Getting the Most Out of Ranges

Other than performing data-entry chores, you probably spend most of your Excel life working with ranges in some way. Whether you're copying, moving, formatting, naming, or filling them, ranges are a big part of Excel's day-to-day operations. And why not? After all, working with a range of cells is a lot easier than working with each cell individually. For example, suppose that you want to know the average of a column of numbers running from B1 to B30. You *could* enter all 30 cells as arguments in the AVERAGE function, but I'm assuming that you have a life to lead away from your computer screen. Typing =AVERAGE(B1:B30) is decidedly quicker (and probably more accurate).

In other words, ranges save time and they save wear and tear on your typing fingers. But there's more to ranges than that. Ranges are powerful tools that can unlock the hidden power of Excel. So, the more you know about ranges, the more you'll get out of your Excel investment. This chapter takes you beyond the range routine and shows you some techniques for taking full advantage of Excel's range capabilities.

Advanced Range-Selection Techniques

As you work with Excel, you'll come across three situations in which you'll select a cell range:

- When a dialog box field requires a range input
- While entering a function argument
- Before selecting a command that uses a range input

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In a dialog box field or function argument, the most straightforward way to select a range is to enter the range coordinates by hand. Just type the address of the upper-left cell (called the *anchor cell*), followed by a colon and then the address of the lower-right cell. To use this method, either you must be able to see the range you want to select or you must know in advance the range coordinates you want. Because often this is not the case, most people don't type the range coordinates directly; instead, they select ranges using either the mouse or the keyboard.

I'm going to assume you know the basic, garden-variety range-selection techniques. The next few sections show you a few advanced techniques that can make your selection chores faster and easier.

Mouse Range-Selection Tricks

Bear in mind these handy techniques when using a mouse to select a range:

- When selecting a rectangular, contiguous range, you might find that you select the wrong lower-right corner and your range ends up either too big or too small. To fix it, hold down the Shift key and click the correct lower-right cell. The range adjusts automatically.

- After selecting a large range, you'll often no longer see the active cell because you've scrolled it off the screen. If you need to see the active cell before continuing, you can either use the scrollbars to bring it into view or press Ctrl+backspace.

- You can use Excel's Extend mode as an alternative method for using the mouse to select a rectangular, contiguous range. Click the upper-left cell of the range you want to select, press F8 to enter Extend mode (you see `Extend Selection` in the status bar), then click the lower-right cell of the range. Excel selects the entire range. Press F8 again to turn off Extend mode.

- If the cells you want to work with are scattered willy-nilly throughout the sheet, you need to combine them into a noncontiguous range. The secret to defining a noncontiguous range is to hold down the Ctrl key while selecting the cells. That is, you first select the cell or range you want to include in the noncontiguous range, press and hold down the Ctrl key, and then select the other cells or rectangular ranges you want to include in the noncontiguous range.

> **CAUTION**
>
> When you're selecting a noncontiguous range, always press and hold down the Ctrl key *after* you've selected your first cell or range. Otherwise, Excel includes the currently selected cell or range as part of the noncontiguous range. This action could create a circular reference in a function if you are defining the range as one of the function's arguments.

➔ If you're not sure what a "circular reference" is, **see** "Fixing Circular References," **p.120**.

Keyboard Range-Selection Tricks

Excel also comes with a couple of tricks to make selecting a range via the keyboard easier or more efficient:

- If you want to select a contiguous range that contains data, there's an easier way to select the entire range. First, move to the upper-left cell of the range. To select the contiguous cells below the upper-left cell, press Ctrl+Shift+down arrow; to select the contiguous cells to the right of the selected cells, press Ctrl+Shift+right arrow.

- If you select a range large enough that all the cells don't fit on the screen, you can scroll through the selected cells by activating the Scroll Lock key. When Scroll Lock is on, pressing the arrow keys (or Page Up and Page Down) scrolls you through the cells while keeping the selection intact.

Working with 3D Ranges

A *3D range* is a range selected on multiple worksheets. This is a powerful concept because it means that you can select a range on two or more sheets and then enter data, apply formatting, or give a command, and the operation will affect all the ranges at once. This is useful when you're working with a multi-sheet model where some or all of the labels are the same on each sheet. For example, in a workbook of expense calculations where each sheet details the expenses from a different division or department, you might want the label "Expenses" to appear in cell A1 on each sheet.

To create a 3D range, you first need to group the worksheets you want to work with. To select multiple sheets, use any of the following techniques:

- To select adjacent sheets, click the tab of the first sheet, hold down the Shift key, and click the tab of the last sheet.

- To select nonadjacent sheets, hold down the Ctrl key and click the tab of each sheet you want to include in the group.

- To select all the sheets in a workbook, right-click any sheet tab and click the Select All Sheets command.

When you've selected your sheets, each tab is highlighted and `[Group]` appears in the workbook title bar. To ungroup the sheets, click a tab that isn't in the group. Alternatively, you can right-click one of the group's tabs and select the Ungroup Sheets command from the shortcut menu.

With the sheets now grouped, you create your 3D range by activating any of the grouped sheets and then selecting a range. Excel selects the same cells in all the other sheets in the group.

You can also type in a 3D range by hand when, say, entering a formula. Here's the general format for a 3D reference:

`FirstSheet:LastSheet!ULCorner:LRCorner`

Here, *FirstSheet* is the name of the first sheet in the 3D range, *LastSheet* is the name of the last sheet, and *ULCorner* and *LRCorner* define the cell range you want to work with on each sheet. For example, to specify the range A1:E10 on worksheets Sheet1, Sheet2, and Sheet3, use the following reference:

```
Sheet1:Sheet3!A1:E10
```

> **CAUTION**
>
> If one or both of the sheet names used in the 3D reference contains a space, be sure to enclose the sheet names in single quotation marks, as in this example:
>
> ```
> 'First Quarter:Fourth Quarter'!A1:F16
> ```

You normally use 3D references in worksheet functions that accept them. These functions include AVERAGE(), COUNT(), COUNTA(), MAX(), MIN(), PRODUCT(), STDEV(), STDEVP(), SUM(), VAR(), and VARP(). (You'll learn about all of these functions and many more in Part 2, "Harnessing the Power of Functions.")

Selecting a Range Using Go To

For very large ranges, Excel's Go To command comes in handy. You normally use the Go To command to jump quickly to a specific cell address or range name. The following steps show you how to exploit this power to select a range:

1. Select the upper-left cell of the range.

2. Choose Home, Find & Select, <u>G</u>o To, or press Ctrl+G. The Go To dialog box appears, as shown in Figure 1.1.

Figure 1.1
You can use the Go To dialog box to eas-ily select a large range.

3. Use the <u>R</u>eference text box to enter the cell address of the lower-right corner of the range.

> **TIP**
>
> You also can select a range using Go To by entering the range coordinates in the <u>R</u>eference text box.

4. Hold down the Shift key and click OK. Excel selects the range.

> T I P Another way to select very large ranges is to choose View, Zoom and click a reduced magnification in the Zoom dialog box (say, 50% or 25%). You can then use this "big picture" view to select your range.
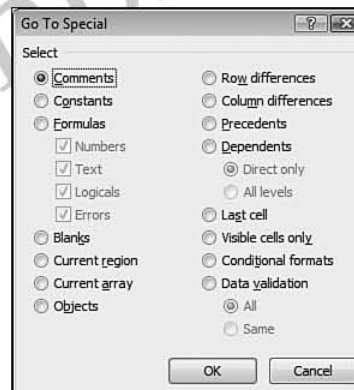
Using the Go To Special Dialog Box

You normally select cells according to their position within a worksheet, but Excel includes a powerful feature that enables you to select cells according to their contents or other special properties. If you choose Home, Find & Select, Go To Special (or click the Special button in the Go To dialog box), the Go To Special dialog box appears, as shown in Figure 1.2.

Figure 1.2
Use the Go To Special dialog box to select cells according to their contents, formula relationships, and more.

Selecting Cells by Type

The Go To Special dialog box contains many options, but only four of them enable you to select cells according to the type of contents they contain. Table 1.1 summarizes these four options. (The next few sections discuss the other Go To Special options.)

Table 1.1   Options for Selecting a Cell by Type

Option	Description
Comments	Selects all cells that contain a comment (you can also choose Home, Find & Select, Comments)
Constants	Selects all cells that contain constants of the types specified in one or more of the check boxes listed under the Formulas option (you can also choose Home, Find & Select, Constants)

Table 1.1 Continued

Option	Description	
Formulas	Selects all cells containing formulas that produce results of the types specified in one or more of the following four check boxes (you can also choose Home, Find & Select, Formulas):	
	Numbers	Selects all cells that contain numbers
	Text	Selects all cells that contain text
	Logicals	Selects all cells that contain logical values
	Errors	Selects all cells that contain errors
Blanks	Selects all cells that are blank	

Selecting Adjacent Cells

If you need to select cells adjacent to the active cell, the Go To Special dialog box gives you two options. Click the Current Region option to select a rectangular range that includes all the nonblank cells that touch the active cell.

If the active cell is part of an array, click the Current Array option to select all the cells in the array.

→ For an in-depth discussion of Excel arrays, **see** "Working with Arrays," **p. 89**.

Selecting Cells by Differences

Excel also enables you to select cells by comparing rows or columns of data and selecting only those cells that are different. The following steps show you how it's done:

1. Select the rows or columns you want to compare. (Make sure that the active cell is in the row or column with the comparison values you want to use.)

2. Display the Go To Special dialog box, and click one of the following options:

Row Differences	This option uses the data in the active cell's column as the comparison values. Excel selects the cells in the corresponding rows that are different.
Column Differences	This option uses the data in the active cell's row as the comparison values. Excel selects the cells in the corresponding columns that are different.

3. Click OK.

For example, Figure 1.3 shows a selected range of numbers. The values in column B are the budget numbers assigned to all the company's divisions; the values in columns C and D are the actual numbers achieved by the East Division and the West Division, respectively. Suppose you want to know the items for which a division ended up either under or over the budget. In other words, you want to compare the numbers in columns C and D with those in column B, and select the ones in C and D that are different. Because you're comparing

rows of data, you would select the Row Differences option from the Go To Special dialog box. Figure 1.4 shows the results.

Figure 1.3
Before using the Go To Special feature that compares rows (or columns) of data, select the entire range of cells involved in the comparison.

Figure 1.4
After running the Row Differences option, Excel shows those rows in columns C and D that are different than the value in column B.

Selecting Cells by Reference

If a cell contains a formula, Excel defines the cell's *precedents* as those cells that the formula refers to. For example, if cell A4 contains the formula =SUM(A1:A3), cells A1, A2, and A3 are the precedents of A4. A *direct* precedent is a cell referred to explicitly in the formula. In the preceding example, A1, A2, and A3 are direct precedents of A4. An *indirect* precedent is a cell referred to by a precedent. For example, if cell A1 contains the formula =B3*2, cell B3 is an indirect precedent of cell A4.

Excel also defines a cell's *dependents* as those cells with a formula that refers to the cell. In the preceding example, cell A4 would be a dependent of cell A1. (Think of it this way:

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The value that appears in cell A4 *depends on* the value that's entered into cell A1.) Like precedents, dependents can be direct or indirect.

The Go To Special dialog box enables you to select precedents and dependents as described in these steps:

1. Select the range you want to work with.
2. Display the Go To Special dialog box.
3. Click either the Precedents or the Dependents option.
4. Click the Direct Only option to select only direct precedents or dependents. If you need to select both the direct and the indirect precedents or dependents, click the All Levels option.
5. Click OK.

Other Go To Special Options

The Go To Special dialog box includes a few more options to help you in your range-selection chores:

Option	Description
Last Cell	Selects the last cell in the worksheet (that is, the lower-right corner) that contains data or formatting.
Visible Cells Only	Selects only cells that are unhidden.
Conditional Formats	Selects only cells that contain conditional formatting (you can also choose Home, Find & Select, Conditional Formatting).
Data Validation	Selects cells that contain data-validation rules (you can also choose Home, Find & Select, Data Validation). If you click All, Excel selects every cell with a data-validation rule; if you click Same, Excel selects every cell that has the same validation rule as the current cell.

➔ To learn about conditional formatting, **see** "Applying Conditional Formatting to a Range," **p. 24**.

➔ To learn about data validation, **see** "Applying Data-Validation Rules to Cells," **p. 102**.

Shortcut Keys for Selecting via Go To

Table 1.2 lists the shortcut keys you can use to run many of the Go To Special operations.

Table 1.2   Shortcut Keys for Selecting Precedents and Dependents

Shortcut Key	Selects
Ctrl+*	Current region
Ctrl+/	Current array
Ctrl+\	Row differences
Ctrl+|	Column differences
Ctrl+[	Direct precedents
Ctrl+]	Direct dependents
Ctrl+{	All levels of precedents
Ctrl+}	All levels of dependents
Ctrl+End	The last cell
Alt+;	Visible cells

Data Entry in a Range

If you know in advance the range you'll use for data entry, you can save yourself some time and keystrokes by selecting the range before you begin. As you enter your data in each cell, use the keys listed in Table 1.3 to navigate the range.

Table 1.3   Navigation Keys for a Selected Range

Key	Result
Enter	Moves down one row
Shift+Enter	Moves up one row
Tab	Moves right one column
Shift+Tab	Moves left one column
Ctrl+. (period)	Moves from corner to corner in the range
Ctrl+Alt+right arrow	Moves to the next range in a noncontiguous selection
Ctrl+Alt+left arrow	Moves to the preceding range in a noncontiguous selection

The advantage of this technique is that the active cell never leaves the range. For example, if you press Enter after adding data to a cell in the last row of the range, the active cell moves back to the top row and over one column.

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Filling a Range

If you need to fill a range with a particular value or formula, Excel gives you two methods:

- Select the range you want to fill, type the value or formula, and press Ctrl+Enter. Excel fills the entire range with whatever you entered in the formula bar.

- Enter the initial value or formula, select the range you want to fill (including the initial cell), and choose Home, Fill. Then choose the appropriate command from the submenu that appears. For example, if you're filling a range down from the initial cell, choose the Down command. If you've selected multiple sheets, use Home, Fill, Across Worksheets to fill the range in each worksheet.

> **TIP**
>
> Press Ctrl+D to choose Home, Fill, Down; press Ctrl+R to choose Home, Fill, Right.

Using the Fill Handle

The *fill handle* is the small black square in the bottom-right corner of the active cell or range. This versatile little tool can do many useful things, including create a series of text or numeric values and fill, clear, insert, and delete ranges. The next few sections show you how to use the fill handle to perform each of these operations.

Using AutoFill to Create Text and Numeric Series

Worksheets often use text series (such as January, February, March; or Sunday, Monday, Tuesday) and numeric series (such as 1, 3, 5; or 2003, 2004, 2005). Instead of entering these series by hand, you can use the fill handle to create them automatically. This handy feature is called *AutoFill*. The following steps show you how it works:

1. For a text series, select the first cell of the range you want to use, and enter the initial value. For a numeric series, enter the first two values and then select both cells.

2. Position the mouse pointer over the fill handle. The pointer changes to a plus sign (+).

3. Click and drag the mouse pointer until the gray border encompasses the range you want to fill. If you're not sure where to stop, keep your eye on the pop-up value that appears near the mouse pointer and shows you the series value of the last selected cell.

4. Release the mouse button. Excel fills in the range with the series.

When you release the mouse button after using AutoFill, Excel not only fills in the series, but it also displays the Auto Fill Options smart tag. To see the options, move your mouse pointer over the smart tag and then click the downward-pointing arrow to drop down the list. The options you see depend on the type of series you created. (See "Creating a Series," later in this chapter, for details on some of the options you might see.) However, you'll usually see at least the following four:

<u>C</u>opy Cells—Click this option to fill the range by copying the original cell or cells.

Fill <u>S</u>eries—Click this option to get the default series fill.

Fill <u>F</u>ormatting Only—Click this option to apply only the original cell's formatting to the selected range.

Fill With<u>o</u>ut Formatting—Click this option to fill the range with the series data but without the formatting of the original cell.

Figure 1.5 shows several series created with the fill handle (the shaded cells are the initial fill values). Notice, in particular, that Excel increments any text value that includes a numeric component (such as Quarter 1 and Customer 1001).

Figure 1.5
Some sample series created with the fill handle. Shaded entries are the initial fill values.

Auto Fill Options list

Keep a few guidelines in mind when using the fill handle to create series:

■ Clicking and dragging the handle down or to the right increments the values. Clicking and dragging up or to the left decrements the values.

■ The fill handle recognizes standard abbreviations, such as Jan (January) and Sun (Sunday).

■ To vary the series interval for a text series, enter the first two values of the series and then select both of them before clicking and dragging. For example, entering `1st` and `3rd` produces the series `1st`, `3rd`, `5th`, and so on.

■ If you use three or more numbers as the initial values for the fill handle series, Excel creates a "best fit" or "trend" line.

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Creating a Custom AutoFill List

As you've seen, Excel recognizes certain values (for example, January, Sunday, Quarter 1) as part of a larger list. When you drag the fill handle from a cell containing one of these values, Excel fills the cells with the appropriate series. However, you're not stuck with just the few lists that Excel recognized out of the box. You're free to define your own AutoFill lists, as described in the following steps:

1. Choose Office, Excel Options to display the Excel Options dialog box.

2. Click Popular and then click Edit Custom Lists to open the Custom Lists dialog box.

3. In the Custom Lists box, click New List. An insertion point appears in the List Entries box.

4. Type an item from your list into the List Entries box and press Enter. Repeat this step for each item. (Make sure that you add the items in the order in which you want them to appear in the series.) Figure 1.6 shows an example.

Figure 1.6
Use the Custom Lists tab to create your own lists that Excel can fill in automatically using the AutoFill feature.
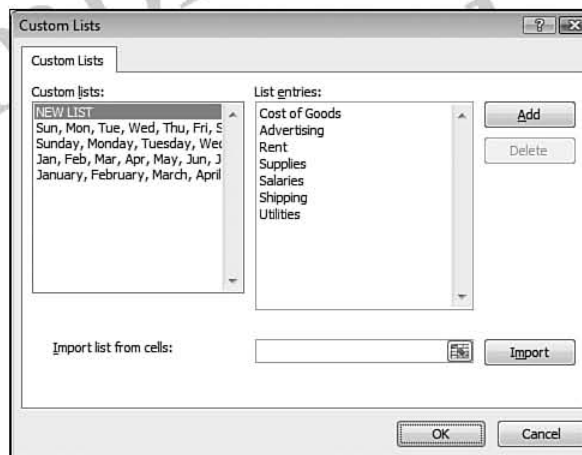
5. Click Add to add the list to the Custom Lists box.

6. Click OK and then click OK again to return to the worksheet.

TIP   If you already have the list in a worksheet range, don't bother entering each item by hand. Instead, activate the Import List from Cells edit box and enter a reference to the range (you can either type the reference or select the cells directly on the worksheet). Click the Import button to add the list to the Custom Lists box.

NOTE   If you need to delete a custom list, highlight it in the Custom Lists box and then click Delete.

Filling a Range

You can use the fill handle to fill a range with a value or formula. To do this, enter your initial values or formulas, select them, and then click and drag the fill handle over the destination range. (I'm assuming here that the data you're copying won't create a series.) When you release the mouse button, Excel fills the range.

Note that if the initial cell contains a formula with relative references, Excel adjusts the references accordingly. For example, suppose the initial cell contains the formula =A1. If you fill down, the next cell will contain the formula =A2, the next will contain =A3, and so on.

➜ For information on relative references, **see** "Understanding Relative Reference Format," **p. 65**.

Creating a Series

Instead of using the fill handle to create a series, you can use Excel's Series command to gain a little more control over the whole process. Follow these steps:

1. Select the first cell you want to use for the series, and enter the starting value. If you want to create a series out of a particular pattern (such as 2, 4, 6, and so on), fill in enough cells to define the pattern.

2. Select the entire range you want to fill.

3. Choose Home, Fill, Series. Excel displays the Series dialog box, shown in Figure 1.7.

Figure 1.7
Use the Series dialog box to define the series you want to create.
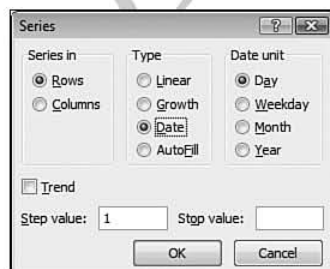
4. Either click Rows to create the series in rows starting from the active cell, or click Columns to create the series in columns.

5. Use the Type group to click the type of series you want. You have the following options:

Linear	This option finds the next series value by adding the step value (see step 7) to the preceding value in the series.
Growth	This option finds the next series value by multiplying the preceding value by the step value.
Date	This option creates a series of dates based on the option you select in the Date Unit group (Day, Weekday, Month, or Year).

AutoFill	This option works much like the fill handle. You can use it to extend a numeric pattern or a text series (for example, Qtr1, Qtr2, Qtr3).

6. If you want to extend a series trend, activate the Trend check box. You can use this option only with the Linear or Growth series types.

7. If you chose a Linear, Growth, or Date series type, enter a number in the Step Value box. This number is what Excel uses to increment each value in the series.

8. To place a limit on the series, enter the appropriate number in the Stop Value box.

9. Click OK. Excel fills in the series and returns you to the worksheet.

Figure 1.8 shows some sample column series. Note that the Growth series stops at cell C12 (value 128) because the next term in the series (256) is greater than the stop value of 250. The Day series fills the range with every second date (because the step value is 2). The Weekday series is slightly different: The dates are sequential, but weekends are skipped.

Figure 1.8
Some sample column series generated with the Series command.

Series Type:	Linear	Growth	Date (Day)	Date (Weekday)	Date (Month)
Step Value:	5	2	2	1	6
Stop Value:	-	250			
	0	1	1/1/2007	1/1/2007	1/1/2007
	5	2	1/3/2007	1/2/2007	7/1/2007
	10	4	1/5/2007	1/3/2007	1/1/2008
	15	8	1/7/2007	1/4/2007	7/1/2008
	20	16	1/9/2007	1/5/2007	1/1/2009
	25	32	1/11/2007	1/8/2007	7/1/2009
	30	64	1/13/2007	1/9/2007	1/1/2010
	35	128	1/15/2007	1/10/2007	7/1/2010
	40		1/17/2007	1/11/2007	1/1/2011
	45		1/19/2007	1/12/2007	7/1/2011

Advanced Range Copying

The standard Excel range copying techniques (for example, choosing Home, Copy or pressing Ctrl+C and then choosing Home, Paste or pressing Ctrl+V) normally copy the entire contents of each cell in the range: the value or formula, the formatting, and any attached cell comments. If you like, you can tell Excel to copy only some of these attributes, you can transpose rows and columns, or you can combine the source and destination ranges arithmetically. All this is possible with Excel's Paste Special command. These techniques are outlined in the next three sections.

Copying Selected Cell Attributes

When rearranging a worksheet, you can save time by combining cell attributes. For example, if you need to copy several formulas to a range but you don't want to disturb the existing formatting, you can tell Excel to copy only the formulas.

If you want to copy only selected cell attributes, follow these steps:

1. Select and then copy the range you want to work with.

2. Select the destination range.

3. Choose Home, pull down the Paste menu, and then choose Paste <u>S</u>pecial. Excel displays the Paste Special dialog box, shown in Figure 1.9.

Figure 1.9
Use the Paste Special dialog box to select the cell attributes you want to copy.
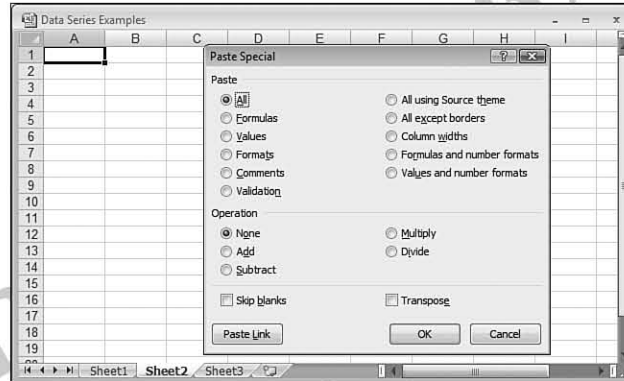

> **TIP**
> You also can display the Paste Special dialog box by right-clicking the destination range and choosing Paste <u>S</u>pecial from the shortcut menu.

4. In the Paste group, click the attribute you want to paste into the destination range:

<u>A</u>ll	Pastes all of the source range's cell attributes.
<u>F</u>ormulas	Pastes only the cell formulas (you can also choose Home, Paste, <u>F</u>ormulas).
<u>V</u>alues	Converts the cell formulas to values and pastes only the values (you can also choose Home, Paste, Paste <u>V</u>alues).
Forma<u>t</u>s	Pastes only the cell formatting.
<u>C</u>omments	Pastes only the cell comments.
Validatio<u>n</u>	Pastes only the cell-validation rules.
All Using Source T<u>h</u>eme	Pastes all the cell attributes and formats the copied range using the theme that's applied to the copied range.
All E<u>x</u>cept Borders	Pastes all the cell attributes except the cell's border formatting (you can also choose Home, Paste, No <u>B</u>orders).
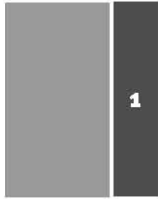
Column Widths	Changes the width of the destination columns to match the widths of the source columns. No data is pasted.
Formulas and Number Formats	Pastes the cell formulas and numeric formatting.
Values and Number Formats	Converts the cell formulas to values and pastes only the values and the numeric formats.

5. If you don't want Excel to paste any blank cells included in the selection, activate the Skip Blanks check box.

6. If you want to paste only formulas that set the destination cells equal to the values of the source cells, click Paste Link. (For example, if the source cell is A1, the value of the destination cell is set to the formula =A1.) Otherwise, click OK to paste the range.

Combining the Source and Destination Arithmetically

Excel enables you to combine two ranges arithmetically. For example, suppose that you have a range of constants that you want to double. Instead of creating formulas that multiply each cell by 2 (or, even worse, doubling each cell by hand), you can create a range of the same size that consists of nothing but 2s. You then combine this new range with the old one and tell Excel to multiply them. The following steps show you what to do:

1. Select the destination range. (Make sure that it's the same shape as the source range.)

2. Type the constant you want to use, and then press Ctrl+Enter. Excel fills the destination range with the number you entered.

3. Select and copy the source range.

4. Select the destination range again.

5. Choose Home, click the bottom half of the Paste button, and then choose Paste Special to display the Paste Special dialog box.

6. Use the following options in the Operation group to click the arithmetic operator you want to use:

| None	Performs no operation.
Add	Adds the destination cells to the source cells.
Subtract	Subtracts the source cells from the destination cells.
Multiply	Multiplies the source cells by the destination cells.
Divide	Divides the destination cells by the source cells.

7. If you don't want Excel to include any blank cells in the operation, activate the Skip Blanks check box.

8. Click OK. Excel pastes the results of the operation (the final values, not formulas) into the destination range.

Transposing Rows and Columns

If you have row data that you would prefer to see in columns (or vice versa), you can use the Transpose command to transpose the data. Follow these steps:

1. Select and copy the source cells.

2. Select the upper-left corner of the destination range.

3. Choose Home, pull down the Paste menu, and choose Transpose. (If you already have the Paste Special dialog box open, activate the Transpose check box and then click OK.) Excel transposes the source range, as shown in Figure 1.10.

Transposed destination range

Figure 1.10
You can use the Transpose command to transpose a column of data into a row (as shown here), or vice versa.

Copied range
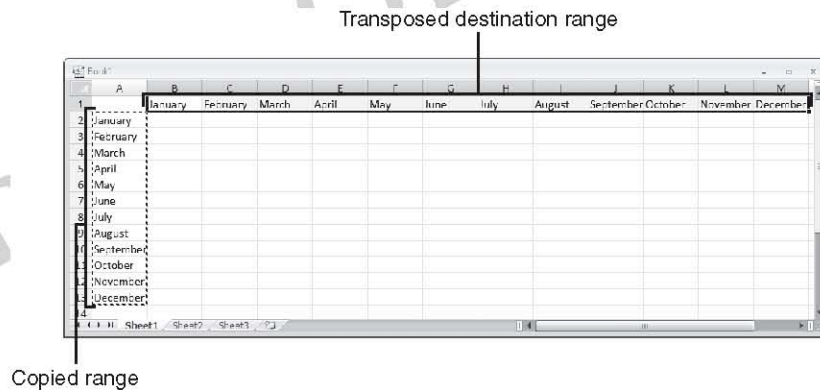
Clearing a Range

Deleting a range actually removes the cells from the worksheet. What if you want the cells to remain, but you want their contents or formats cleared? For that, you can use Excel's Clear command, as described in the following steps:

1. Select the range you want to clear.

2. Choose Home, Clear. Excel displays a submenu of Clear commands.

3. Select either Clear All, Clear Formats, Clear Contents, or Clear Comments, as appropriate.

To clear the values and formulas in a range with the fill handle, you can use either of the following two techniques:

- If you want to clear only the values and formulas in a range, select the range and then click and drag the fill handle into the range and over the cells you want to clear. Excel grays out the cells as you select them. When you release the mouse button, Excel clears the cells' values and formulas.

- If you want to scrub everything from the range (values, formulas, formats, and comments), select the range and then hold down the Ctrl key. Next, click and drag the fill handle into the range and over each cell you want to clear. Excel clears the cells when you release the mouse button.

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Applying Conditional Formatting to a Range

Many Excel worksheets contain hundreds of data values. The chapters in the rest of this book are designed to help you make sense of large sets of data by creating formulas, applying functions, and performing data analysis. However, there are plenty of times when you don't really want to analyze a worksheet per se. Instead, all you really want are answers to simple questions such as "Which cell values are less than 0?" or "What are the top 10 values?" or "Which cell values are above average and which are below average?"

These simple questions aren't easy to answer just by glancing at the worksheet, and the more numbers you're dealing with, the harder it gets. To help you "eyeball" your worksheets and answer these and similar questions, Excel lets you apply *conditional formatting* to the cells. This is a special format that Excel only applies to those cells that satisfy some condition. For example, you could show all the negative values in a red font.

In previous versions of Excel, you could only apply a few formats to cells that satisfied the condition: You could change the font, apply a border, or assign a background pattern. You also had only a few options for creating your conditions: less than, equal to, between, and so on. In Excel 2007, Microsoft has given conditional formatting a complete makeover that simultaneously makes the feature easier to use and more powerful (which is no mean feat). You get a wider array of formatting options—including the capability of applying numeric formats and gradient fill effects—and many more options for setting up conditions, which in Excel 2007 are called *rules*—for example, cells that are in the top or bottom of the range, cells that are above or below average, unique or duplicate values, and more. Excel 2007 also enables you to augment cells with special features—called data bars, color scales, and icon sets—that let you see at a glance how the cell values in a range relate to each other. The next few sections show you how to use these new conditional formatting features.

Creating Highlight Cells Rules

NEW A *highlight cell* rule is one that applies a format to cells that meet specified criteria. In this sense, a highlight cell rule is similar to the conditional formatting feature in Excel 2003, although Excel 2007 adds a few new wrinkles, as you'll see. To create a highlight cell rule, begin by choosing Home, Conditional Formatting, Highlight Cells Rules. Excel displays seven choices:

Greater Than	Choose this command to apply formatting to cells with values greater than the value you specify. For example, if you want to identify sales reps who increased their sales by more than 10 percent over last year, you'd create a column that calculates the percentage difference in yearly sales (see column D in Figure 1.11) and you'd then apply the Greater Than rule to that column to look for increases greater than 0.1.

Less Than	Choose this command to apply formatting to cells with values less than the value you specify. For example, if you want to recognize divisions, products, or reps whose sales fell from the previous year, you'd use this command to look for percentage or absolute differences that are less than 0.
Between	Choose this command to apply formatting to cells with values between the two values you specify. For example, if you have a series of fixed-income investment possibilities on a worksheet and you're only interested in medium term investments, you'd apply this rule to highlight investments where the value in the Term column (expressed in years) is between 5 and 10.
Equal To	Choose this command to apply formatting to cells with values equal to the value you specify. For example, in a table of product inventory where you're interested in those products that are currently out of stock, you'd apply this rule to highlight those products where the value in the On Hand column equals 0.
Text that Contains	Choose this command to apply formatting to cells with text values that contain the text value you specify (which is not case sensitive). For example, in a table of bonds that includes ratings where you're interested only in those bonds that are upper medium quality or higher (A, AA, or AAA), you'd apply this rule to highlight ratings that include the letter A. (Note that this doesn't work for certain rating codes that include A in lower ratings, such as Baa and Ba.)
A Date Occurring	Choose this command to apply formatting to cells with date values that satisfy the condition you choose: Yesterday, Today, Tomorrow, In the Last 7 Days, Next Week, and so on. For example, in a table of employee data that includes birthdays, you could apply this command to the birthdays to look for those that occur next week so you can plan celebrations ahead of time.
Duplicate Values	Choose this command to apply formatting to cells with values that appear more than once in the range. For example, if you have a table of account numbers, no two customers should have the same account number, so you can apply the Duplicate Values rule to those numbers to make sure they're unique. You can also format cells with unique values—values that appear only once in the range.

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In each case, you see a dialog box that you use to specify the condition and the formatting that you want applied to cells that match the condition. For example, Figure 1.11 shows the Less Than dialog box. In this case, I'm looking for cell values that are less than 0; Figure 1.12 shows the worksheet with the conditional formatting applied.

Figure 1.11

In the Highlight Cells Rules menu, choose a command to display a dialog box for entering your condition, such as the Less Than dialog box shown here.

Figure 1.12

The conditional formatting rule shown in Figure 1.11 applied to the percentages in column D.

Creating Top/Bottom Rules

A *top/bottom* rule is one that applies a format to cells that rank in the top or bottom (for numerical items, the highest or lowest) values in a range. You can select the top or bottom either as an absolute value (for example, the top 10 items) or as a percentage (for example, the bottom 25 percent). You can also apply formatting to those cells that are above or below the average. To create a top/bottom rule, begin by choosing Home, Conditional Formatting, Top/Bottom Rules. Excel displays six choices:

| Top 10 Items | Choose this command to apply formatting to those cells with values that rank in the top X items in the range, where X is the number of items you want to see (the default is 10). For example, in a table of product sales, you could use this rule to see the top 50 products. |

Top 10%	Choose this command to apply formatting to those cells with values that rank in the top X percentage of items in the range, where X is the percentage you want to see (the default is 10). For example, in a table of sales by sales rep, you could recognize your elite performers by applying this rule to see those reps who are in the top 5 percent.
Bottom 10 Items	Choose this command to apply formatting to those cells with values that rank in the bottom X items in the range, where X is the number of items you want to see (the default is 10). For example, if you have a table of unit sales by product, you could apply this rule to see the 20 products that sold the fewest units with an eye to either promoting those products or discontinuing them.
Bottom 10%	Choose this command to apply formatting to those cells with values that rank in the bottom X percentage of items in the range, where X is the percentage you want to see (the default is 10). For example, in a table that displays product manufacturing defects, you could apply this rule to see those products that rank in the bottom 10%, and so are the most reliably produced.
Above Average	Choose this command to apply formatting to those cells with values that are above the average of all the values in the range. For example, in a table of investment returns, you could apply this rule to see those investments that are performing above the average for all your investments.
Below Average	Choose this command to apply formatting to those cells with values that are below the average of all the values in the range. For example, if you have a list of products and the margins they generate, you could apply this rule to see those that have below average margins so you can take steps to improve sales or reduce costs.

In each case, you see a dialog box that you use to set up the specifics of the rule. For the Top 10 Items, Top 10%, Bottom 10 Items, and Bottom 10% rules, you use the dialog box to specify the condition and the formatting that you want applied to cells that match the condition. (For the Above Average and Below Average rules, you use the dialog box to specify the formatting only.) For example, Figure 1.13 shows the Top 10 Items dialog box. In this case, I'm looking for the top 10 values in the range; Figure 1.14 shows the worksheet with the conditional formatting applied.

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Figure 1.13
In the Top/Bottom Rules menu, choose a command to display a dialog box for entering your condition, such as the Top 10 Items dialog box shown here.

Figure 1.14
The conditional formatting rule shown in Figure 1.13 applied to the dollar values in column C.

CAUTION

Excel 2007 supports unlimited (within the confines of your system memory) conditional formatting rules for any range (previous versions allowed only a maximum of three conditional formats). Be careful, though: When you apply a rule, select the range, and then apply another rule, Excel does *not* replace the original rule. Instead, it adds the new rule to the existing one. If you want to change an existing rule, choose Home, Conditional Formatting, Manage Rules, click the rule, and then click Edit Rule.

Adding Data Bars

NEW Applying formatting to cells based on highlight cells rules or top/bottom rules is a great way to get particular values to stand out in a crowded worksheet. However, what if you're more interested in the *relationship* between similar values in a worksheet? For example, if you have a table of products that includes a column showing unit sales, how do you compare the relative sales of all the products? You could create a new column that calculates the percentage of unit sales for each product relative to the highest value. If the product with the highest sales sold 1,000 units, a product that sold 500 units would show 50% in the new column.

That would work, but all you're doing is adding more numbers to the worksheet, which may not make things any clearer. You really need some way to *visualize* the relative values in a range, and that's where Excel 2007's new *data bars* come in. Data bars are colored, horizontal bars that appear "behind" the values in a range. (They're reminiscent of a horizontal bar chart.) Their key feature is that the length of the data bar that appears in each cell depends on the value in that cell: the larger the value, the longer the data bar. The cell with the highest value has the longest data bar, and the data bars that appear in the other cells have lengths that reflect their values. (For example, a cell with a value that is half of the largest value would have a data bar that's half as long as the longest data bar.)

To apply data bars to the selected range, choose Home, Conditional Formatting, Data Bars, and then choose the color you prefer. Figure 1.15 shows data bars applied to the values in the worksheet's Units column.

> **TIP**
>
> When you work with data bars, you'll notice that the shortest bar never gets *too* short. For example, if you have a value of 10 in one cell and all the other values are in the thousands, you'll still see a fairly substantial data bar in the cell with value 10. That's because Excel sets the minimum data bar size at 10 percent of the cell width. If that minimum width is throwing off your visualization, you can change it using VBA. The trick is to set the `PercentMin` property for the `Databar` object associated with the range. Select the range, open the VBA Editor (press Alt+F11), and then enter and run the following macro:
>
> ```
> Sub SetDataBarMin()
>     Dim db As Databar
>     For Each db In Selection.FormatConditions
>         db.PercentMin = 5
>     Next 'db
> End Sub
> ```

Figure 1.15
Use data bars to visualize the relative values in a range.

	Product Name	Units	$ Total	D	E	F	G	H
2	Northwind Traders Almonds	20	$ 200					
3	Northwind Traders Beer	487	$ 6,818					
4	Northwind Traders Boysenberry Spread	100	$ 2,500					
5	Northwind Traders Cajun Seasoning	40	$ 880					
6	Northwind Traders Chai	40	$ 720					
7	Northwind Traders Chocolate	200	$ 2,550					
8	Northwind Traders Chocolate Biscuits Mix	85	$ 782					
9	Northwind Traders Clam Chowder	290	$ 2,799					
10	Northwind Traders Coffee	650	$ 29,900					
11	Northwind Traders Crab Meat	120	$ 2,208					
12	Northwind Traders Curry Sauce	65	$ 2,600					
13	Northwind Traders Dried Apples	40	$ 2,120					
14	Northwind Traders Dried Pears	40	$ 1,200					
15	Northwind Traders Dried Plums	75	$ 263					
16	Northwind Traders Fruit Cocktail	40	$ 1,560					
17	Northwind Traders Gnocchi	10	$ 380					
18	Northwind Traders Green Tea	275	$ 822					
19	Northwind Traders Long Grain Rice	40	$ 280					
20	Northwind Traders Marmalade	40	$ 3,240					
21	Northwind Traders Mozzarella	90	$ 3,132					
22	Northwind Traders Olive Oil	25	$ 534					
23	Northwind Traders Ravioli	100	$ 1,950					
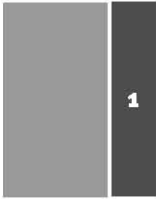
Excel configures its default data bars with the longest data bar based on the highest value in the range, and the shortest data bar based on the lowest value in the range. However, what if you want to visualize your values based on different criteria? With test scores, for example, you might prefer to see the data bars based on values between 0 and 100 (so for a value of 50, the data bar always fills only half the cell, no matter what the top mark is).

To apply custom data bars, select the range and then choose Home, Conditional Formatting, Data Bars, More Rules to display the New Formatting Rule dialog box, shown in Figure 1.16. In the Edit the Rule Description group, make sure Data Bar appears in the Format Style list. Notice that there is a Type list for both the Shortest Bar and Longest Bar. The type determines how Excel applies the data bars. You have five choices:

|	
Lowest/Highest Value	This is the default data bar type: The lowest value in the range gets the shortest data bar, and the highest value in the range gets the longest data bar.
Number	Use this type to base the data bar lengths on values that you specify in the two Value text boxes. For the Shortest Bar, any cell in the range that has a value less than or equal to the value you specify will get the shortest data bar; similarly, for the Longest Bar, any cell in the range that has a value greater than or equal to the value you specify will get the longest data bar.
Percent	Use this type to base the data bar lengths on a percentage of the largest value in the range. For the Shortest Bar, any cell in the range that has a relative value less than or equal to the percentage you specify will get the shortest data bar; for example, if you specify 10 percent and the largest value in the range is 1,000, any cell with a value of 100 or less will get the shortest data bar. For the Longest Bar, any cell in the range that has a relative value greater than or equal to the percentage you specify will get the longest data bar; for example, if you specify 90 percent and the largest value in the range is 1,000, any cell with a value of 900 or more will get the longest data bar.
Formula	Use this type to base the data bar lengths on a formula. I discuss this type in Chapter 8.

➔ To learn how to use the formula type, **see** "Applying Conditional Formatting with Formulas," **p. 175**.

Percentile	Use this type to base the data bar lengths on the percentile within which each cell value falls given the overall range of the values. In this case, Excel ranks all the values in the range and assigns each cell a

position within the ranking. For the Shortest Bar, any cell in the range that has a rank less than or equal to the percentile you specify will get the shortest data bar; for example, if you have 100 values, and specify the 10th percentile, the cells ranked 10th or less will get the shortest data bar. For the Longest Bar, any cell in the range that has a rank greater than or equal to the percentile you specify will get the longest data bar; for example, if you have 100 values and specify the 75th percentile, any cell ranked 75th or higher will get the longest data bar.

Figure 1.16
Use the New Formatting Rule dialog box to apply a different type of data bar.
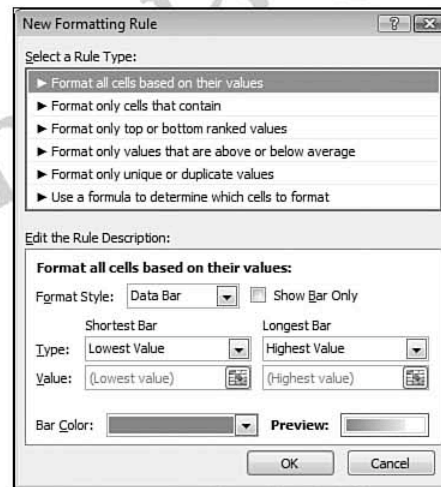
Adding Color Scales
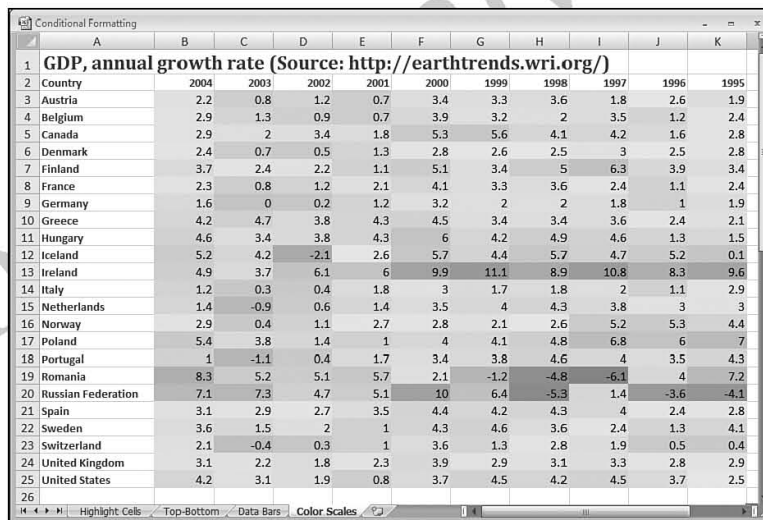
When examining your data, it's often useful to get more of a "big picture" view. For example, you might want to know something about the overall distribution of the values. Are there lots of low values and just a few high values? Are most of the values clustered around the average? Are there any *outliers*, values that are much higher or lower than all or most of the other values? Similarly, you might want to make value judgments about your data. High sales and low numbers of product defects are "good," whereas low margins and high employee turnover rates are "bad."

You can analyze your worksheet data in these and similar ways by using Excel 2007's new *color scales*. A color scale is similar to a data bar in that it compares the relative values of cells in a range. Instead of bars in each cell, you see cell shading, where the shading color is a reflection of the cell's value. For example, the lowest values might be shaded red, the higher values might be shaded light red, then orange, yellow, lime green, and finally deep green for the highest values. The distribution of the colors in the range gives you an

immediate visualization of the distribution of the cell values, and outliers jump out because they have a completely different shading than the rest of the range. Value judgments are built-in because (in this case) you can think of red as being "bad" (think of a red light) and green being "good" (a green light).

To apply a color scale to the selected range, choose Home, Conditional Formatting, Color Scales, and then choose the colors. Figure 1.17 shows color scales applied to a range of gross domestic product (GDP) growth rates for various countries.

Figure 1.17
Use color scales to visualize the distribution of values in a range.

Your configuration options for color scales are similar to those you learned about in the previous section for data bars. To apply a custom color scale, select the range and then choose Home, Conditional Formatting, Color Scales, More Rules to display the New Formatting Rule dialog box. In the Edit the Rule Description group, you can choose either 2-Color Scale or 3-Color Scale in the Format Style list. If you choose the 3-Color Scale, you can select a Type, Value, and Color for three parameters: the Minimum, the Midpoint, and the Maximum, as shown in Figure 1.18. Note that the items in the Type lists are the same as the ones I discussed for data bars in the previous section.

Figure 1.18
Choose 3-Color Scale in the Format Style list to apply three colors to your cells.

New Formatting Rule

Select a Rule Type:

► Format all cells based on their values
► Format only cells that contain
► Format only top or bottom ranked values
► Format only values that are above or below average
► Format only unique or duplicate values
► Use a formula to determine which cells to format

Edit the Rule Description:

Format all cells based on their values:

Format Style: 3-Color Scale

|	Minimum	Midpoint	Maximum
Type:	Lowest Value	Percent	Highest Value
Value:	(Lowest value)	50	(Highest value)
Color:			

Preview:

OK   Cancel

Adding Icon Sets

NEW When you're trying to make sense of a great deal of data, symbols are often a useful aid for cutting through the clutter. With movie reviews, for example, a simple thumb's up (or thumb's down) is immediately comprehensible and tells you something useful about the movie. There are many such symbols that you have strong associations with. For example, a check mark means something is good or finished or acceptable, whereas an X means something is bad or unfinished or unacceptable; a green circle is positive, whereas a red circle is negative (think traffic lights); a smiley face is good, whereas a sad face is bad; an up arrow means things are progressing, a down arrow means things are going backward, and a horizontal arrow means things are remaining as they are.

Excel 2007 puts these and many other symbolic associations to good use with the new *icon sets* feature. Like data bars and color scales, you use icon sets to visualize the relative values of cells in a range. In this case, however, Excel adds a particular icon to each cell in the range, and that icon tells you something about the cell's value relative to the rest of the range. For example, the highest values might get an upward pointing arrow, the lowest values a downward pointing arrow, and the values in between a horizontal arrow.

To apply an icon set to the selected range, choose Home, Conditional Formatting, Icon Sets, and then choose the set you want. Figure 1.19 shows the 5 Arrows icon set applied to the percentage increases and decreases in employee sales.

Figure 1.19
Use icon sets to visualize relative values with meaningful symbols.
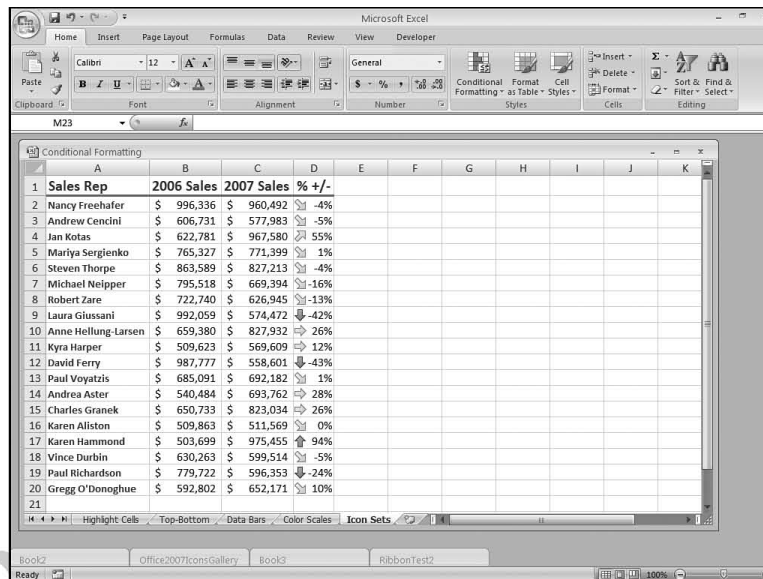
Your configuration options for icon sets are similar to those you learned about for data bars and color scales. In this case, you need to specify a type and value for each icon (although the range for the lowest icon is always assumed to be less than the lower bound of the second-lowest icon range). To apply a custom icon set, select the range and then choose Home, Conditional Formatting, Icon Sets, More Rules to display the New Formatting Rule dialog box, as shown in Figure 1.20. In the Edit the Rule Description group, choose the icon set you want in the Icon Style list. Then select an operator, Value, and Type for each icon.

Figure 1.20
The New Formatting Rule dialog box for a custom icon set.

From Here

- For information on relative references, **see** "Understanding Relative Reference Format," **p. 65**.

- For an in-depth discussion of Excel arrays, **see** "Working with Arrays," **p. 89**.

- To learn about data validation, **see** "Applying Data-Validation Rules to Cells," **p. 102**.

- If you're not sure what a circular reference is, **see** "Fixing Circular References," **p. 120**.

- To learn how to create formula-based rules, **see** "Applying Conditional Formatting with Formulas," **p. 175**.

- To learn more about using Excel for trend analysis, **see** "Using Regression to Track Trends and Make Forecasts," **p. 385**.

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