a formula. In this worksheet, the Open price for each day is in column B and the Close price is in column C, with Volume in column D. So we can click in E2, type an equal sign, click C2, type a minus sign (-), and click B2. As soon as we press Enter, Excel creates a new column using the current table format and copies the formula we just typed to every cell in that column.

INSIDE OUT   Take control of calculated columns

If you create a formula to the right of the current table and you don't want it to be copied to other cells in the column, use the options on the AutoCorrect menu to immediately undo the calculated column. To prevent Excel from automatically copying calculated formulas to the rest of a column, click File, click Options, and then click AutoCorrect Options on the Proofing tab. On the AutoFormat As You Type tab, under the Automatically As You Work heading, clear Fill Formulas In Tables To Create Calculated Columns.

The new column includes a generic heading that you'll probably want to replace with a descriptive heading, and you might also want to insert a formula in the Total row, but Excel does all the work of creating the calculated column, as shown in Figure 13-5.

E2	▾	⋮	✕	✓	fx	=[@Close]-[@Open]	

	A	B	C	D	E	F
1	Date	Open	Close	Volume	Change	
2	26-Dec	12.31	12.79	140,267,200	0.48	
3	24-Dec	11.67	12.4	91,734,900	0.73	
4	21-Dec	11.55	11.86	94,489,300	0.31	
5	20-Dec	11.74	11.77	47,750,100	0.03	
6	19-Dec	11.79	11.73	54,884,700	-0.06	
7	18-Dec	11.48	11.67	61,810,400	0.19	

Figure 13-5 If you add a calculated cell to the right of an existing table, Excel copies the formula to the entire column using structured references.

If you look carefully at the formula bar in Figure 13-5, you'll see that the formula Excel creates includes some unusual cell references. These are called *structured references,* which are designed to make it easy to automatically copy formulas as you add new rows. They're

created automatically when you click to select cell references for use in a formula; you can choose to use standard references instead by simply typing the cell address. Brackets indicate a column heading name and an @ sign indicates the current row. The # sign is used with one of four keywords to refer to specific parts of the table: #All, #Data, #Headers, or #Totals.
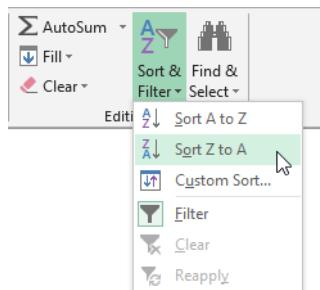
Sorting and filtering data

In this section we discuss how to create order out of even the most chaotic worksheet data. You can enter or import that data in any order or even at random. Once it's arranged in rows and columns, you can rearrange it as needed. You can sort by numbers, text, or dates. You can also reduce clutter by filtering a list to show only data that matches conditions you define. These options work on simple data ranges and on tables.

Sorting a range, region, or table

You can sort a range, region, or table by using values from one or more columns. That's true regardless of the data type. In a membership roster, for example, you can sort the list in alphabetical order using the Last Name column, or by date, oldest to youngest, using the Birthday column, or by number if you're using the Donations column to track progress in a fundraising drive.

To sort the current region, click a single cell in the column you want to sort by and then click Sort & Filter in the Editing group on the Home tab. The choices at the top of the list vary to reflect the data type. For text, Sort A To Z and Sort Z To A are available, as shown here. For dates, the choice is Sort Oldest To Newest and Sort Newest To Oldest. For numbers, the choices are Sort Smallest To Largest and Sort Largest To Smallest.

If you prefer to sort the current column with a single click, use the commands in the Sort & Filter group on the Data tab, or pin the Sort A To Z and Sort Z To A buttons to the Quick Access Toolbar.

To sort by multiple columns, click Sort on the Data tab; or click Sort & Filter on the Home Tab and then click Custom Sort; or right-click a cell in the table or range, click Sort, and then click Custom Sort.

Any of those roads take you to the Sort dialog box, shown in Figure 13-6. In operation, it's pretty straightforward and easy to figure out. You build a list of sort levels, each based on a column, and then define the sort order for each level.
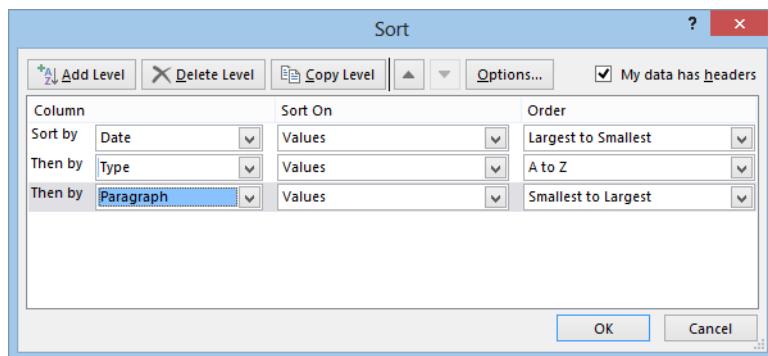
Figure 13-6 Create as many custom Sort By conditions as you need to arrange your list. Use the up and down arrow buttons to change their order.

INSIDE OUT   Create a custom column to preserve original sort order

Is the original order of your data important? If so, then make sure you can return to that order easily. For off-the-cuff tasks, you can simply copy a range to a new worksheet, sort and filter as needed, and then delete the copy when you're done. To ensure that you can always return to the original order of a range or table, even if it's sorted accidentally, add a new column (with a descriptive heading like Original_Order) and fill it with numbers that indicate the current order—starting with 1 for the first row and increasing by 1 for each additional row. With this column in place, you can always re-sort the table or range by this column to display its original state.

Excel sorts dates, times, and numbers exactly as you would expect, depending on the sort order you select—Newest To Oldest, Smallest To Largest, and so on. The rules for text are slightly more complicated. For A to Z (ascending) sorts, numbers come first, then most punctuation characters, and then letters in ascending (A–Z) order. The sort is not case-sensitive, so capital letters and lowercase letters are considered the same for sorting purposes. Apostrophes and hyphens are typically ignored except when two strings of text are

otherwise identical; in that case, the one that contains the additional punctuation follows the one without. The precise order for punctuation places the space character first, then uses the same numbering as the Unicode character set to determine the order of additional nonalphabetic characters.

You can also sort by a custom series, such as the January through December and Sunday through Monday series that are defined in Excel by default. For more details, see "Entering and sorting data with custom series" in Chapter 14.

Filtering data in a table

As a list gets longer and longer, it becomes more difficult to see patterns associated with subsets of that data. That's when filtering the list becomes useful, hiding rows except those that match criteria you specify. If you're analyzing data from a dozen schools, stores, or customers, each with a unique identifier in a common column, you can filter the worksheet to show only the names you select from that column. You can filter on numbers and dates as well. For example, to create a filtered list of products that are out of stock (or nearly so), you can include only rows where the value in the QtyOnHand column is below 3.

If the number of choices in a column is limited, or if you know exactly which names or values you want to include, you have two options.

The first option uses a feature called *slicers*, whose capabilities have been expanded in Excel 2013 to work with ordinary tables as well as PivotTables. A slicer is essentially a floating list, built on the fly, that lists all the unique items in a column. By clicking items in the slicer, you instantly filter the table to show matching rows.

To add a slicer to a worksheet, click to select a cell within a table and then click Slicer in the Filters group on the Insert tab. Select the name of the column you want to "slice," and click OK. The result is a list like the one shown here, which scrolls if necessary so that you can see and click items to use as a filter.

Ctrl+click to select or clear multiple items from the filter list. Click the Clear Filter button in the upper-right corner of the slicer (or press Alt+C) to clear your selections and display the lists sans filter.

When you click a slicer box, Excel displays a context-sensitive Slicer Tools Options tab on the ribbon, where you can adjust the name displayed in the slicer's title bar, change the height and width of individual buttons, and display buttons in multiple columns. (Similar controls allow you to adjust the height of the slicer box itself, but it's easier to drag the borders of the slicer to change its height or width.)

And you're not limited to a single slicer. If you use two or more slicers together, they cooperate neatly. In Figure 13-7, for example, we've filtered the list using three company names. Doing so caused the Country Code slicer to display matching values at the top of the slicer, where we are free to click (or Ctrl+click) to filter the list further.

Figure 13-7 Using multiple slicers allows you to build a complex filter. Here, we've changed the button height in the Company slicer and arranged the second slicer into two columns.

The second option, which works with or without slicers, is to filter the contents of one or more columns directly. Click the arrow to the right of the column heading and pick from the list at the bottom of the menu, as shown in Figure 13-8.

The values in this list are drawn from the contents of the current column. Clear the Select All check box at the top of the list to clear all items, after which you can select a few specific items from the list. Click Select All again to reselect all items. When you have a mix of manually selected and cleared check boxes, the Select All box is a solid square as in Figure 13-8.

Figure 13-8 To create a completely custom filter, select items in the list at the bottom of this menu, which contains all values found in that column.

If the list of items is too long to be easily manageable, use the search box on the menu to restrict the list of items to those that match whatever you type. The text you enter doesn't have to be a complete word or phrase, and the search results show any match regardless of whether it's at the beginning, middle, or end of a cell's contents. Thus, entering *dat* returns A. Datum Corporation and Consolidated Messenger.

CAUTION!

The option to filter by selecting from a list is limited to the first 10,000 items in a list. In the case of a particularly long list in which a single column has many unique values, you see a warning message beneath the list that reads Not All Items Showing. Try using the search box to reduce the number of unique items, or choose a different filtering method.
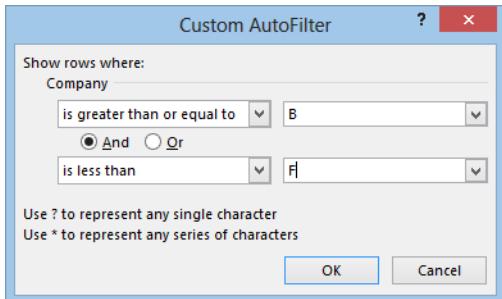
For dates that range over a long period of time, Excel automatically collapses the choices in the filter list, allowing you to choose entire years or to expand the list to include months or even days within a year. Here, for example, we started with a list of stock prices that includes data from every trading day for 25 years. By typing **Jan** in the search box, we filtered the list to show only the dates from January.
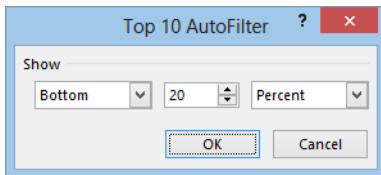
If our goal is just to compare data from the month of January for the past five years, we can click Select All Search Results to clear the current list, then manually include 2012, 2011, and so on. Or we can manually choose certain years. When the selection is complete, select Add Current Selection To Filter, and click OK.

In addition to item-by-item filtering, you can create a custom filter for any column to show or hide rows in the list according to the criteria you specify. The exact set of options depends on the data type. The menu option above the search box reads Text Filters, Number Filters, or Date Filters, depending on the contents of the current column.

Options on the Text Filters menu all lead to the Custom AutoFilter dialog box, where you can define one or two criteria for your filter. You can base criteria on the exact cell contents (Equals, Does Not Equal) or on what the cell begins with or contains. The following example finds all rows where the contents of the Vendor column begin with B, C, D, or E.

For a column that contains numbers, most of the options on the Number Filters menu lead to the same Custom AutoFilter dialog box. The menu contains three additional choices that work only with numbers. The Above Average and Below Average options work as expected, instantly filtering the list to show only those items that are above or below the arithmetic mean. The other choice, Top Ten, is misleadingly named. It opens the Top 10 AutoFilter dialog box, with Top 10 Items selected by default. However, you can select any number between 1 and 500; you can choose to show the Top or Bottom entries that match that value; and you can change Items to Percent. In this example, we've filtered the list to show only those records with values in the bottom 20 percent.

The options on the Date Filters menu are probably the most extensive. You can quickly define a range of dates, choose relative dates (Yesterday, This Quarter), or create a custom filter. Figure 13-9 provides one example of the full range of options, where we've used check boxes to narrow the list to the three most recent years and then used the Date Filters menu to specify that we want only dates from Quarter 1 in those years.

If you choose the Custom Filter option, the dialog box resembles the one available for text and numbers, with the small but crucial difference that it includes calendar controls to use when you are picking dates.
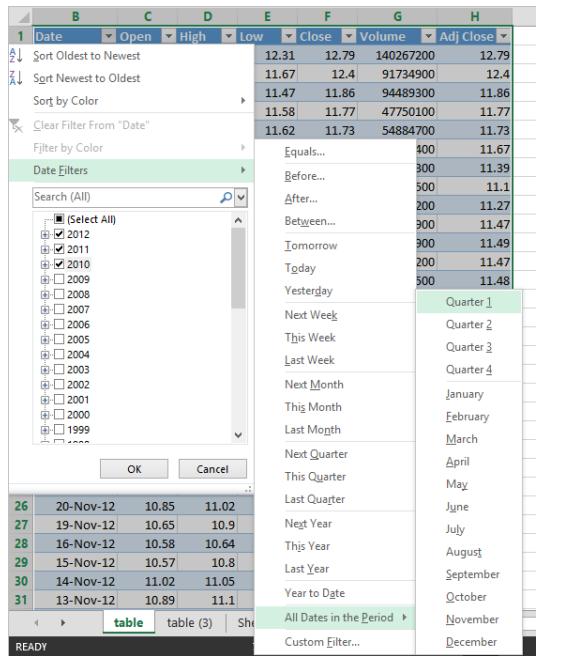
Figure 13-9 Use the Date Filters menu to choose from this extensive list of AutoFilter options when the current column contains mostly dates.

Using conditional formatting to highlight cells based on their content

Tables filled with data can be overwhelming and difficult to understand without lengthy explanations. Are there ways to highlight trends and patterns and identify anomalies while still maintaining a full view of the data in a table? Indeed there are.
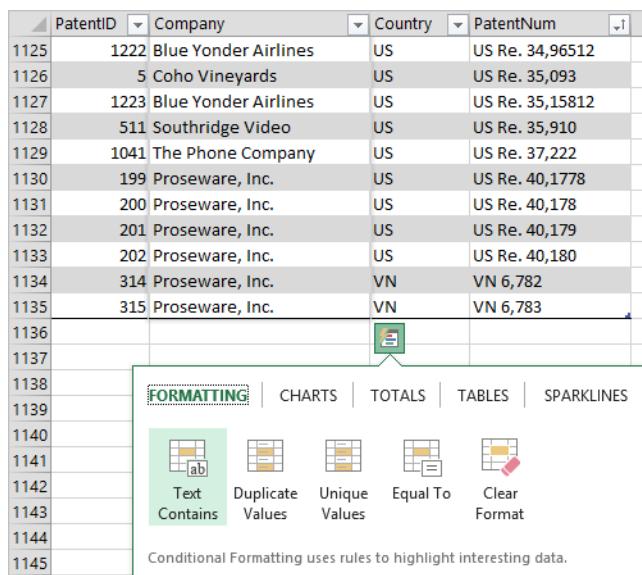
You can help your audience (and yourself) make more sense of data by using conditional formatting to highlight values that meet criteria you define. We introduced this feature briefly at the beginning of this chapter, in the discussion of the Quick Analysis tool. In this section, we explain how to take full advantage of it.

The idea behind conditional formatting is simple: You want to be able to look at a table or a range of data and quickly see any values that demand your immediate attention or spot trends that might not be apparent from the raw data. Is a particular value greater than or less than a specific amount? Is it in the top (or bottom) of all values in the range? Does it contain a specific word or string of text or fall within a range of dates?

After you define those conditions, Excel can apply automatic formatting that identifies matching values: displaying the bottom 20 percent of values in red, for example, with the top 20 percent in green; or using a color scale that moves from red to yellow to green as the values in the selection go from low to high; or adding data bars that provide a visual representation of the relative size of values in a cell.

The easiest way to get started is to use the Formatting section of the Quick Analysis tool.

Select a range of data—an entire table, a column or row containing totals, or a subset of data representing groups whose performance you want to examine more closely. Then press Ctrl+Q to open the Quick Analysis tool. The options available depend on whether your selection includes numbers or text. Figure 13-1, at the beginning of this chapter, shows the options available when you select numbers. Figure 13-10 shows what you see if your selection includes only text (in this case, the contents of the Company column).

PatentID	Company	Country	PatentNum
1222	Blue Yonder Airlines	US	US Re. 34,96512
5	Coho Vineyards	US	US Re. 35,093
1223	Blue Yonder Airlines	US	US Re. 35,15812
511	Southridge Video	US	US Re. 35,910
1041	The Phone Company	US	US Re. 37,222
199	Proseware, Inc.	US	US Re. 40,1778
200	Proseware, Inc.	US	US Re. 40,178
201	Proseware, Inc.	US	US Re. 40,179
202	Proseware, Inc.	US	US Re. 40,180
314	Proseware, Inc.	VN	VN 6,782
315	Proseware, Inc.	VN	VN 6,783

Figure 13-10 The Formatting options in the Quick Analysis tool offer these choices when your selection includes only text.

If you click Duplicate Values, Excel applies a red background to all values in the selection that are repeated at least once. Click Unique Values to perform the inverse operation, applying similar formatting to any cell whose contents are not repeated elsewhere in the list.
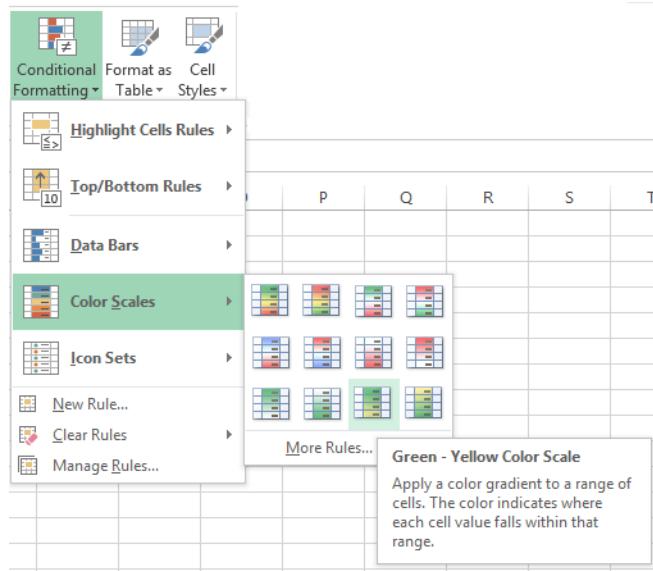
The Text Contains and Equal To options require some explanation. The effect of clicking either button depends on the contents of the current cell within the selection. (You can

move the current cell within the selection using Tab and Shift+Tab.) If the current cell contains "Contoso," click Text Contains to apply a red background to any cell containing that word: Contoso, Contoso Inc., Contoso Pharmaceuticals, and so on. Click Equal To and Excel will highlight only cells that are a perfect match for the current cell.

The options in the Quick Analysis tool for a selection that contains numbers rather than text allow you to add data bars, icons, or colored shading to a selection of data, features we explore in the remainder of this section.

Any conditional formatting you apply using the Quick Analysis tool uses default settings. For greater control over the conditions and appearance of the formatting, you can create conditional formatting rules directly.
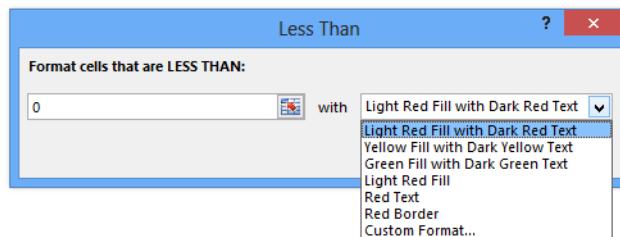
To get started, select a range of data and then click Conditional Formatting in the Styles group on the Home tab. That displays the Conditional Formatting menu:
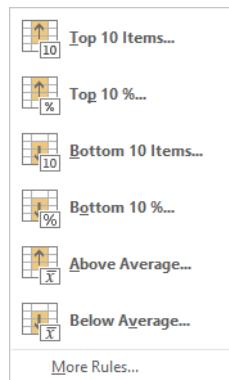
Each of the five main choices on this menu provides access to a range of preset rules. The More Rules option at the bottom of each of the submenus allows you to create custom choices that vary from the preset configurations. The following list describes what you'll find in each of the five main choices:

- **Highlight Cells Rules**   Each of the seven preset options opens a dialog box that lets you construct a formula using a comparison operator (greater than, less than, equal

to, and so on) along with a value or cell reference to compare with each cell's contents. Excel fills in values using its internal algorithms; you can change those values or point to a cell reference. The list on the right allows you to choose the formatting to be applied to cells matching your specified conditions.

- **Top/Bottom Rules**   The input dialog box that opens when you select any of the choices on this menu also allows you to create a rule on the fly. Don't be misled by the number 10 in the Top 10% and similar options. You can change that value or percentage to a different number if you prefer.

- **Data Bars**   This option adds a small bar (a longer bar equals a higher value) to each selected data cell, using a solid or gradient color. These bars show up as a live preview in the selected data so you can see the effect before you make it final. In the example shown in Figure 13-11, we've already created a customized data bar; choosing an option from the Solid Fill list changes the color without changing other settings. Note the ScreenTip, which explains, tersely, what the thumbnail represents.
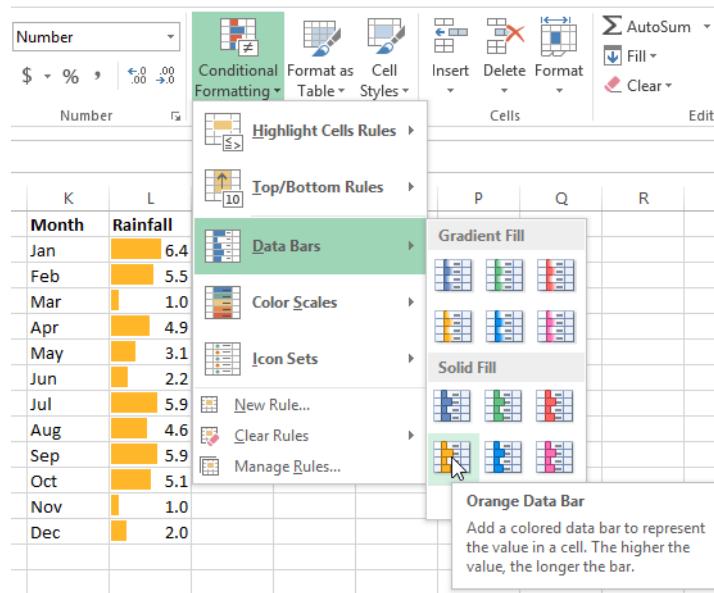
Figure 13-11 Adding a data bar to a range (the Rainfall column, in this example) adds a colored bar to visually represent the data in the selection.

- **Color Scales**   This option applies colored cell backgrounds to the selected range using two or three colors in a range that is defined by the data itself. The Green-Yellow-Red option, for example, uses green for the lowest values, red for the highest, and yellow for everything in between. The actual number of shades used is much more than two or three, with more intense shades representing the extremes of higher and lower values.

- **Icon Sets**   This is the most visually diverse (and potentially cringe-inducing) of all the preset conditional formatting options. You can choose from arrows, circles and other shapes, flags, and rating scales made up of stars and bars and immediately recognizable symbols like the ones shown here.

You can combine multiple rules in the same selection, highlighting values in the top 20 per-cent in bold green text on a light green background, with values in the bottom 20 percent displayed in bold red italics on a light red background, for example.

If none of the preset options match your needs, you can create custom rules from scratch. In some cases, you might start with a preset rule (from the Quick Analysis tool or from the Conditional Formatting menu) and then, after applying it to the selection, modify the rule.

Click More Rules at the bottom of any of the Conditional Formatting menu options to dis-play the New Formatting Rule dialog box. The example shown in Figure 13-12 adjusts the default rules for data bars so that the largest bar in the selection doesn't cover up the num-ber it represents.
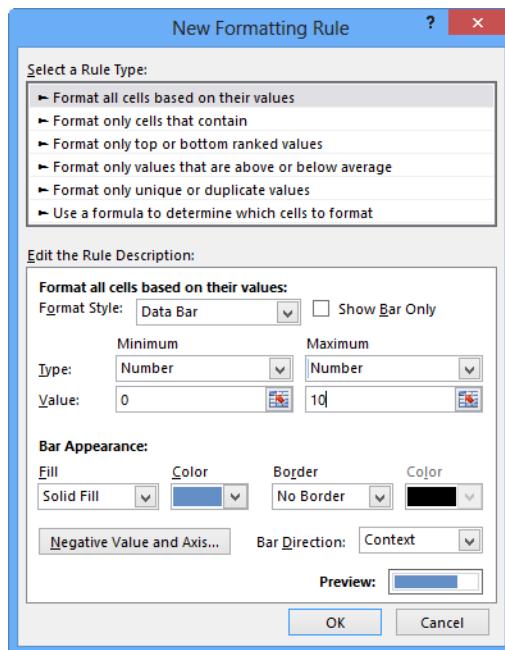
Figure 13-12 Click More Rules at the bottom of a conditional formatting option to build a rule from scratch. Changing the Minimum and Maximum values here adjusts the length of data bars to avoid covering the value.

If you've already defined rules and want to adjust them, click Conditional Formatting (in the Styles group on the Home tab) and then click Manage Rules. That opens the Conditional Formatting Rules Manager dialog box, shown in Figure 13-13. Select This Worksheet to see all rules for the current sheet.
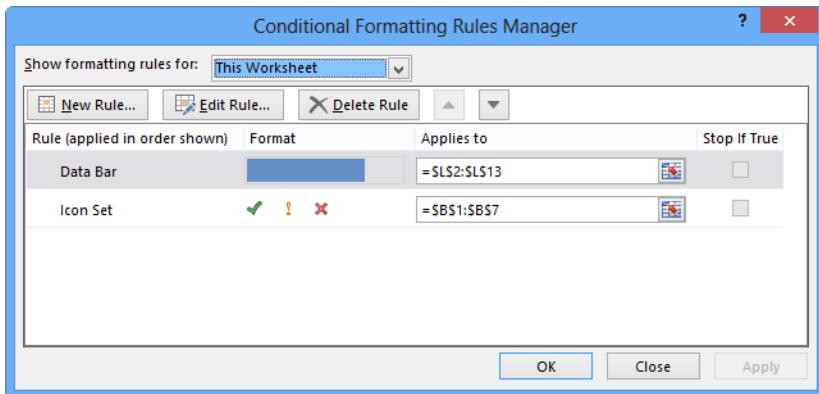
Figure 13-13 You can edit any existing rule from this dialog box. Use the Stop If True option if you want to apply conditional formats in a precise hierarchy.

To edit an existing rule, select its entry in the Conditional Formatting Rules Manager dialog box and click Edit Rule. The exact options you see here depend on the type of rule you originally created. For example, you can hide the underlying value and show only an icon or data bar.

TROUBLESHOOTING

Conditional formats don't behave as expected
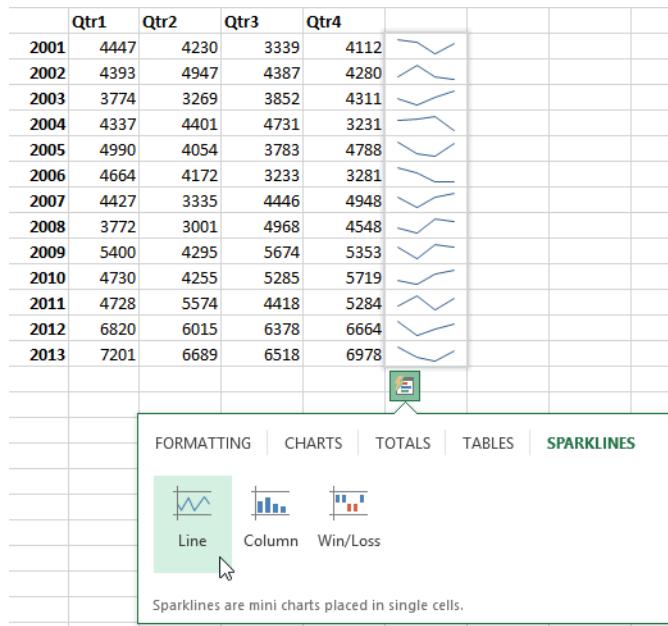
If the formats you see in a table aren't displayed as you expected, you should check several possible causes. If you experimented with multiple rules, it's possible that you left an old set of rules in place and added a new, conflicting rule that applies to the same data. To check for this possibility, open the Conditional Formatting Rules Manager dialog box and choose This Worksheet from the Show Formatting Rules For list. If you see an old, unnecessary rule, select it and click Delete Rule. It's also possible you have a conflict between multiple rules, with the rule at the top of the list applying one set of formatting that is then overruled by a later rule. If you want the first rule to take primacy, select the Stop If True check box for that rule. Then be sure that the Applies To range for each rule is correct. When you add, move, or copy cells or formatting, the conditional formats don't always follow in the way you might expect. Finally, check the numbers used as triggers within each rule. Excel applies some default settings when you create the rule. If your data has changed since then, you might need to tweak the rules accordingly.

If you experiment a little too much with conditional formatting rules and want to get a fresh start, click Clear Rules on the Conditional Formatting menu. You can erase the rules from a selection, an entire sheet, a table, or a PivotTable.

Using sparklines to visualize trends within a range

If you think of sparklines as tiny charts that fit in a single cell, you won't be too far from the truth. This feature, introduced in Excel 2010, enables you to visualize a data series in a single cell. The following example shows quarterly results over a period of several years, with a sparkline at the end of each row that shows the up and down gyrations over each year.

The easiest way to apply sparklines to a range of data is to select the range and then open the Quick Analysis tool, as shown here.

Sparklines come in three varieties: Line and Column work almost exactly like their full-size chart counterparts, while Win/Loss shows an up or down marker depending on whether the associated data is positive (win) or negative (loss).

To add a sparkline for a selection other than the full data range, click Line, Column, or Win/Loss from the Sparklines group on the Insert tab. If you made a selection first, the Data Range box is filled in with that range; you just need to select the cell where you want the sparkline to appear.

To change an existing sparkline, use the Design tab under the Sparkline Tools heading (it's only visible when you select one or more cells containing a sparkline). Figure 13-14 shows the commands available on this tab.

Figure 13-14 As with a full-size chart, you can use commands on this specialized tab to change the style of a sparkline, add data markers, and edit the source data.

Most of the options on the Design tab are self-explanatory. One that deserves special attention is the Axis command, which allows you to customize how each axis in the mini-chart is treated. Normally, each sparkline is treated as an independent series, with values charted using only the data in its source data range. If you want Excel to chart multiple sparklines using the same range of values, click Axis, and then change the selections under Vertical Axis Minimum Value Options and Vertical Axis Maximum Value Options to Same For All Sparklines.

Turning data into charts

The process of building a chart in Excel is literally a two-step operation. Step one: select some data. Step two: choose a chart type. Everything beyond that is a matter of refinement, making the resulting chart more visually appealing and understandable, with titles and labels and color gradients and other tweaks.

In this whirlwind tour of the charting features in Excel, we focus on the nuts and bolts of actually building a chart. If you're looking for detailed explanations of the concepts behind turning information into graphics, we highly recommend starting with Edward Tufte's seminal work on the subject (see *www.edwardtufte.com*). And because space is limited in this chapter, we can only dive just below the surface in showing you the many options available when you create and customize Excel charts. For a much more complete picture, we recommend *Microsoft Excel 2013 Inside Out*, by our colleagues Mark Dodge and Craig Stinson (Microsoft Press, 2013).

With that disclaimer out of the way, we ask you to look at the simple line chart shown in Figure 13-15, which illustrates the most common chart elements.

Vertical axis   Title   Plot area
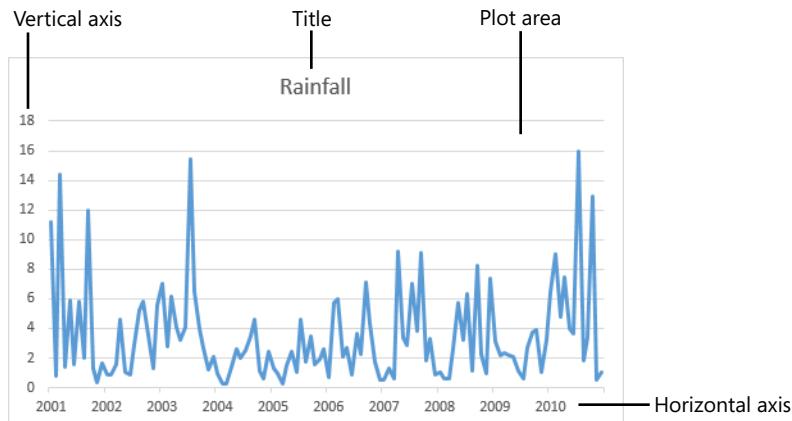
Horizontal axis

Figure 13-15 This simple line chart includes several basic elements—a chart title, a plot area (with gridlines), and two axes—horizontal and vertical.

With a little more data and a few more clicks, we could make this chart much more compli-cated, although that would defeat its purpose. The following list describes the main chart elements available to you in Excel:

- **Data series and plot area**   Each series of data appears within the plot area, repre-sented as a line, column, bar, or pie slice, depending on the chart type. You can use a unique color in the plot area to make it stand out from the chart background. Three-dimensional charts have a wall, a floor, and rotation options as well.

- **Axes and gridlines**   Column, bar, and line charts typically plot data along two axes. Figure 13-15, for example, shows time along the horizontal axis and rainfall (mea-sured in inches) along the vertical axis. A depth axis is available for 3-D charts. Grid-lines help you compare the values in a data series to the values on an axis.

- **Titles**   If you choose to use a chart title, you can overlay the title on the chart itself or allow the title to sit above the chart. In addition, you can add a title to any axis to help explain the data plotted along that axis. Figure 13-15, for example, might be easier to understand at a glance if the vertical axis had "Monthly rainfall (inches)" as a title.

- **Legend**   This optional element functions as a key when a chart contains multiple data series; it typically provides labels next to the color or shape used for the corre-sponding data series.

- **Labels**   You can add labels to axes to indicate what each step along the axis repre-sents. On the horizontal axis shown in Figure 13-15, we removed the labels for the 12 data points (January through December) within each year and instead used labels

to identify entire years. You can also add data labels to a data series in the plot area itself to indicate the actual values represented by plot points.

All of the tools you need to create a chart are in the Charts section of the Insert tab, shown here.
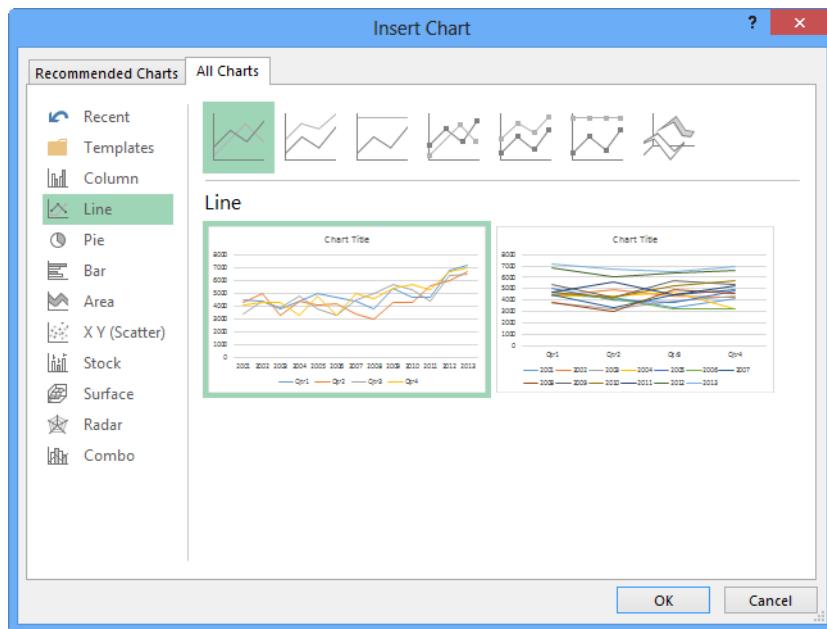
There's nothing subtle about the way this group of commands pushes a signature feature of Excel 2013. Click the oversize Recommended Charts button on the left and you get exactly what you would expect: one or more suggestions on how to turn the current selection or region into a chart. (If you know the exact type of chart you want to use, you can click its icon from the set of eight options in the middle of the command group.)

Figure 13-16 shows one set of recommendations. The choices you see on the dialog box's Recommended Charts tab use your real data and display an accurate representation of what you'll get if you click OK. The exact number and type of suggestions on this tab depend on the type of data you select and how it's arranged.

Figure 13-16 The selections on the Recommended Charts tab represent live previews of the current data, so you can flip through the suggestions and choose the one that best tells your story.

If none of the recommendations suits your fancy, click the All Charts tab to choose from the full range of chart types, as shown here.

Choose a chart type from the column on the left and then one of the subtypes from the thumbnails along the top of the preview pane on the right. The resulting thumbnails use your live data, and you can get a closer look at any chart by letting your mouse hover over the thumbnail until it zooms.

Choosing the right chart type

How do you know which type of chart is right for your data? Recommendations go a long way, and Excel's algorithms can be spookily accurate. But, as mentioned earlier, building a chart involves equal parts art and science, and there's nothing like your own eye (and perhaps feedback from colleagues) to help you determine whether the chart you've chosen is the right one for the story you're trying to tell.

In this section, we look at the main chart types with an eye to helping you choose the right one.

> **Note**
>
> You must select a chart type and subtype to create a chart initially, but you can switch
> to a different subtype or even choose a completely different chart type later. Click to
> select any part of the chart, and then click the Change Chart Type command on the
> Design tab to open the Change Chart Type dialog box, which shows the same All Charts
> tab you see when creating a new chart.

Column charts

Column charts are tailor-made for side-by-side comparisons, especially over time. Available
subtypes include clustered columns, stacked columns, and 100% stacked columns, with and
without 3-D effects. Figure 13-17, for example, shows a clustered column chart that offers
a simple comparison of revenues in four regions over four years. It's easy to see at a glance
that revenues in the North and East regions have been flat or down slightly over time, while
the South and West regions have grown impressively. Note that the recommended chart
includes a placeholder for a title, which we need to replace with a meaningful description.
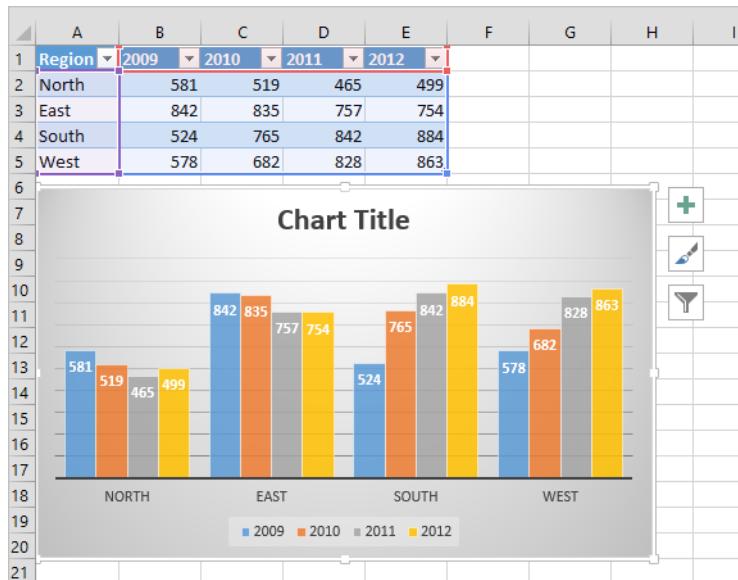
Figure 13-17 Column charts make it possible to compare data points side by side. This clustered
column chart shows trends over time for four regions.

INSIDE OUT   Swap the axes to tell a different story

Sometimes all you need is a slightly different angle to see a completely different picture. Clicking the Switch Row/Column button, in the Data group on the Design tab, is a particularly effective way of looking at column charts from a different perspective. The command name is misleading: what it really does is swap the data series associated with the horizontal and vertical axes. The column chart shown earlier in Figure 13-17, for example, looks at four regions over time, emphasizing the trend for each region. If you click Switch Row/Column, the data series that make up the clustered columns are swapped, and you get the revised chart shown here:

Chart Title

	2009	2010	2011	2012
North	581	519	465	499
East	842	835	757	754
South	524	765	842	884
West	578	682	828	863

■ North ■ East ■ South ■ West

At first glance, the chart looks similar to the earlier arrangement. But the story it tells is different, emphasizing differences over time, with one region dominating in the first year, but with a much narrower gap between the leaders just three years later. Which arrangement you choose depends on which story you want to communicate.

The other main variation in this chart type is the stacked column chart, which combines data from different series into a single column that emphasizes the relationship of individual items to the total. If your data series includes several similar totals and you want to emphasize a percentage change in one or more individual components, use a 100% stacked chart.

For column charts, most of the 3-D subtypes apply visual effects only. The exception is the 3-D Column subtype, which uses the horizontal axis and the depth axis to compare series and categories equally, with values on the vertical axis.

Line charts

Use a line chart when you want to plot data over time (or along ordered categories) to show trends on a continuous scale: revenues by quarter, economic growth by year or decade, rainfall or high and low temperature by month, and so on. The horizontal axis should be divided into equal units, with no gaps. Figure 13-18, for example, shows a month's worth of daily high and low temperatures plotted on a line graph.
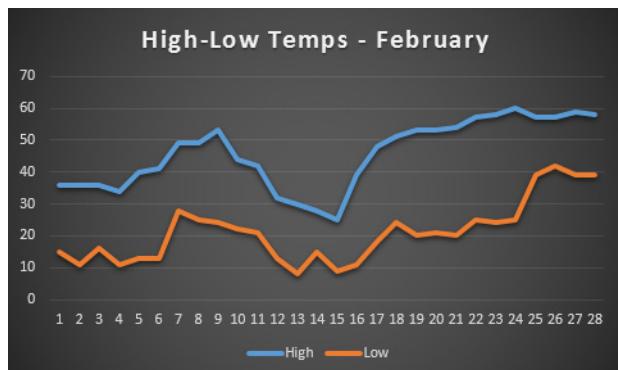
Figure 13-18 Because this line graph has 28 separate data points on each line, we've chosen not to use data markers.

Each of the 2-D subtypes in the Line Chart category includes options to show lines with or without data markers. If the number of data points on the category axis is relatively small, let Excel automatically add markers to show the exact location of each point. That makes it easier to find the value associated with each entry on the horizontal axis. You can customize the color and shape of each marker, as we explain later in this chapter.
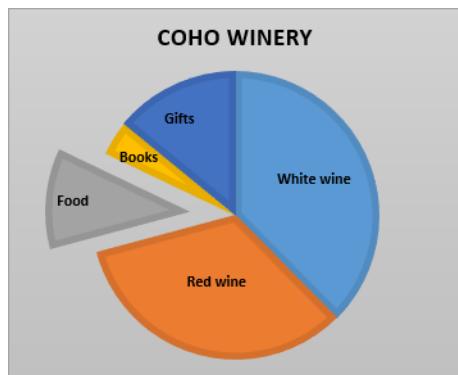
INSIDE OUT   **Add data labels selectively**

Adding data labels to every point in a series can sometimes lead to information over-load. The alternative is to add data labels to specific data points. Click to select the data series, and you'll see a selection marker over every point in the series. Click any individual data point to select just that point. Now you can show or hide the label for that point alone. Use the options on the Data Labels menu, under Add Chart Element on the Design tab, to choose a position for the label, or drag it manually.

Pie charts

If the data you want to plot is in a single row or column, it just might fit in a pie chart. Each pie chart consists of a single data series. Each data point is a slice proportional in size to the other items in the series, adding up to 100 percent. Pie charts work best when you have a small number of data points, six or seven at most, and no slice is too close to 0. (Negative numbers aren't allowed in a pie chart.)

You can emphasize one or more slices of a pie chart by "exploding" it from the rest of the chart, as we've done here. Select a slice and drag it away from the pie. (This option is especially dramatic if you've chosen a 3-D chart type.) If you select the entire series—in other words, every slice of the pie—and drag out, you'll end up with an exploded pie chart. This option is most relevant when you want to talk about each data point separately in order of size.

Two of the advanced pie chart subtypes are surprisingly useful when you want to tell a story within a story. It's also a good way to create a readable chart when you have a dozen or more data points. The Pie Of Pie and Bar Of Pie subtypes let you combine two or more slices into a single slice called Other, with those data points plotted in a second pie or bar chart. Figure 13-19 shows the Bar Of Pie chart subtype.

The options for the second chart are well hidden. Right-click the bar portion of the chart and then choose Format Data Series. In the Format Data Series pane on the right, use the Split Series By options to define which pieces of the original pie are broken out into the second chart. Use the sliders under the Gap Width and Second Plot Size headings to adjust the distance between the two charts and change their size relative to each other.

Doughnut charts are similar to pie charts but can contain multiple data series, with one series inside the "doughnut hole" of the next. Excel's Help system notes that doughnut charts are "not easy to read" and suggests stacked column or stacked bar charts as alternatives.
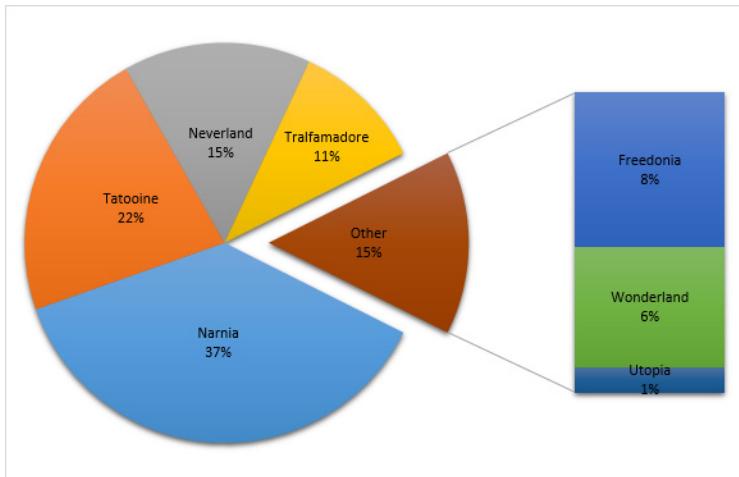
Figure 13-19 You define which values go in the bar chart on the right by setting a condition—in this example, the three smallest values in the list.

Bar charts

A bar chart is, in its simplest form, a column chart turned on its side, with the values on the horizontal axis and categories on the vertical axis. Bar charts are ideal for differentiating winners and losers—or at least those who are in the lead for now. Bar charts work equally well for presenting results of speed tests and for pointing out who's in front in a fundraising competition. In Figure 13-20, for example, we could have just as easily plotted this data as a column chart, but the long school names would have been awkward to position along the horizontal axis and look more natural and readable here.
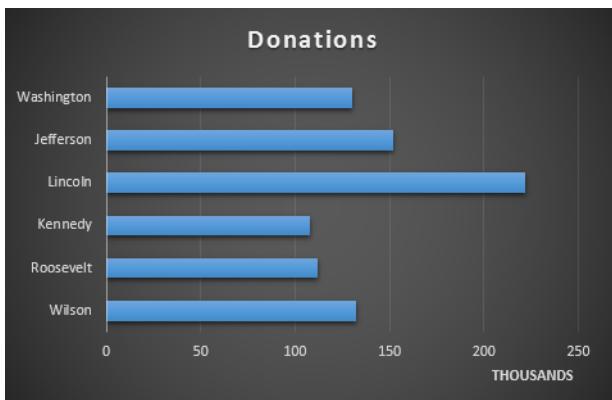
Figure 13-20 Bar charts work especially well when the category names are long, as in this example. The horizontal arrangement makes the current leader easy to identify.

Area charts

Area charts show the magnitude of change in a data set over time and thus offer a good way to show changes in the relative contributions of different parts of a group. In their plainest form, 2-D and 3-D area charts are like line charts, except that the value between the data point and the next lowest point on another series (or the lowest point on the axis) is filled in with color.

A stacked area chart like the one shown in Figure 13-21 adds all the values together so that the highest point on the chart for each point on the horizontal axis represents the total for that point.
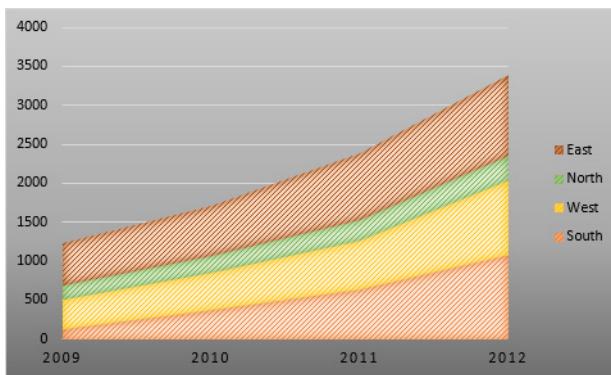
Figure 13-21 Use a stacked area chart to pile each data series on top of the one before it and show its contribution to the total.

Scatter (X, Y) charts

Scatter charts (also known as X, Y charts) are fascinating, versatile, and often misunderstood. A scatter chart is made up of two numeric data series, plotted in pairs on the horizontal and vertical axes (which are also known respectively as the x-axis and y-axis, thus explaining the origin of the name). You can use a scatter chart in place of a line chart when data points on the horizontal axis aren't linear; the visual result is similar, but without the distortion caused by irregular spacing of data points. One common use of a scatter chart is to identify clusters of similar data in a nonlinear set. In Figure 13-22, for example, we've created this chart type by plotting survey data for 15 companies, with customer satisfaction ratings on the vertical axis and price on the horizontal axis.

You'll notice in this scatter chart that we deliberately hid the values on both axes. The numbers themselves can be on any scale you create. It's the position of the data in this chart that matters most. The data point for Wingtip Toys represents the best value, while the one for Wide World Importers is the worst.
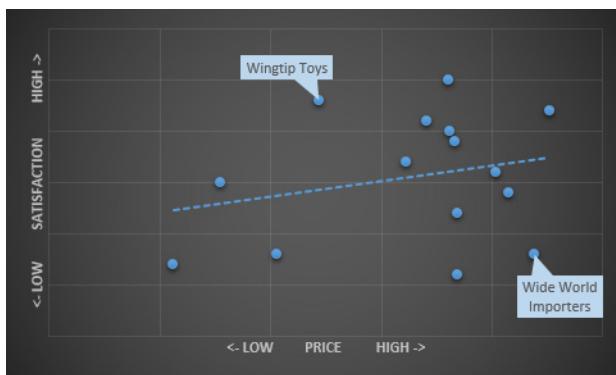
Figure 13-22 Each dot represents a pair of survey results for a company's products. The dashed trendline shows that higher prices generally mean greater satisfaction, but the two data labels identify noteworthy exceptions.

Bubble charts resemble scatter (X, Y) charts with an extra dimension that turns plot points into bubbles of varying sizes. As in a scatter chart, the values in the x and y series plot the location of each data point. The third value determines the bubble size.
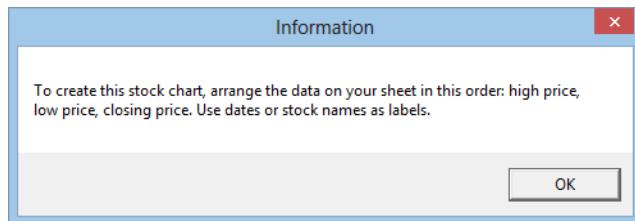
Other chart types

The last two tiny icons in the Charts group on the Insert tab cover a hodgepodge of chart types that are useful for specialized purposes. One icon covers Stock, Surface, and Radar charts; the other lets you create a Combo chart.

Analyzing trends in the markets for stocks, bonds, and other securities was once one of the most popular uses for Excel charts. It's less important today, with the widespread availability of online services that can create these charts for you. But if you have a set of data that includes historical stock prices, this chart type is made for you. The four available layout options enable you to plot the movement of stock prices on a daily basis, using a single line to indicate high, low, and closing prices. Opening prices and trading volume are optional data series.

Building a stock chart requires that you arrange your data in a specific order. If you try to create a stock chart using an incorrect arrangement of data, you're greeted with a helpful

message like the one shown here. (The exact content of the message changes based on the chart subtype you've selected.)

Surface charts are made up of two data series containing numeric data and resemble a topographic map. If you can envision a rubber sheet stretched over a 3-D column chart, you have a pretty good idea of what a 3-D surface chart looks like.

Radar charts plot data in a circular arrangement, where one set of numeric values starts at the center of the chart and a second set of ordered values (typically time) is plotted around the outside of the circle.

Changing a chart's layout or design

After you create a chart, you can change its fundamental organization, layout, and location at any time. You can also tweak the style and appearance of individual chart elements. In previous versions of Excel, these tasks required visits to myriad dialog boxes. In Excel 2013, selecting a chart exposes two custom tabs that appear under the Chart Tools heading.

On the left side of the Design tab is an Add Chart Element menu, which displays options that are specifically designed for the type of chart you've selected. You might want to add labels showing the exact numbers associated with each bar, for example. To do so, click Data Labels. As Figure 13-23 shows, allowing the mouse pointer to hover over an individual option previews the effect of that option on the live chart. Click to apply the change.

Other items on the Design tab allow you to quickly change the layout of a chart, keeping its basic organization but showing, hiding, and rearranging elements such as chart titles and axis titles. The Change Colors menu lets you choose from a selection of ready-made color palettes, some bold and others muted. You can also adjust colors and fonts automatically using thumbnails in the Chart Styles group. All of these options allow you to point and preview their effects in the live chart. If you don't like the effect, move the pointer away to preserve your existing chart choices.
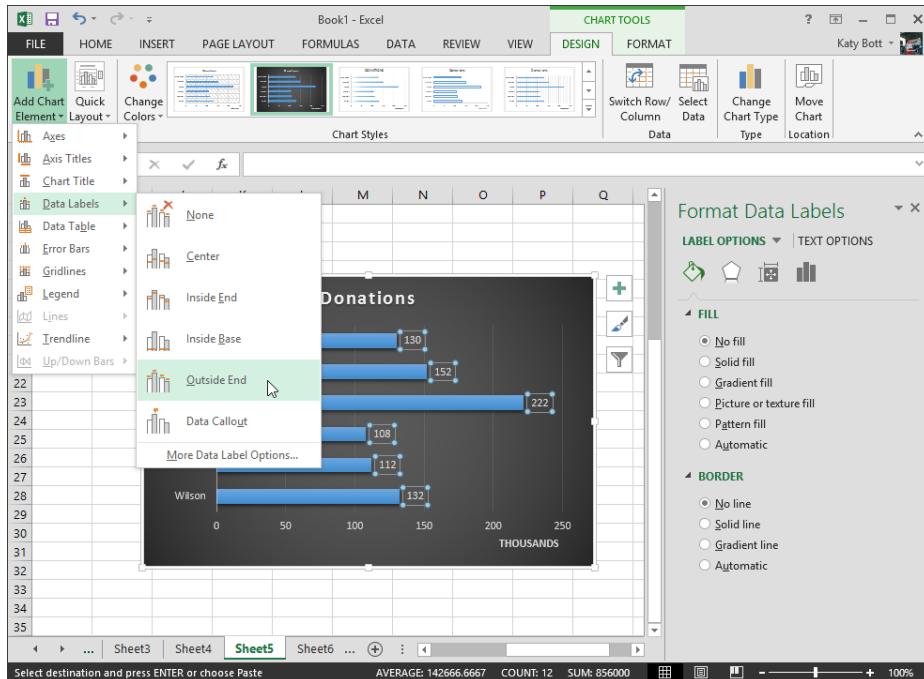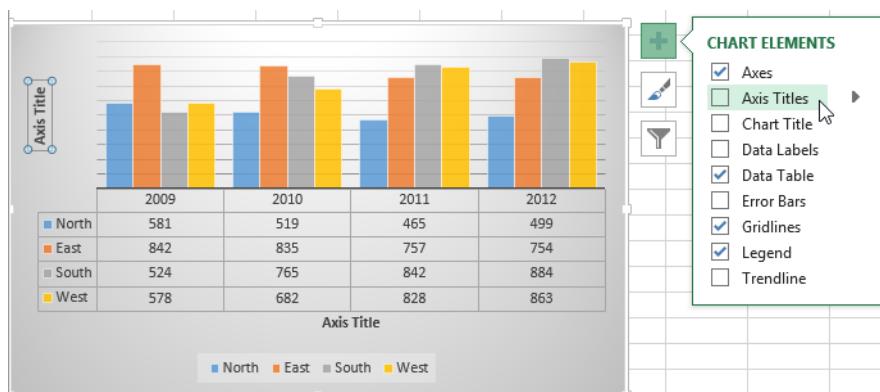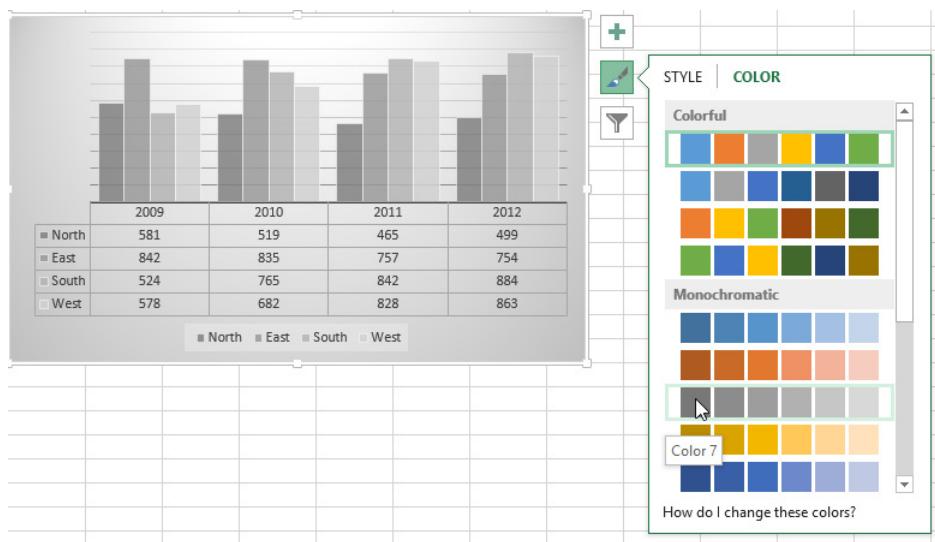
Figure 13-23 Let the mouse pointer hover over any item on the Add Chart Element menu to preview its effects on the graph. Here, you can see the data labels at the end of each bar.

For alternative access to the same controls, click anywhere within the chart to reveal three buttons at the right. Clicking any button reveals additional options, such as the Chart Elements menu shown here.

Selecting a check box adds an element to the chart; clearing a check box removes it from the chart. Allow the mouse pointer to hover over the name of an element to preview its appearance. Click the arrow to the right of any item to see a submenu with additional choices. Note that this menu is identical in function, if not appearance, to the Add Chart Element menu on the Design tab.

Likewise, the choices available when you click the second button mirror the options you can choose from the Chart Styles group and the Change Colors menu, respectively, on the Design tab.

The third and final button has the same effect as the Select Data button on the Design tab, allowing you to adjust the values and names of data series that appear in the chart.

These options work well for most charts, but there are times when you might want to fine-tune the appearance or position of a particular chart element. When that type of situation arises, you have four choices:

● Click the Add Chart Element menu on the Design tab, select an element, and then click the More *element type* Options menu choice below the ready-made choices.

● Click the Chart Elements button (the first one to the right of the chart, identified by a plus sign), click the arrow to the right of the element you want to adjust, and then click More Options at the bottom of the submenu.

- Click the Format tab and choose an element from the list at the top of the Current Selection group; then click Format Selection.

- If the element is visible in the chart, double-click it.
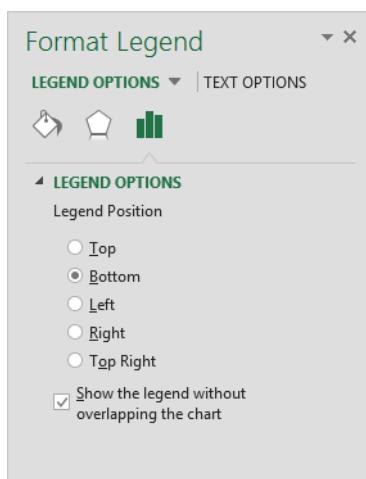
Regardless of which method you select, the tools you need appear in task-specific panes on the right side of the worksheet.

INSIDE OUT   **Use the arrow keys to cycle through individual chart elements**

If you're more comfortable with a keyboard than a mouse, you can use the arrow keys to cycle through all available elements in the current chart. Double-click anywhere inside the chart borders (but away from axes, titles, legends, and the like) to select the Chart Area, which is the first entry in the Chart Elements list in the Current Selection group on the Format tab. Now use the Up and Down Arrow keys to move through the list, to the plot area, individual data series, axes, and so on. Use the Left and Right Arrow keys to move through individual items in a series, a legend, or another element made up of multiple data points. If the legend is selected, press the Right Arrow key to select the first entry in the list, and keep pressing to move through the entire legend.

There are, quite literally, thousands of individual options available to you when you begin poking around at a granular level with individual chart elements. The pane containing formatting options is typically divided into tabs. The Format Legend pane, for example, includes the Legend Options tab (shown here) and a Text Options tab; both are in turn divided into three subgroups of settings.

Many of the commands in the formatting panes lead to collapsible menus that present common formatting options. The Format Axis Title pane, for example, shows three options you'll find repeated in the corresponding formatting panes for other elements. From left to right, these are Fill (shown in Figure 13-24), Effects, and Size & Properties.
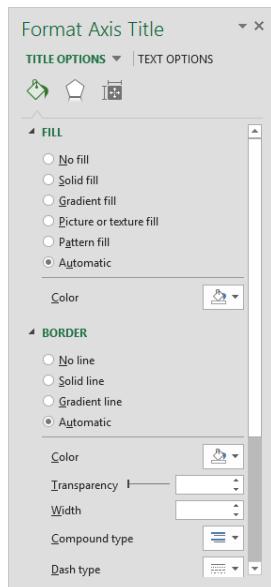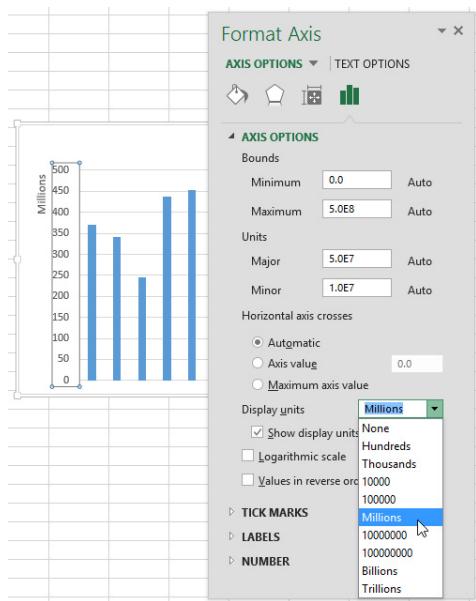
Figure 13-24 Click one of the three small icons below Title Options to change the set of options shown in this formatting pane.
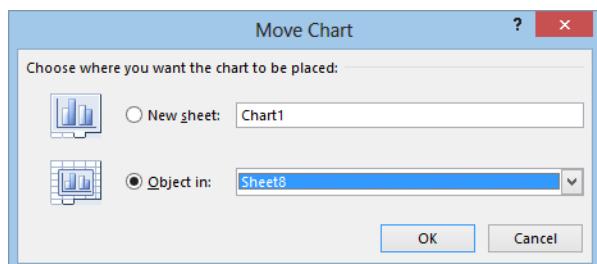
A surprising range of options is available if you dig deep enough. For example, a graph whose values are expressed in large numbers—thousands or millions—might benefit from having the values shown in a truncated form on the axis, so that 244,778,845 appears between the tick marks for 200 and 250. The Format Axis pane, shown next, lets you do exactly that, setting a value-based axis to show numbers in hundreds, thousands, millions, billions, trillions, or even a logarithmic scale.

The process of building a chart doesn't have to be linear. After you get a few basic design decisions out of the way, you can revisit and refine the chart's layout, formatting, and style options as needed, in any order, trying out alternatives until you're satisfied.

If the iterative process turns out a collection of settings you're especially pleased with, or if you want to share your handiwork with other people, you can save the current settings as a chart template for reuse. Right-click the chart area, choose Save As Template from the shortcut menu, and give the template a descriptive name. To apply all those settings to a new chart with one pass, click Change Chart Type on the Design tab, choose the Templates category from the All Charts tab, and pick the thumbnail for your saved template.

One final option allows you to change the location of a chart. Click Move Chart (the right-most command on the Design tab) to see the dialog box shown here. You can position the chart on its own sheet or as an object that floats on a worksheet—typically the same one containing your source data.

INSIDE OUT   **Change a chart's location to suit the task at hand**

It's perfectly acceptable to move a chart to make it easier to work with. As you change the data in a table, for example, you might want to see your changes reflected in real time in a linked chart. In that scenario, move the chart to the current worksheet and position the chart object alongside the data you're entering or editing. When you've polished the chart to perfection, move it to its own chart sheet and give the sheet a descriptive name. That makes finding the chart easier so you can use it in a Word document or a PowerPoint presentation later.

Linking worksheet data to chart elements

The elements that make up a chart are, in most cases, linked directly to data within a worksheet. Series names typically come from the label attached to the column or row that provides the data series values. Axis labels and legends are also derived from source data. If you change any of the data points in the source data, the corresponding chart element is updated immediately.

You can view and edit the source data for a chart by clicking anywhere in the chart and then clicking Select Data, in the Data group on the Design tab. Figure 13-25 shows this dialog box for a chart whose data source consists of four rows (each treated as a separate data series) and four columns (each treated as a separate category).
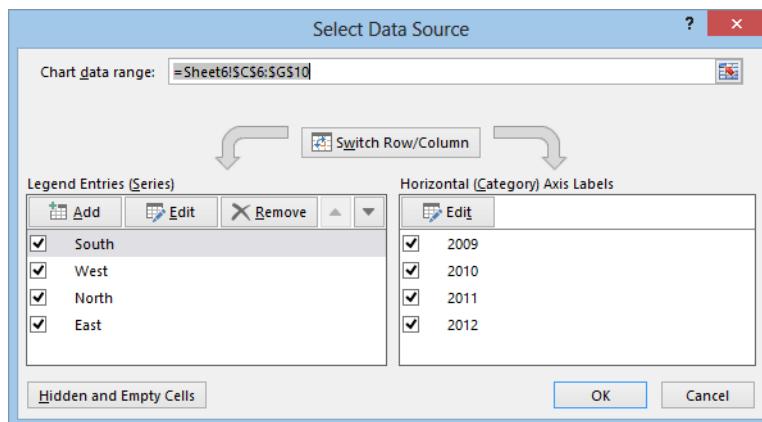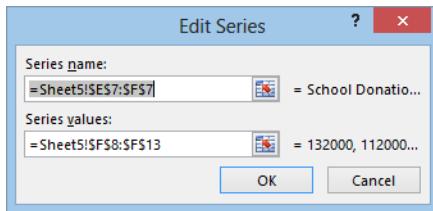
Figure 13-25 You can edit the source data for any series or rearrange the order of series and categories in this dialog box.

In this example, the source data (as identified in the Chart Data Range box) is a single contiguous range. If your chart consists of selected rows or columns from a larger range or table, you'll see each range listed separately, with commas separating the multiple ranges.

The labels above the two main boxes in the Select Data Source dialog box do not change with the chart type, which can lead to some confusing results. For example, in a pie chart, the values in the Horizontal (Category) Axis Labels box define each slice of the pie and are used for the legend, while the values in the Legend Entries (Series) box contain the values that are plotted in the chart and are *not* in the legend.

When you open the Select Data Source dialog box, it positions itself so that the upper-left corner of the chart's data range is visible.

To edit an individual data series, select it in the Legend Entries (Series) list and then click the Edit button. The Edit Series dialog box, shown here, shows you which cell is being picked up as the series name and which range defines the data series. In both cases, you can see the current values to the right of the Collapse Dialog button and the equal sign.

> **Note**
>
> **If the series you select is part of a scatter (X, Y) chart, the Edit Series dialog box contains separate boxes for Series X Values and Series Y Values.**

The Add button opens the same Edit Series dialog box, with no data source selected. Click to fill in the Series Name and Series Values boxes with valid ranges and then click OK to add the new series to your chart. The Remove button completely removes the selected data series from the chart. Use the Move Up and Move Down arrows (to the right of the Remove button) to change the order of the selected data series in the list. (You cannot change the order of categories here—do that by using the Axis Options tab in the Format Axis task pane.)

With a chart that is embedded on the same sheet as the source data, you can edit chart data directly, using color-coded handles that surround the corresponding source data. If

you click to select the entire chart, selection handles appear around all values listed in the Chart Data Range box. If you click to select a data series in the chart, the handles appear around the source cells and ranges associated with that series. Figure 13-26, for example, shows the result when we select the fourth and final series in a clustered column chart.
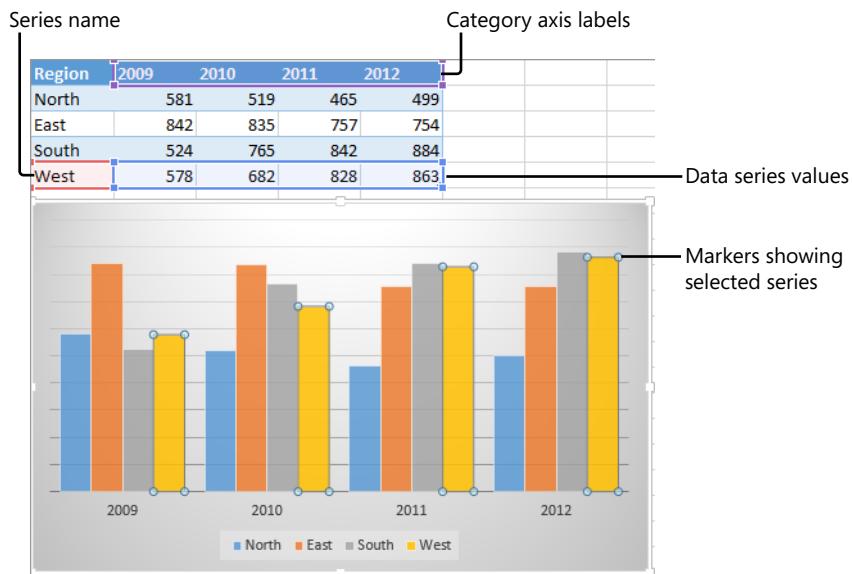
Figure 13-26 The color-coded selection boxes show the series name and values and category axis labels.

The red box indicates the data series names, the blue box indicates the series values (points to be plotted in the chart), and the purple box identifies category axis labels.

If you use a table as the source data for your chart, adding a new row or column automatically extends the corresponding series in the linked chart. If your data source is a simple range, you have to add new data manually. To do so, enter your data first, including the column or row heading, and then click the chart to expose the color-coded handles. Drag the corner of the range containing the series values so that it includes your new row or column, and then drag the series name or category axis label, as needed, to include the newly added cell.

If you find it easier to use the Clipboard, you can add a new row or column to your data source (or select an existing range that isn't currently part of the chart), copy it to the Clipboard, and then click to select the chart and paste the Clipboard contents. Be sure to include the cell that includes the series name or category axis label, if appropriate.

You can also use the sizing handles to reduce the number of series or data points. For example, if you have a column chart that includes 12 months' worth of results but you want to show only the last three months, drag the corresponding selections in the data source to make them smaller, using just the data you want to include.

INSIDE OUT   **No more data limits**

Previous versions of Excel imposed strict limits on the number of data points you could include per data series and per chart. Beginning with Excel 2010, those limits were completely removed. You can now include as many data points as your PC's memory can accommodate. That's good news for scientists and engineers who want to visualize very large sets of data. However, this change doesn't repeal the most fundamental principle of turning information into graphics: KISS (Keep It Simple, Stupid).

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About the authors

Ed Bott is an award-winning author and technology journalist who has been researching and writing about technology, in print and on the Internet, for more than two decades, with no intention of stopping anytime soon. He has written more than 25 books, all on Windows and Office. His books have been translated into dozens of languages and distributed worldwide. You can read Ed's latest opinions and hands-on advice at The Ed Bott Report on ZDNet (*www.zdnet.com/blog/bott*) and on his personal site at *edbott.com*. Ed and his wife, Judy, live in northern New Mexico, with a pair of very lucky pets, Mackie and Lucy, who were adopted with the help of English Springer Rescue America (*springerrescue.org*). They and their much-missed feline friend Katy make cameo appearances in this book.

Carl Siechert began his writing career at age eight as editor of the *Mesita Road News*, a neighborhood newsletter that reached a peak worldwide circulation of 43 during its eight-year run. Following several years as an estimator and production manager in a commercial printing business, Carl returned to writing with the formation of Siechert & Wood Professional Documentation, a Pasadena, California, firm that specializes in writing and producing product documentation for the personal computer industry. Carl is a coauthor of more than 20 books, covering operating systems from MS-DOS 3.0 to Windows 7 and productivity applications from Microsoft Works 3 to Office 2013. In a convergence of new and old technology, Carl's company now operates a popular website for hobby machinists, *littlemachineshop.com*. Carl hiked the Pacific Crest Trail from Mexico to Canada in 1977 and would rather be hiking right now. He and his wife, Jan, live in Southern California.