

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.

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.

	A	B	C	D	E	F	G	H	I
1	Sales Rep	2006 Sales	2007 Sales	% +/-					
2	Nancy Freehafer	\$ 996,336	\$ 960,492	-4%					
3	Andrew Cencini	\$ 606,731	\$ 577,983	-5%					
4	Jan Kotas	\$ 622,781	\$ 967,580	55%					
5	Mariya Sergienko	\$ 765,327	\$ 771,399	1%					
6	Steven Thorpe	\$ 863,589	\$ 827,213	-4%					
7	Michael Neipper	\$ 795,518	\$ 669,394	-16%					
8	Robert Zare	\$ 722,740	\$ 626,945	-13%					
9	Laura Giussani	\$ 992,059	\$ 574,472	-42%					
10	Anne Hellung-Larsen	\$ 659,380	\$ 827,932	26%					
11	Kyra Harper	\$ 509,623	\$ 569,609	12%					
12	David Ferry	\$ 987,777	\$ 558,601	-43%					
13	Paul Voyatzis	\$ 685,091	\$ 692,182	1%					
14	Andrea Aster	\$ 540,484	\$ 693,762	28%					
15	Charles Granek	\$ 650,733	\$ 823,034	26%					
16	Karen Aliston	\$ 509,863	\$ 511,569	0%					
17	Karen Hammond	\$ 503,699	\$ 975,455	94%					
18	Vince Durbin	\$ 630,263	\$ 599,514	-5%					
19	Paul Richardson	\$ 779,722	\$ 596,353	-24%					
20	Gregg O'Donoghue	\$ 592,802	\$ 652,171	10%					
21									

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.

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.

	A	B	C	D	E	F	G	H
1	Product Name	Units	\$ Total					
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					

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.

	A	B	C	D	E	F	G	H
1	Product Name	Units	\$ Total					
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					
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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.

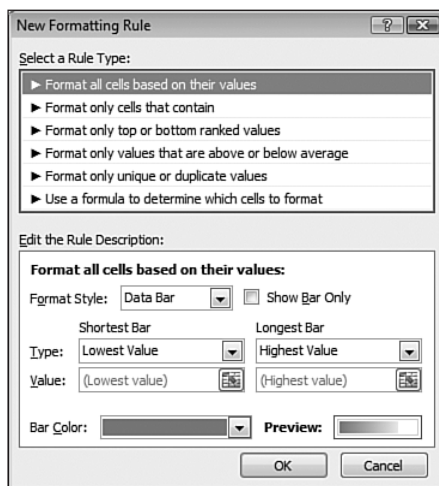
Percentile

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

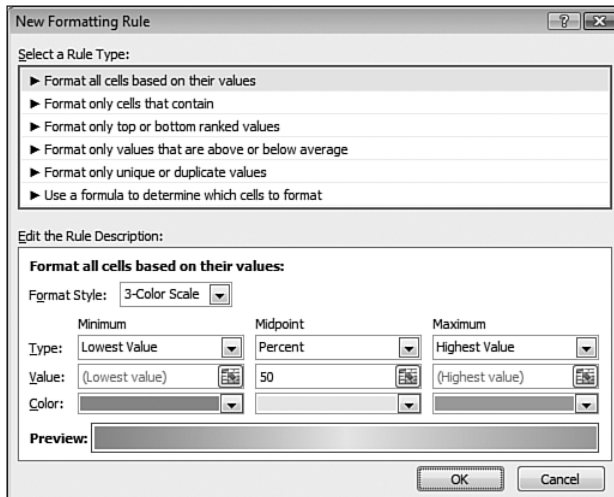
Use color scales to visualize the distribution of values in a range.

	A	B	C	D	E	F	G	H	I	J	K
1	GDP, annual growth rate (Source: http://earthtrends.wri.org/)										
2	Country	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995
3	Austria	2.2	0.8	1.2	0.7	3.4	3.3	3.6	1.8	2.6	1.9
4	Belgium	2.9	1.3	0.9	0.7	3.9	3.2	2	3.5	1.2	2.4
5	Canada	2.9	2	3.4	1.8	5.3	5.6	4.1	4.2	1.6	2.8
6	Denmark	2.4	0.7	0.5	1.3	2.8	2.6	2.5	3	2.5	2.8
7	Finland	3.7	2.4	2.2	1.1	5.1	3.4	5	6.3	3.9	3.4
8	France	2.3	0.8	1.2	2.1	4.1	3.3	3.6	2.4	1.1	2.4
9	Germany	1.6	0	0.2	1.2	3.2	2	2	1.8	1	1.9
10	Greece	4.2	4.7	3.8	4.3	4.5	3.4	3.4	3.6	2.4	2.1
11	Hungary	4.6	3.4	3.8	4.3	6	4.2	4.9	4.6	1.3	1.5
12	Iceland	5.2	4.2	-2.1	2.6	5.7	4.4	5.7	4.7	5.2	0.1
13	Ireland	4.9	3.7	6.1	6	9.9	11.1	8.9	10.8	8.3	9.6
14	Italy	1.2	0.3	0.4	1.8	3	1.7	1.8	2	1.1	2.9
15	Netherlands	1.4	-0.9	0.6	1.4	3.5	4	4.3	3.8	3	3
16	Norway	2.9	0.4	1.1	2.7	2.8	2.1	2.6	5.2	5.3	4.4
17	Poland	5.4	3.8	1.4	1	4	4.1	4.8	6.8	6	7
18	Portugal	1	-1.1	0.4	1.7	3.4	3.8	4.6	4	3.5	4.3
19	Romania	8.3	5.2	5.1	5.7	2.1	-1.2	-4.8	-6.1	4	7.2
20	Russian Federation	7.1	7.3	4.7	5.1	10	6.4	-5.3	1.4	-3.6	-4.1
21	Spain	3.1	2.9	2.7	3.5	4.4	4.2	4.3	4	2.4	2.8
22	Sweden	3.6	1.5	2	1	4.3	4.6	3.6	2.4	1.3	4.1
23	Switzerland	2.1	-0.4	0.3	1	3.6	1.3	2.8	1.9	0.5	0.4
24	United Kingdom	3.1	2.2	1.8	2.3	3.9	2.9	3.1	3.3	2.8	2.9
25	United States	4.2	3.1	1.9	0.8	3.7	4.5	4.2	4.5	3.7	2.5
26											

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.



Adding Icon Sets

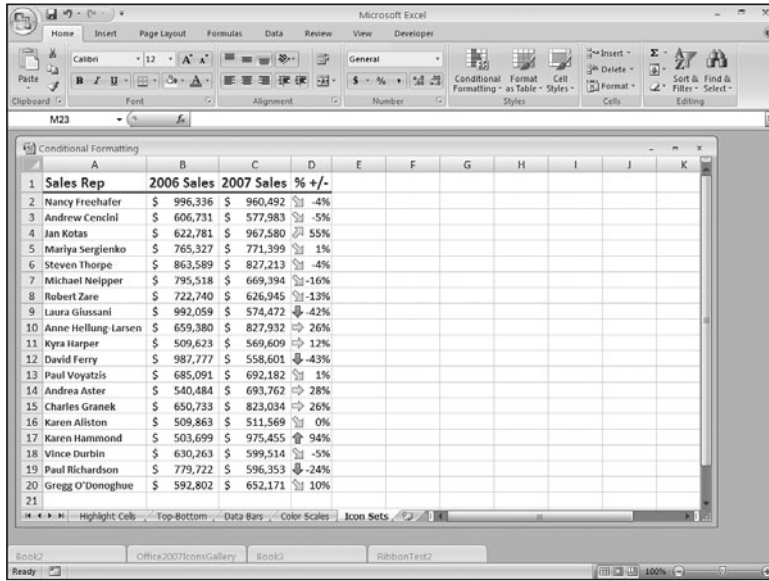
NEW When you're trying to make sense of a great deal of data, symbols are often a useful aid for cutting through the clutter. With movie reviews, for example, a simple thumb's up (or thumb's down) is immediately comprehensible and tells you something useful about the movie. There are many such symbols 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.

