

Course Title:
Advance Excel 2010

MANAGING AND ANALYZING DATA

Exploring Interface of Excel 2010

Microsoft Excel® 2010 is a spreadsheet program designed for computers that run on the Microsoft Windows® operating system. Along with the other programs in the Microsoft Office® 2010 Suite, the 2010 version of Excel has been significantly revamped. With this program, Microsoft has made the user interface more powerful yet simpler to use.

Though the interface has been overhauled, the Excel 2010 work area looks and works much the same as in previous versions of Excel. The work area has three main parts:

- Spreadsheet: This grid of columns (labelled by letter or letter combination, starting with A) and rows (labelled by number, starting with 1) displays the spreadsheet you're currently working on.
- Name box: This lists the current active cell by column and row letter. If the top left cell is the active cell, A1 will appear in the Name box.
- Formula bar: This lists the contents of the active cell, whether text, a number, an equation, or a formula.

Keyboard Shortcuts in Excel 2010

Keyboard Shortcuts – An Overview

Keyboard shortcuts are combinations of keystrokes that let you execute commands more quickly than with a mouse. Keyboard shortcuts from previous versions of Excel, such as Ctrl+S to save and Ctrl+B to bold, also work in Excel 2010.

This guide includes the Excel keyboard shortcuts associated with any commands covered in the guide, but it does not cover all of the hundreds of keyboard shortcuts that are possible in Excel.

How to Customize Keyboard Shortcuts

You can create new shortcuts or modify existing shortcuts by recording actions as a macro. To record a macro:

1. Click the Record Macro icon located at the bottom left of the Excel window.
2. The Record Macro dialog box opens. Give the macro a name and assign it a shortcut key. The "Store Macro in" field should say Personal Macro Workbook. Click OK.
3. Go to the View tab. At the far right, click the Macro drop-down and select Use Relative References.
4. Do the action for which you'd like to make a shortcut.
5. Click the Stop Record button at the bottom left of the main Excel window.
6. To use the macro, press the shortcut key you assigned to it in step 2.

-Monica Gupta

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How to Control Excel Using the Keyboard

Along with keyboard shortcuts, Excel 2010 provides a keyboard system for executing most Excel commands. This system is based on the Alt key. Press the key and little letters and numbers appear next to the various tabs or commands on the screen. Hit the appropriate key (or keys) to use the marked command. For instance, to get to the Ribbon's Home tab, you'd type Alt+H. Once there, a new set of letters and numbers appears that marks the Home tab commands. Hit those keys to enact those commands. To make the shortcut numbers and letters disappear, hit the Alt key again.

Alt-key commands can involve anywhere from two to five keystrokes and may overlap with traditional keyboard shortcuts. For instance, you can save an Excel file using Ctrl+S or Alt+F, S.

Navigating an Excel 2010 Spreadsheet

Introduction to Excel 2010 Navigation

To work effectively in Excel, it's helpful to know how to navigate around the Excel work space. You can navigate around a spreadsheet in two main ways:

- Scroll by moving the right and bottom scrollbars with your mouse.
- Use keyboard commands to move the active cell around the spreadsheet.

To move . . .	Press . . .
Down one cell	Enter
One cell to the right	Tab
One cell up, down, left, or right	Arrow Keys
To the edge of the data region	Ctrl+Arrow Key
To column A in the current view	Home
To cell A1	Ctrl+Home
To the last cell in the spreadsheet containing data or text	Ctrl+End
Up one screen	Page Up
Down one screen	Page Down
Left one screen	Alt+Page Up
Right one screen	Alt+Page Down

You can also move to a specific cell in a spreadsheet by typing the cell's column and row number into the Name Box.

How to Navigate Between Spreadsheets

An Excel document is also called a workbook because it contains more than one spreadsheet. You can navigate between different spreadsheets in a workbook by using the spreadsheet tabs at the bottom left of the Excel window.

To move from one spreadsheet in a workbook to the next, just click on the spreadsheets tab.

Other Uses for the Spreadsheet Tabs

In addition to navigation, you can use the spreadsheet tabs to perform a number of other actions:

- Rename a spreadsheet: Either double-click the tab or right-click the tab and then choose Rename from the shortcut menu.
- Insert a new spreadsheet: Click the New Spreadsheet tab or double-click a tab and choose Insert from the shortcut menu. The new Spreadsheet tab will appear to the left of the tab that you right-clicked.
- Delete a spreadsheet: Right-click the Sheet tab and choose Delete. When you delete a spreadsheet, all data (if any) in that spreadsheet is lost.
- Rearrange the order of a spreadsheet: You can reorder the tabs by clicking and dragging them.
- Move or copy a spreadsheet: Right-click the tab and choose Move or Copy. You can choose to move the tab within the existing workbook or to another open workbook. To copy rather than move the tab, click the Create a Copy box in the Move or Copy dialog box.

How to Zoom in Excel

Because Excel spreadsheets can get very large, it's helpful to be able to zoom in on a particular area of the spreadsheet to do detailed work or zoom out to get a better sense of the big picture. Excel gives you two ways to zoom: the zoom group and the zoom slider.

- Zoom group: You can use the buttons on the zoom tab to zoom in on selected cells, zoom to a 100% view of the spreadsheet (the size it will be when printed), or click on the magnifying glass to open the zoom dialog box, which has more zooming options.
- Zoom slider: This is a sliding bar located at the bottom right of the Excel window. Click on the "+" or "-" or drag the slider to zoom in or out.

USING FORMULAS AND FUNCTIONS

Working with Excel Formulas and Functions

Excel Formulas and Functions – An Overview

Excel lets you perform calculations in order to analyze and work with the data in an Excel spreadsheet. You can perform calculations in two basic ways:

- Simple formulas: Use only addition, subtraction, multiplication, or division to work with data.
- Functions: Use powerful mathematical formulas built into Excel to perform higher-level calculations.

How to Write Simple Formulas in Excel

You can write simple formulas to evaluate a complete mathematical expression within a single cell or build an expression that relates the data contained in multiple cells.

How to Write a Simple Formula in a Single Cell

Writing a simple formula that does not reference the data in other cells is similar to using a calculator. You type in a mathematical expression, and Excel calculates the answer.

1. Select the cell where you'd like the answer to appear.
2. Type the = sign. (All formulas in Excel must begin with an = sign.)
3. Type in a mathematical equation using + (plus), - (minus), * (multiplied by), / (divided by), or ^ (to the nth power) and parentheses to mark the order of operations, as necessary. For instance, you could write out the expression $=(10+5)*3$.
4. Press Enter. The cell will show the answer to the mathematical expression (45 for the above example).

To edit the mathematical expression, select the cell and click in the formula bar or double-click in the cell.

How to Write Simple Formulas Involving Multiple Cells

The real power of Excel is that it allows you to write mathematical expressions that refer to the data in other cells.

1. Select the cell in which you'd like the answer to appear.
2. Type the = sign to start the formula.
3. Click the cell that contains the first number upon which you want to perform the calculation, or write the cell's address.
4. Type an operation (+, -, *, /, ^) and/or parentheses to define the order of operations.
5. Click the cell that contains the second number that figures into the formula.
6. Repeat steps 4–5 (if needed) until you've included all the cells you need into the formula.

7. Press Enter.

How to Use Functions in Excel

Functions are predefined mathematical formulas built into Excel. Each function allows you to perform a specific operation. Excel contains over 300 functions, ranging from basic functions to complex functions used in statistics. Some of the most popular Excel functions include:

- SUM: Calculates the sum of a range of cells
- AVERAGE: Calculates the average of a range of cells
- COUNT: Counts the number of cells in a range that contain a number
- COUNTA: Counts the number of cells in a range that contain either text or a number
- MIN: Identifies the smallest number in a range of cells
- MAX: Identifies the largest number in a range of cells

To use a function, you must first type an = sign into the cell, then type the function's name (such as SUM or AVERAGE), and then enter the arguments—the cells or range of cells on which the function should operate. The arguments are always contained within parentheses.

How to Insert a Function

If you know a particular function, you can type it right into a cell. If you're less familiar with a function (or functions in general) you're probably better off inserting functions using the Insert Function icon at Formula > Function Library. Clicking the icon opens the Insert Function dialog box.

The Insert Function dialog box allows you to search for a function by category (recently used, financial, logical, and so on) or by typing in a description. The dialog box also displays the correct format for writing the function you've currently selected. Once you've found the function that you want to use, do the following:

1. Click OK on the dialog box to insert the function into your spreadsheet. (Make sure to select the cell where you'd like the function to appear before you open the dialog box.)
2. The Function Arguments dialog box will open. This dialog box provides fields listed as Number 1, Number 2, and so on, into which you can enter the numbers or cells upon which you want to perform the function. You can enter either a single cell or a range of cells into one of these fields. To enter a cell or range of cells, type in the correct address, or, with your cursor still in the dialog box field, select a cell or range of cells on the spreadsheet with your mouse.
3. To make the selection process easier, you can click the Minimize button to minimize the dialog box so that only the field in which you're entering numbers is visible. You can bring the entire dialog box back into view by clicking the Maximize button.
4. When you've entered all the arguments on which you want the function to operate, click OK.

How to Use the AutoSum Feature

The AutoSum icon engages an Excel feature that makes it easier to insert a function into a spreadsheet. When you use AutoSum, Excel automatically selects the range of cells on which to operate.

- If the selection is correct: Press Enter to insert the function.

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- If the selection is incorrect: Edit the range in the formula bar or in the cell itself.

Despite its name, you can use AutoSum to insert many different functions—not just the SUM function. By default, AutoSum is set to calculate the SUM of a range of cells, but you can change the function that AutoSum applies by clicking on the down arrow beneath the icon. From the menu that pops up, you can then choose AVERAGE, COUNT, MIN, MAX, or More Functions.

Copying Formulas with AutoFill

1. Position the mouse on the AutoFill box in the lower-right corner of a cell with a formula. Make sure the mouse pointer turns into a black cross.
2. Click and drag the AutoFill box to include the cells to which you want to copy the formula. The AutoFill method of copying formulas is helpful if you're copying a formula to surrounding cells.

Editing a Formula

1. Double-click the cell containing the formula you want to edit. The cell expands to show the formula instead of the result.
2. Use the arrow keys to navigate to the character you want to change.
3. Using the Backspace key, delete any unwanted characters and type any additional characters.
4. Press Enter.

USING CHARTS AND GRAPHS

Working with Names in Formulas

Creating or Changing a Cell Reference

A cell reference (cell reference: The set of coordinates that a cell occupies on a worksheet. For example, the reference of the cell that appears at the intersection of column B and row 3 is B3.) refers to a cell or a range of cells on a worksheet and can be used in a formula (formula: A sequence of values, cell references, names, functions, or operators in a cell that together produce a new value. A formula always begins with an equal sign (=).) so that Microsoft Office Excel can find the values or data that you want that formula to calculate.

In one or several formulas, you can use a cell reference to refer to:

- Data from one cell on the worksheet.
- Data that is contained in different areas of a worksheet.
- Data in cells on other worksheets in the same workbook.

Creating a Cell Reference on the Same Worksheet

1. Click the cell in which you want to enter the formula.
2. In the formula bar (formula bar: A bar at the top of the Excel window that you use to enter or edit values or formulas in cells or charts. Displays the constant value or formula stored in the active cell.) Formula bar, type = (equal sign).
3. Do one of the following:
 - Cell reference: To create a reference, select a cell or range of cells on the same worksheet.

Cell references and the borders around the corresponding cells are color-coded to make it easier to work with them.
 - Defined name: To create a reference to a defined name, do one of the following:
 - Type the name.
 - Press F3, select the name in the Paste name box, and then click OK.
4. Do one of the following:
 - If you are creating a reference in a single cell, press ENTER.
 - If you are creating a reference in an array formula (array formula: A formula that performs multiple calculations on one or more sets of values, and then returns either a single result or multiple results. Array formulas are enclosed between braces { } and are entered by pressing CTRL+SHIFT+ENTER.), press CTRL+SHIFT+ENTER.

Defining an Absolute Formula

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1. To prevent a formula from changing a cell reference as you copy it to a different location, you lock in an absolute cell reference using one of these methods:
 - Lock in a cell location: Type a dollar sign in front of both the column reference and the row reference (as in \$C\$2). If the original formula in cell F5 is =E5*\$C\$2, and you copy the formula to cell F6, the copied formula reads E6*=\$C\$2 instead of E6*C3, which is how it would read were it not absolute.
 - Lock in the row or column location only: Type a dollar sign in front of the column reference (\$C2) or in front of the row reference (C\$2).
2. Copy the formula, as needed, to other locations. Notice that the absolute cell reference in the original formula remains unchanged in the copied formulas.

Copying Values Using Paste Special

1. Select a cell (or group of cells) containing a formula and then choose Home > Clipboard > Copy. A marquee appears around the selected cell.
2. Select the cell where you want the answer; then click the arrow under the Paste button on the Home tab.
3. Choose Paste Special. The Paste Special dialog box appears.
4. Select the Values option.
5. Click OK.

Sorting Data in Excel

Sorting – An Overview

You can sort the data in your spreadsheet columns numerically or alphabetically based on the data in one or more of those columns. For instance, if you've created a spreadsheet that records employees' last names, salaries, and start dates, you could then sort all of those columns based on the data in one or more of the columns. In other words, you could sort the data alphabetically by last name, in order of seniority, or from highest to lowest salary.

How to Sort By One Column

Sort a spreadsheet of data according to the data in one column by doing the following:

1. Select all of the data on the spreadsheet.
2. Go to Home > Editing, and click Sort & Filter. In the menu that appears, select Custom Sort.
3. The Sort dialog box will open.
4. In the Sort By drop-down menu, choose the column by which you want to sort the data. If you've written a descriptive header at the top of your column of data, make sure that the "My data has headers" check box at the top right of the window is checked and select the column based on its header. If your columns don't have headers, make sure the check box is unchecked and select the column based on its letter label.

5. The Sort On drop-down menu lets you specify the information you'd like to use from the column as the basis for sorting. The drop-down menu lets you sort by values (the text or data in the cell), cell color, font color, or cell icon.
6. Choose an order from the Order drop-down list. A to Z means ascending, and Z to A means descending.
7. Click OK and all the data will sort based on the data in the column you selected.

How to Sort By Multiple Columns

To refine a sort, sort by multiple columns. Open the Sort dialog box and fill out the first column to sort by, just as you'd do when sorting by one column. Then, for each additional column you'd like to use to sort the data, click Add Level. A new set of drop-down menus will appear; make selections from these menus to choose the second column to sort by. Note that each column selected takes precedence over the next. So if you sorted by salary and then by start date, the start-date sorting would come into play only if two employees had the same salary.

Adding Charts or Graphics to Excel Spreadsheets

How to Create Charts in Excel

To create a chart in Excel 2010, follow these steps:

1. Select the cells you want to turn into a chart. Make sure to select both the text (used as labels) and numbers (used as data points).
2. Go to Insert > Charts on the Ribbon.
3. Select the type of chart you'd like—column, line, pie, bar, area, scatter, or other. Clicking the launcher on the group will pop up a menu that lets you look at all of your options in more detail.
4. Whichever type you choose, a drop-down menu will appear, offering you specific style options for that type of chart. Select the style you prefer.

When you make your selection, the chart will immediately appear in your spreadsheet (it may appear over your data, which isn't a problem since you can easily move the chart).

How to Move or Resize a Chart

Here are how to move or resize a chart:

- To move a chart: Click and hold in the center of the chart, then drag the chart where you want it to go on the spreadsheet.
- To resize a chart: Click the chart, then bring the mouse pointer above one of the little squares, called selection handles, located at the chart's corners. Click and drag the selection handles to resize the chart.

How to Edit or Format a Chart

When you click on a chart, a contextual tab, called Chart Tools, appears on the Ribbon. This tab has three subtabs—Design, Layout, and Format—that contain commands that help you make the look chart exactly how you want it.

- Design: The Design tab provides tools that let you adjust the data range used to create the chart, change the chart type you've selected, change the style of the chart you've selected, or move the chart to another spreadsheet.
- Layout: The Layout tab lets you edit the particular elements of a chart, such as its title, axes, legend, and background.
- Format: The Format tab lets you change the look of the different elements in the table. Select the particular element by clicking it, then click the button you'd like to use in the Format tab.

How to Insert Graphics in Excel

In addition to charts, Excel allows you to insert a variety of other graphical elements into a spreadsheet by using the Insert > Illustrations group. The four main types of graphical elements that you can insert are:

- Picture: Digital images or scanned photos
- Clip art: Over 15,000 clip art illustrations
- Shapes: A gallery of predrawn shapes, from lines to solids to arrows and beyond
- SmartArt: Pre-designed combinations of words and art that allow you to create more complex graphical elements, such as flowcharts or org charts

Clicking any of these icons pops up an associated dialog box that you can use to select and insert the graphical element of your choice.

OUTLINES

Creating and Using Worksheet Outlines

Introducing Worksheet Outlines

You can use outlines to create summary reports in which you don't want to show all the details. You'll find that some worksheets are more suitable for outlines than others. If your worksheet uses hierarchical data with subtotals, it's probably a good candidate for an outline.

The following are points to keep in mind about worksheet outlines:

- A worksheet can have only one outline. If you need to create more than one outline, move the data to a new worksheet.
- You can either create an outline manually or have Excel do it for you automatically. If you choose the latter option, you may need to do some preparation to get the worksheet in the proper format.
- You can create an outline for either all data on a worksheet or just a selected data range.
- You can remove an outline with a single command.
- You can hide the outline symbols (to free screen space) but retain the outline.
- You can have up to eight nested levels in an outline.

Worksheet outlines can be quite useful. But if your main objective is to summarize a large amount of data, you may be better off using a pivot table. A pivot table is much more flexible and doesn't require that you create the subtotal formulas; it does the summarizing for you automatically.

Creating an Outline

In this section, you learn the two ways to create an outline: automatically and manually. Before you create an outline, you need to ensure that data is appropriate for an outline and that the formulas are set up properly.

Preparing The Data

What type of data is appropriate for an outline? Generally, the data should be arranged in a hierarchy.

Before you create an outline, you need to make sure that all the summary formulas are entered correctly and consistently. Consistently means that the formulas are in the same relative location. Generally, formulas that compute summary formulas (such as subtotals) are entered below the data to which they refer. In some cases, however, the summary formulas are entered above the referenced cells. Excel can handle either method, but you must be consistent throughout the range that you outline. If the summary formulas aren't consistent, automatic outlining won't produce the results that you want.

Creating an Outline Automatically

Excel can create an outline for you automatically in a few seconds, whereas it may take you 10 minutes or more to do the same thing manually.

To have Excel create an outline, move the cell pointer anywhere within the range of data that you're outlining. Then, choose Data > Group and Outline > Auto Outline. Excel analyzes the formulas in the range and creates the outline. Depending on the formulas that you have, Excel creates a row outline, a column outline, or both.

If the worksheet already has an outline, Excel asks whether you want to modify the existing outline. Click Yes to force Excel to remove the old outline and create a new one.

Creating an Outline Manually

Usually, letting Excel create the outline is the best approach. It's much faster and less error-prone. If the outline that Excel creates isn't what you have in mind, however, you can create an outline manually.

When Excel creates a row outline, the summary rows must all be above the data or all below the data. (They can't be mixed.) Similarly, for a column outline, the summary columns must all be to the right of the data or to the left of the data. If your worksheet doesn't meet these requirements, you have two choices:

- Rearrange the worksheet so that it does meet the requirements.
- Create the outline manually.

You also need to create an outline manually if the range doesn't contain any formulas. You may have imported a file and want to use an outline to display it better.

Because Excel uses the formulas to determine how to create the outline, it is not able to make an outline without formulas.

Creating an outline manually consists of creating groups of rows (for row outlines) or groups of columns (for column outlines). To create a group of rows, click the row numbers for all the rows that you want to include in the group—but do not select the row that has the summary formulas. Then, choose Data > Group and Outline > Group. Excel displays outline symbols for the group. Repeat this for each group that you want to create. When you collapse the outline, Excel hides rows in the group, but the summary row, which is not in the group, remains in view.

Displaying Levels

To display various outline levels, click the appropriate outline symbol. These symbols consist of buttons with numbers on them (1, 2, and so on) and buttons with either a plus sign (+) or a minus sign (–).

Clicking the 1 button collapses the outline so that it displays no detail, just the highest summary level of information, clicking the 2 button expands the outline to show one level, and so on. The number of numbered buttons depends on the number of outline levels. Choosing a level number displays the detail for that level, plus any lower levels. To display all levels (the most detail), click the highest-level number.

You can expand a particular section by clicking its + button, or you can collapse a particular section by clicking its – button. In short, you have complete control over the details that Excel exposes or hides in an outline.

If you prefer, you can use the Hide Detail and Show Detail commands on the Data↔ Group and Outline menu to hide and show details, respectively.

Adding Data to an Outline

You may need to add additional rows or columns to an outline. In some cases, you may be able to insert new rows or columns without disturbing the outline, and the new rows or columns become part of the outline. In other cases, you'll find that the new row or column is not part of the outline. If you create the outline automatically, just select Data > Group and Outline > Auto Outline again. Excel makes you verify that you want to modify the existing outline. If you create the outline manually, you need to make the adjustments manually, as well.

Removing an Outline

If you no longer need an outline, you can remove it by selecting Data > Group and Outline > Clear Outline. Excel fully expands the outline by displaying all hidden rows and columns, and the outline symbols disappear. Be careful before you do this, however: After you have removed an outline, you can't make it reappear using the Undo button. You must re-create the outline from scratch.

ANALYZING DATA USING PIVOT TABLES

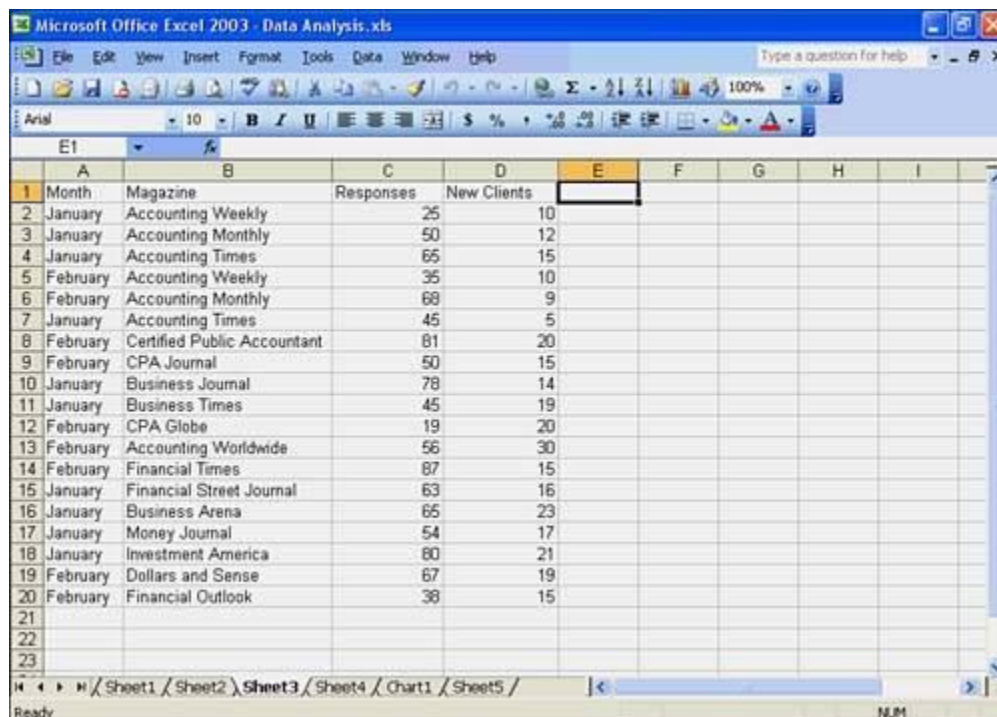
What Is a Pivot Table?

A pivot table lets you analyze, summarize, and manipulate data in large lists, databases, worksheets, workbooks, tables, or other collections of data. Pivot tables offer flexible and intuitive analysis of data. It's called a pivot table because you can move fields with the mouse to provide different types of summary lists; that is, the table can change, or "pivot."

Although the data that appears in pivot tables looks like any other worksheet data, you cannot directly enter or change the data in the data area of a pivot table. The pivot table is linked to the source data, and what you see in the cells of the table are read-only amounts. However, you can change the formatting (Number, Alignment, Font, Border, Patterns) and choose from a variety of computation options such as SUM, AVERAGE, MIN, and MAX.

You can create a pivot table from several sources. The default, and most common choice, is to create a pivot table from an Excel list or database. You can also create a pivot table from an external data source, such as an Access database, multiple consolidation ranges, or another pivot table.

Suppose you have a list of magazine advertisements. A simple pivot table is useful for tracking the magazine advertisements for an accounting firm. The following figures illustrate a simple pivot table example. The first shows an example of a worksheet with a list of magazine advertisements. It contains the month, magazine, and number of responses and new accounts. The second figure shows a typical pivot table for tracking the magazine advertisements.



	A	B	C	D	E	F	G	H	I
1	Month	Magazine	Responses	New Clients					
2	January	Accounting Weekly	25	10					
3	January	Accounting Monthly	50	12					
4	January	Accounting Times	65	15					
5	February	Accounting Weekly	35	10					
6	February	Accounting Monthly	68	9					
7	January	Accounting Times	45	5					
8	February	Certified Public Accountant	81	20					
9	February	CPA Journal	50	15					
10	January	Business Journal	78	14					
11	January	Business Times	45	19					
12	February	CPA Globe	19	20					
13	February	Accounting Worldwide	56	30					
14	February	Financial Times	87	15					
15	January	Financial Street Journal	63	16					
16	January	Business Arena	65	23					
17	January	Money Journal	54	17					
18	January	Investment America	80	21					
19	February	Dollars and Sense	67	19					
20	February	Financial Outlook	38	15					
21									
22									
23									

Fig 2 - List of Magazine Advertisements for an Accounting Firm

	A	B	C	D
1	Magazine	(All)		
2				
3	Sum of New Clients	Month		
4	Responses	January	February	Grand Total
5	19		20	20
6	25	10		10
7	35		10	10
8	38		15	15
9	45	24		24
10	50	12	15	27
11	54	17		17
12	56		30	30
13	63	16		16
14	65	38		38
15	67		19	19
16	68		9	9
17	78	14		14
18	80	21		21
19	81		20	20
20	87		15	15
21	Grand Total	152	153	305

Fig 3 – A Pivot Table Example

Learning the PivotTable Lingo

Here is some PivotTable lingo that you need to know before you work with pivot tables.

- Item— An item label is a subcategory of a PivotTable field and is derived from unique entries in a database field or in a list column. Items appear as row or column labels or in the lists for page fields in a pivot table report.
- Row field— Row field labels have a row orientation in a pivot table report and are displayed as row labels. Appears in the ROW area of a pivot table report layout.
- Column field— Column field labels have a column orientation in a pivot table report and are displayed as column labels. Appears in the COLUMN area of a pivot table report layout.
- Data field— Data fields from a list or table contain summary data in a pivot table, such as numeric data (statistics, sales amounts, text). Summarized in the DATA area of a pivot table report layout.
- Page field— Page fields filter out the data for other items and display one page at a time in a pivot table report.

It's important to know what you want to do with your data in a PivotTable report. You need to know what you want to see. You might find it helpful to put what you want to learn in a series of questions. For example:

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- How many new clients did we gain in January?
- Which magazine provided the highest number of new accounts for February?
- What's the average number of responses from the magazine advertisements?

Building a Pivot Table

Introduction to Pivot Table Creation

You can build a simple pivot table with the Data, PivotTable and PivotChart Report option, which displays a series of PivotTable Wizard dialog boxes. The wizard steps you through the process of creating a pivot table, and you get to see a basic breakdown of the data you have in your Excel list or database. A diagram with the labels PAGE, COLUMN, ROW, and DATA appears, and you just drag field buttons onto the diagram. This step tells Excel about the data you want to analyze with a pivot table.

The steps for creating a pivot table are explained here.

Step1: Specifying the Data Location

After you choose Data → PivotTable and PivotChart Report, you see the dialog box as shown below.



Fig 4 - The First of Three PivotTable and PivotChart Wizard Dialog Boxes

In this step, you identify the data source. Excel is quite flexible in the data that you can use for a pivot table.

Step 2: Specifying the Data

To move on to the next step of the wizard, click the Next button. Step 2 of the PivotTable and PivotChart Wizard prompts you for the data. Remember that the dialog box varies depending on your choice in the first dialog box; The following figure shows the dialog box that appears when you select an Excel list or database in Step 1.



Fig 5 - In Step 2, You Specify the Data Range

If you place the cell pointer anywhere within the worksheet database when you select Data→PivotTable Report, Excel identifies the database range automatically in Step 2 of the PivotTable and PivotChart Wizard.

You can use the Browse button to open a different worksheet and select a range. To move on to Step 3, click the Next button.

Step 3: Completing the pivot table

The following figure shows the dialog box for the final step of the PivotTable and PivotChart Wizard. In this step, you specify the location for the pivot table.

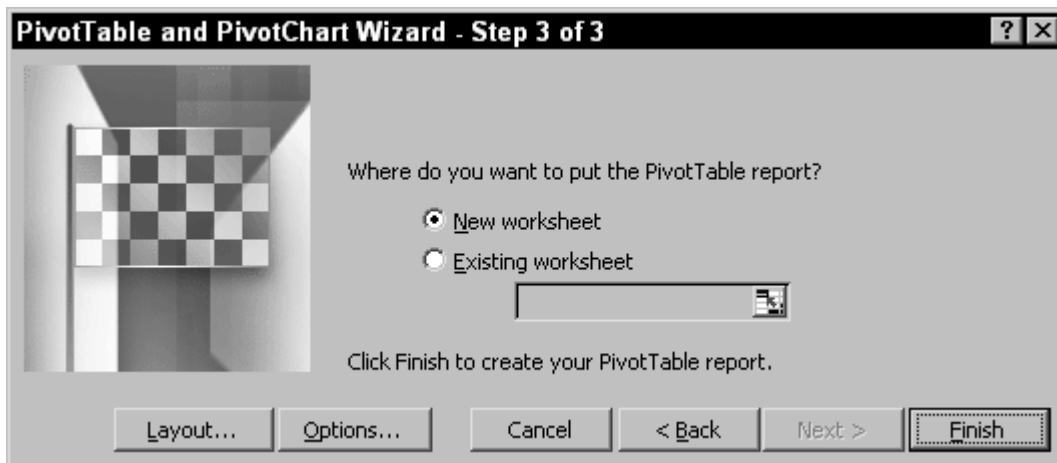


Fig 6 - In Step 3, You Specify the Pivot Table's Location

If you select the New Worksheet option, Excel inserts a new worksheet for the pivot table. If you select the Existing Worksheet option, the pivot table appears on the current worksheet. (You can specify the starting cell location.)

At this point, you can click the Options button to select some options that determine how the table appears. You can set these options at any time after you create the pivot table, so you do not need to do so before creating the pivot table.

You can set up the actual layout of the pivot table by using either of two techniques:

- By clicking the Layout button in Step 3 of the PivotTable and PivotChart Wizard. You then can use a dialog box to lay out the pivot table.

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- By clicking the Finish button to create a blank pivot table. You then can use the PivotTable Field List toolbar to lay out the pivot table.

Both of these options are explained in the following subsections.

Using a Dialog Box to Lay Out a Pivot Table

When you click the Layout button of the wizard's last dialog box, you get the dialog box shown in the figure below. The fields in the database appear as buttons along the right side of the dialog box. Simply drag the buttons to the appropriate area of the pivot table diagram (which appears in the center of the dialog box).

The pivot table diagram has four areas:

- Page: Buttons in this area appear as page items in the pivot table.
- Row: Buttons in this area appear as row items in the pivot table.
- Data: Buttons in this area indicate the data that is summarized in the pivot table.
- Column: Buttons in this area appear as column items in the pivot table.

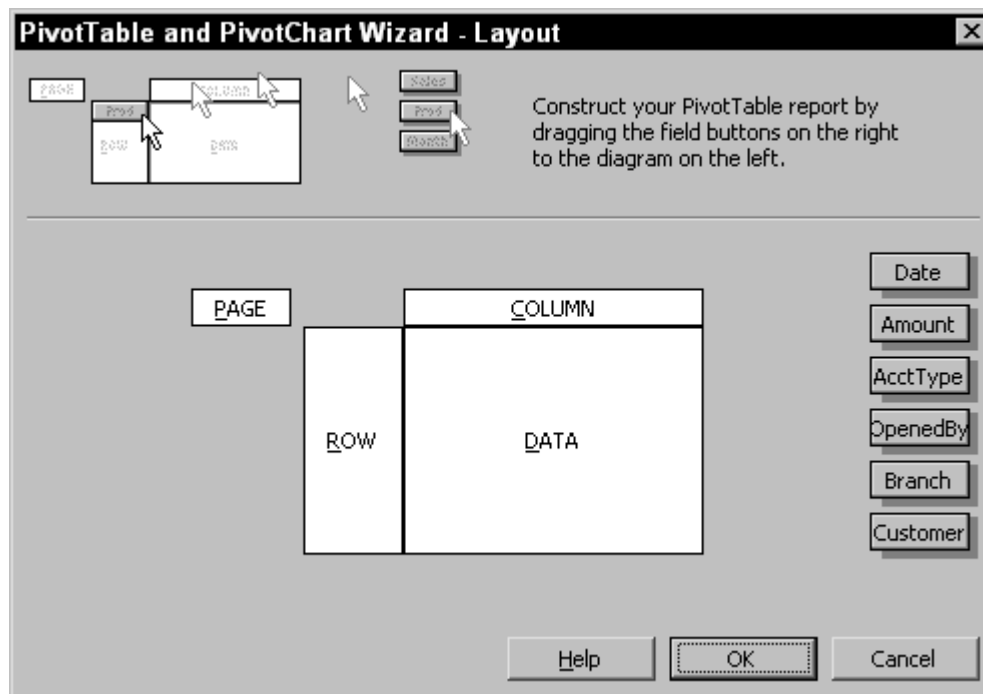


Fig 7 - Specify the Table Layout

You can drag as many field buttons as you want to any of these locations, and you don't have to use all the fields. Any fields that you don't use simply don't appear in the pivot table.

When you drag a field button to the Data area, the PivotTable and PivotChart Wizard applies the Sum function if the field contains numeric values; it applies the Count function if the field contains non-numeric values.

While you set up the pivot table, you can double-click a field button to customize it. You can specify, for example, to summarize a particular field as a Count or other function. You also can specify which items in a field to hide or omit. If you drag a field button to an incorrect location, just drag it off the table diagram to get rid of it. Note that you can customize fields at any time after you create the pivot table.

The following figure shows how the dialog box looks after dragging some field buttons to the pivot table diagram. This pivot table displays the sum of the Amount field, broken down by AcctType (as rows) and Customer (as columns). In addition, the Branch field appears as a page field. Click OK to redisplay the PivotTable and PivotChart Wizard—Step 3 of the dialog box.

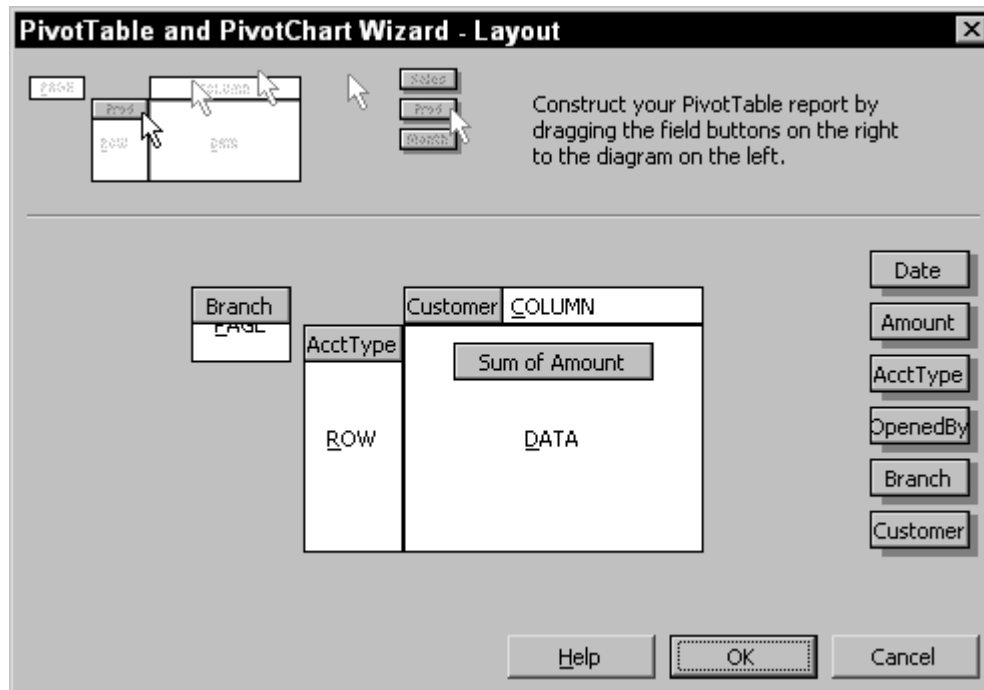


Fig 8 - The Table Layout After Dragging Field Buttons To The Pivot Table Diagram

Using the PivotTable Field List Toolbar to Lay Out a Pivot Table

You may prefer to lay out your pivot table directly in the worksheet by using the PivotTable Field List toolbar. The technique closely resembles the one just described because you still drag and drop fields. But in this case, you drag fields from the toolbar into the worksheet.

Complete the first two steps of the PivotTable and PivotChart Wizard. If you want, set options for the pivot table by using the Options button that appears in the third dialog box of the wizard. Don't bother with the Layout button, however. Select a location for the pivot table and choose Finish. Excel displays a pivot table template similar to the one you see in following figure. The template provides you with hints about where to drop various types of fields.

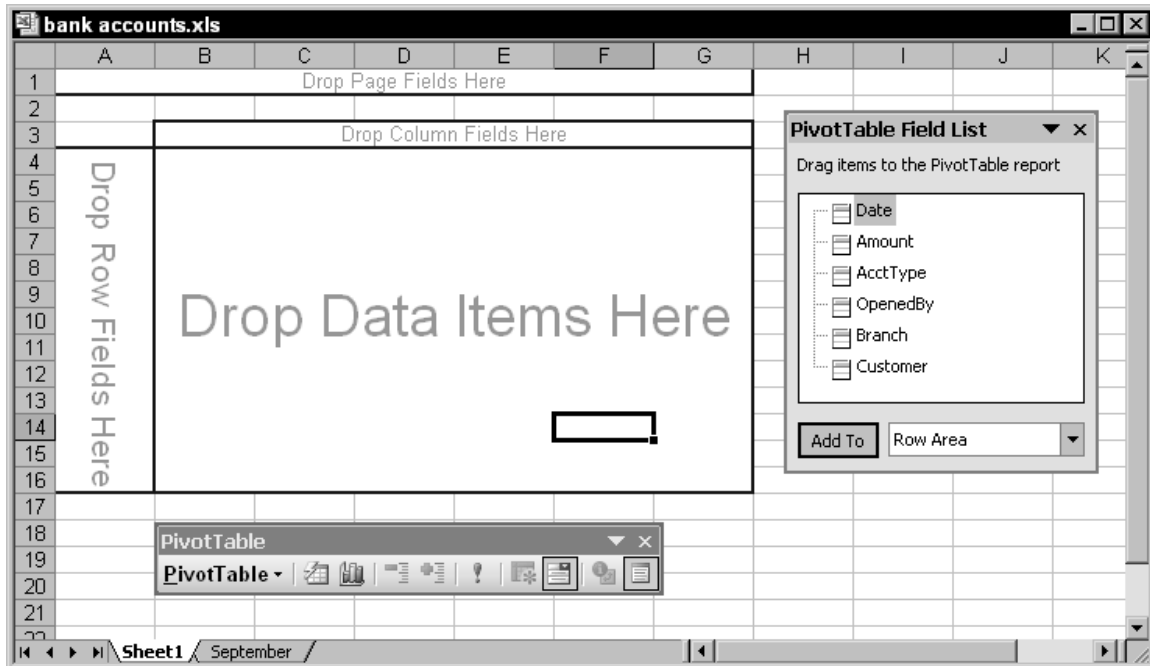


Fig 9 - Use the PivotTable Field List Toolbar to Drag and Drop Fields onto the Pivot Table Template That Excel Displays

Drag and drop fields from the PivotTable Field List toolbar onto the template. Or select the field name, choose the location from the drop-down list, and click the Add To button. Excel continues to update the pivot table as you add or remove fields. For this reason, you'll find this method easiest to use if you drag and drop data items last. In other words, set up the field items and then specify the data to summarize.

If you make a mistake, simply drag the field off the template and drop it on the worksheet—Excel removes it from the pivot table template. All fields remain on the PivotTable Field List toolbar, even if you use them.

Modifying a Pivot Table

After you build a pivot table, you can make changes to it any time. For example, if you want to examine the new clients for a particular month, you need to change the Month field. Use the drop-down list to the right of the field name. Select a month and click OK. This step selects and deselects new clients in the list, and Excel instantly displays new clients broken down by more or less magazines in the DATA area of the pivot table. You also should see the grand total dollar amounts by magazine at the bottom of each item. At the bottom of the table, you should see the grand total for new clients to all magazines.

You can use this report to analyze your data in various ways. For instance, click the PivotTable down arrow button on the PivotTable toolbar, choose PivotTable Wizard, and click the Layout button. Drag the buttons off the diagram, and arrange the fields like this: Magazine in the PAGE area, Month in the COLUMN area, New Clients in the DATA area, and Responses in the ROW area.

The PivotTable toolbar provides tools for working with pivot tables. The following table lists those tools and what they can do for you.

Tool	What It Does
PivotTable	A menu that contains commands for working with a pivot table.
Format Report	Enables you to format the pivot table report.
Chart Wizard	Enables you to create a chart using the data in the pivot table.
Hide Detail	Hides the detail information in a pivot table and shows only the totals.
Show Detail	Shows the detail information in a pivot table.
Refresh External Data	Allows you to refresh the data in the pivot table after you make changes to data in the data source.
Include Hidden Items in Totals	Lets you show the hidden items in the totals.
Always Display Items	Always shows the field item buttons with drop-down arrows in the pivot table.
Field Settings	Displays the PivotTable Field dialog box so that you can change computations and their number format.
Hide Field List	Hides and shows the PivotTable Field List window.

Below the buttons on the PivotTable toolbar, you should see the PivotTable Field List window. The field buttons that you dragged to the PAGE, ROW, COLUMN, and DATA areas in the PivotTable diagram appear in the window. You can drag a field button from the window to the PivotTable at any time to rearrange the data in your pivot table.

Some other changes you might want to make to your pivot table include removing and adding fields in the pivot table. To remove fields, drag the field item buttons off the PivotTable. Excel indicates in the pivot table exactly where you should place a field button. For example, in the PAGE area, you should see "Drop the page field here." To add fields to the pivot table, drag the fields from the PivotTable Field List window into the PAGE, COLUMN, ROW, and DATA areas marked on the PivotTable. By using the PivotTable Field List window, you can build new or different pivot tables in a snap.

You can change the computation for the numbers. By default, the numbers are added with the SUM function, but you can change to AVERAGE, MIN, or MAX. For example, if you want to average the numbers instead of summing them, double-click the Sum of New Clients button in the DATA area. The PivotTable Field dialog box opens as shown below:



Fig 10 – The PivotTable Field Dialog Box

Choose Average and click OK. Excel changes the Sum of New Clients to Average of New Clients.

If you want to group PivotTable items and create a new field for the items as a group, select the cells you want to group. Choose Data, Group and Outline, Group. Excel creates a new field that contains the selected items.

To group items automatically, select one item in a field. Choose Data, Group and Outline, Group. In the Group Dialog box, in the By list, select the grouping options you want. Then click OK. Excel creates the groups based on the options you selected.

Refreshing a PivotTable

PivotTables are not updated each time a change occurs in their source data. To update a table, select any cell in the table and choose Data, Refresh External Data, or click the red exclamation point on the PivotTable toolbar.

If you want Excel to refresh your PivotTable every time you open the workbook in which it resides, choose PivotTable, Table Options. (The PivotTable menu is on the PivotTable toolbar.) Then select the Refresh On Open check box in the PivotTable Options dialog box. If you want to prevent Excel from updating the table each time you open the workbook (for example, if the table is based on a time-consuming query of external data), be sure this check box is cleared.

Building a PivotChart

Creating a PivotChart

A PivotChart is basically a column chart (by default) that is based on the data in a pivot table. You can change the chart to a different chart type if desired.

The steps to build a PivotChart are:

1. Choose Data, PivotTable and PivotChart Report. If the Office Assistant asks whether you want help with pivot tables, choose No. The PivotTable and PivotChart Wizard—Step 1 of 3 dialog box opens. From this point, until the PivotChart appears in the worksheet, you are working in the PivotTable and PivotChart Wizard.

2. In the Where Is the Data That You Want to Analyze? area, choose Microsoft Excel List or Database if it's not already selected. This step tells Excel the source of the chart data.
3. In the What Kind of Report Do You Want to Create? area, choose PivotChart (with PivotTable). Now you've told Excel that you want to create a PivotChart with a pivot table.
4. Click the Next button. The PivotTable and PivotChart Wizard—Step 2 of 3 dialog box shows up. In the Range box, specify the data range you want to use for the PivotChart.
5. Click the Next button. Excel asks whether you want to save memory and combine reports by placing the chart on the same sheet as the pivot table or keep the reports separate by placing the PivotChart on a chart sheet by itself. You want to keep the reports separate.
6. Choose No to separate the reports. The PivotTable and PivotChart Wizard—Step 3 of 3 dialog box opens. You can now tell Excel whether you want to place the PivotChart with pivot table on an existing or new worksheet. You want to place the chart and table on a new worksheet.
7. If necessary, choose New Worksheet.
8. The next step is to design the layout of the pivot table so that Excel can create the chart from the data in the table. Click the Layout button. Excel opens the PivotTable and PivotChart Wizard—Layout dialog box.

The fields appear on buttons to the right in the dialog box. These currently are the column fields. The four areas you can define to create your pivot table are ROW, COLUMN, DATA, and PAGE.

9. Drag the field buttons to the areas to define the layout of your pivot table. For example, to summarize the values in a field in the body of the table, place the field button in the DATA area. To arrange items in a field in columns with the labels across the top, place the field button in the COLUMN area. To arrange items in a field of rows with labels along the side, place the field button in the ROW area. To show data for one item at a time, one item per page, place the field button in the PAGE area.
10. Click OK to return to the PivotTable and PivotChart Wizard—Step 3 of 3 dialog box. Then click the Finish button. The PivotTable toolbar and PivotTable Field List window should appear. Close the toolbar and the window.

The following figure shows the first dialog box of PivotTable and PivotChart Wizard:



Fig 18 - The PivotTable and PivotChart Wizard—Step 1 of 3 Dialog Box

The following figure shows a sample PivotChart:

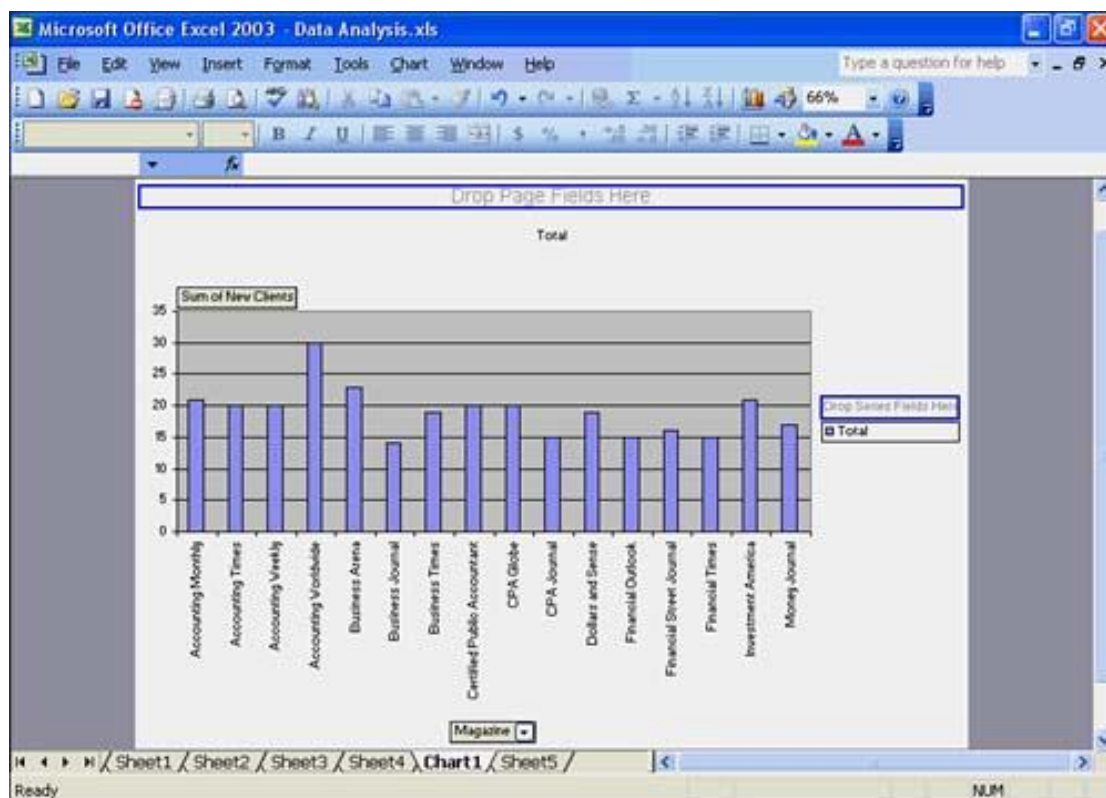


Fig 19- An Example of a PivotChart

Creating a Chart from PivotTable Report Data

What if you don't want to create a PivotChart that interacts with the data in the PivotTable report? You can create an ordinary, non-interactive chart to represent the pivot table data. To

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do so, select the data in the PivotTable report that you want to include in your chart. If you want to include field button data in the first row and column of the PivotTable report, select the data by dragging from the bottom right corner of the data.

Click the Copy button on the Standard toolbar. Click in a cell in a blank area. Choose Edit, Paste Special. Click Values, and then click OK. Create your chart using the Chart Wizard.

Using Lookup Functions

Introduction

Lookup functions search for values within tables or lists. Each lookup function uses a different method for searching and returning values. Each method is suited for a particular task. Anytime your worksheet uses tables to hold values, such as tax tables or price tables, you can employ a lookup function for added power in the application.

VLOOKUP and HLOOKUP

These two lookup functions search for values in tables based on a lookup value, the value you are trying to match. For example, a tax table contains tax rates based on income. Income is the lookup value. VLOOKUP searches vertically in a column of values and then returns a corresponding value from the table. HLOOKUP searches horizontally in a row of values and then returns a corresponding value from the table.

If the lookup range within the specified table range contains text strings, the search variable must also be a text string. In such cases, the lookup function must be able to find an exact match for the specified information, including upper- and lowercase letters. If no match is found, the function returns the error #VALUE!. The data in the table (that is, the value to be returned) can be numeric values or text. The syntax for the HLOOKUP function is

`=HLOOKUP(value,range,row offset)`

As an example, suppose you have a table of prices for merchandise and want to search that table for item number 125. When item number 125 is located in the table, the price of the item is returned.

The VLOOKUP function searches vertically in a column of values and then returns a corresponding value from another table column. The function works like this:

`=VLOOKUP(value,table range,offset)`

An example of a vertical lookup function is

`=VLOOKUP(B2,A4:B10,2)`

Lookup Wizard

Excel's Lookup Wizard can step you through searching for values in tables based on a lookup value, the value you are trying to find. As an example, if you have a price table that contains prices for merchandise based on item numbers, price is the lookup value. What if you want to search that table for item number 50? The Lookup Wizard searches vertically in a column of values and horizontally in a row of values, finds the value at the intersection of the column and row, and then returns that value from the table. For instance, the price of item number 50 is returned and copied into a cell on the worksheet.

Excel can copy the results in two ways:

- Copy just the lookup formula with its result into a cell.
- Copy the lookup formula with its lookup parameters (the column label, the row label, and the formula with its result).

MANAGING AND ANALYZING DATA - II

Performing Spreadsheet What-If Analysis

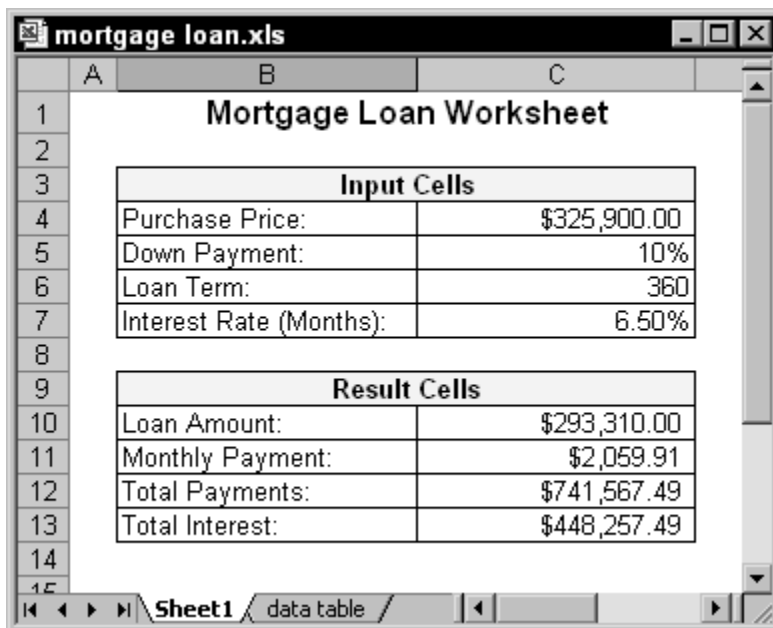
What is What-If Analysis?

One of the most appealing aspects of Excel is its ability to create dynamic models. A dynamic model uses formulas that instantly recalculate when you change values in cells to which the formulas refer. When you change values in cells in a systematic manner and observe the effects on specific formula cells, you're performing a type of what-if analysis.

What-if analysis is the process of asking such questions as "What if the interest rate on the loan changes to 7.5 percent rather than 7.0 percent?" or "What if we raise our product prices by 5 percent?"

If you set up your spreadsheet properly, answering such questions is simply a matter of plugging in new values and observing the results of the recalculation. Excel provides useful tools to assist you in your what-if endeavours.

The following figure shows a spreadsheet that calculates information pertaining to a mortgage loan. The worksheet is divided into two sections: the input cells and the result cells (which contain formulas).



	A	B	C
1	Mortgage Loan Worksheet		
2			
3	Input Cells		
4	Purchase Price:		\$325,900.00
5	Down Payment:		10%
6	Loan Term:		360
7	Interest Rate (Months):		6.50%
8			
9	Result Cells		
10	Loan Amount:		\$293,310.00
11	Monthly Payment:		\$2,059.91
12	Total Payments:		\$741,567.49
13	Total Interest:		\$448,257.49
14			
15			

Fig 20 – An Example of What-If Analysis

Types of What-If Analyses

As you may expect, Excel can handle much more sophisticated models than the preceding example. To perform a what-if analysis using Excel, you have three basic options:

- Manual what-if analysis: Plug in new values and observe the effects on formula cells.

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- Data tables: Create a table that displays the results of selected formula cells as you systematically change one or two input cells.
- Scenario Manager: Create named scenarios and generate reports that use outlines or pivot tables.

Manual What-If Analysis

This method doesn't require too much explanation. Manual what-if analysis is based on the idea that you have one or more input cells that affect one or more key formula cells.

You change the value in the input cells and see what happens to the formula cells. You may want to print the results or save each scenario to a new workbook. The term scenario refers to a specific set of values in one or more input cells. This is how most people perform what-if analysis. Manual what-if analysis certainly has nothing wrong with it, but you should be aware of some other techniques.

Creating Data Tables

When you're working with a what-if model, Excel displays only one scenario at a time. But you can compare the results of various scenarios by using any of the following techniques:

- Print multiple copies of the worksheet, each displaying a different scenario.
- Copy the model to other worksheets and set it up so that each worksheet displays a different scenario.
- Manually create a table that summarizes key formula cells for each scenario.
- Use Excel's Data↔Table command to create a summary table automatically.

This section discusses the last option—the Data↔Table command, which enables you to create a handy data table that summarizes formula cells for various values of either of the following:

- A single input cell
- Various combinations of two input cells

You can create a data table fairly easily, but data tables have some limitations. In particular, a data table can deal with only one or two input cells at a time. In other words, you can't create a data table that uses a combination of three or more input cells.

The Scenario Manager, discussed later in this chapter, can produce a report that summarizes any number of input cells and result cells.

Creating a One-Input Data Table

A one-input data table displays the results of one or more formulas when you use multiple values in a single input cell. You can place the table anywhere in a worksheet. The left column contains various values for the single input cell. The top row contains formulas or, more often, references to formulas located elsewhere in the worksheet. You can use a single formula reference or any number of formula references. The upper-left cell of the table remains empty. Excel calculates the values that result from each level of the input cell and places them under each formula reference.

To create the table, select the data table range and then choose Data > Table. Excel displays the Table dialog box. You must specify the worksheet cell that contains the input value. Click OK, and Excel fills in the table with the appropriate results.

Creating a Two-Input Data Table

As the name implies, a two-input data table lets you vary two input cells. Although it looks similar to a one-input table, the two-input table has one critical difference: It can show the results of only one formula at a time. With a one-input table, you can place any number of formulas, or references to formulas, across the top row of the table.

In a two-input table, this top row holds the values for the second input cell. The upper-left cell of the table contains a reference to the single result formula.

You could create a two-input data table that shows the results of a formula (say, monthly payment) for various combinations of two input cells (such as interest rate and down-payment percent). To see the effects on other formulas, you simply create multiple data tables—one for each formula cell that you want to summarize.

Using the Scenario Manager

Scenario Manager – An Introduction

Data tables are useful, but they have a few limitations:

- You can vary only one or two input cells at a time.
- The process of setting up a data table is not all that intuitive.
- A two-input table shows the results of only one formula cell (although you can create additional tables for more formulas).
- More often than not, you're interested in a few select combinations—not an entire table that shows all possible combinations of two input cells.

Excel's Scenario Manager feature makes it easy to automate your what-if models.

What is a Scenario Manager?

Excel's Scenario Manager feature enables you to analyze your data to see how changing one or more values in the worksheet affects the other cells in the worksheet. This feature comes in handy for figuring out what would happen if certain factors in your business changed.

After you create a simple scenario in this section, you'll learn about hiding and protecting scenarios to prevent others from making changes to them. Then you will view different scenarios on the worksheet. Finally, you will create a scenario summary to view all scenarios from your worksheets in one report.

Scenario Manager – An Example

To introduce you to the Scenario Manager, this section starts with an example that uses a simple production model, as shown in following figure.

	A	B	C	D	E
1	Resource Cost Variables				
2	Hourly labor cost	34			
3	Material cost	59			
4					
5					
6		Product A	Product B	Product C	
7	Hours per unit	12	14	24	
8	Material per unit	6	9	14	
9	Cost to produce	\$762	\$1,007	\$1,642	
10	Sales price	\$795	\$1,295	\$2,195	
11	Unit profit	\$33	\$288	\$553	
12	Units produced	36	18	12	
13	Total profit per product	\$1,188	\$5,184	\$6,636	
14					
15	Total Profit	\$13,008			
16					
17					

Fig 21 - A Simple Production Model to Demonstrate Scenario Manager

This worksheet contains two input cells: the hourly labour cost (cell B2) and the unit cost for materials (cell B3). The company produces three products, and each product requires a different number of hours and a different amount of materials to produce. Formulas calculate the total profit per product (row 13), and the total combined profit (cell B15). Management is trying to predict the total profit but is uncertain what the hourly labour cost and material costs are going to be. They've identified three scenarios, as listed in following table.

Table: Three Scenarios for the Production Model

Scenario	Hourly Cost	Materials Cost
Best Case	30	57
Worst Case	38	62
Most Likely	34	59

The Best Case scenario has the lowest hourly cost and materials cost. The Worst Case scenario has high values for both the hourly cost and the materials cost. The third scenario, Most Likely Case, has intermediate values for both of these input cells. (This represents the management's best estimate.) The managers need to be prepared for the worst case, however, and they are interested in what would happen under the Best Case scenario.

Creating Scenarios

In many cases, you use worksheets to perform what-if analysis. After you set up a series of calculations, you can change the values of certain cells to view different scenarios. For example, "What if I sold 15% more products this year? What if I reduce inventory? How would these changes affect my total income?" Being able to anticipate the effect of changes is what makes a spreadsheet so valuable.

The Tools, Scenarios option enables you to substitute one or more values with a range of values and observe how the new values affect the rest of the data in the worksheet. You can ask Excel, "What if the value changes?" and the Scenario Manager instantly shows the substitutions and their effects directly on the worksheet. For instance, perhaps you want to see what happens to your projected income if sales rise or drop, or if you increase or decrease inventory. You can use the Scenario Manager to enter all the possibilities.

Hiding and Protecting Scenarios

You can hide a scenario to prevent others from seeing sensitive or confidential information in the scenario. A hidden scenario does not appear in the Scenarios list in the Scenario Manager dialog box.

You can also protect your scenario from changes. By default, the Prevent Changes option is on, thereby preventing anyone from making changes to the scenario. However, you can turn it off to allow changes.

When you add or edit a scenario, you can hide or protect it. To do so, choose Tools, Scenarios. In the Scenario Manager dialog box, click the Add button or Edit button. The Add Scenario or Edit Scenario dialog box appears.

At the bottom of either dialog box, in the Protection section, click the Hide check box to hide the scenario. If you want to protect the scenarios, leave the check mark in the Prevent Changes check box. If you want to unprotect the scenario and allow changes, click the check box to remove the check mark in the Prevent Changes box. Then click OK to confirm your choices. Click Close in the Scenario Manager dialog box to return to the worksheet.

Viewing a Scenario

Suppose you want to play out different scenarios you had created in order to make some business decisions. You can view each scenario you added and then analyze the sets of data in the scenarios. To do so, choose Tools, Scenarios. Select a scenario in the Scenarios list and click Show. Repeat the step to view different scenarios.

Creating a Scenario Summary Report

If a summary of the scenarios is really what you're interested in, and you'd like to view all your results on one sheet, you can get there directly with the Scenario Summary feature.

To create a scenario summary, choose Tools, Scenarios. In the Scenario Manager dialog box, click the Summary button. The Scenario Summary dialog box opens. Select the Scenario Summary option and click OK. Excel displays the scenario summary on a new sheet before the Sheet 1 tab. The new sheet is called Scenario Summary.

You should see a tree structure to the left of the row heading numbers in the Scenario Summary sheet. There are minus signs and plus signs for collapsing and expanding report sections. Click on a minus sign (–) to hide the section in the report. Click on a plus sign (+) to expand the section in the report.

You can print the report as you would any worksheet by using the File, Print command.

If you want to delete the report, click the Scenario Summary sheet tab, and choose Edit, Delete Sheet. Click Delete to confirm the deletion.

Using the Goal Seek Tool

What-If Analysis—in Reverse

Consider the following what-if question: “What is the total profit if sales increase by 20 percent?” If you set up your worksheet properly, you can change the value in one cell to see what happens to the profit cell. Goal seeking takes the opposite approach. If you know what a formula result should be, Excel can tell you the values that you need to enter in one or more input cells to produce that result. In other words, you can ask a question such as “How much do sales need to increase to produce a profit of \$1.2 million?” Excel provides two tools that are relevant:

- Goal seeking: Determines the value that you need to enter in a single input cell to produce a result that you want in a dependent (formula) cell.
- Solver: Determines the values that you need to enter in multiple input cells to produce a result that you want. Moreover, because you can specify certain constraints to the problem, you gain significant problem-solving ability.

Working with the Goal Seek Tool

The steps to use the Goal Seek tool are:

1. Choose Tools, Goal Seek. The Goal Seek dialog box opens. Here's where you tell Excel which cell contains the formula you want to change, the input value, and the cells that you want to change.
2. Select the cell on the worksheet that contains the formula whose result you want to change.
3. The value you want the formula to reflect needs to be entered in the To Value box.
4. Now you need to tell Excel which cell contains the data you want to change.
5. Click OK. The Goal Seek Status dialog box pops open, as you see in Figure 17.10. This dialog box gives you several options: stepping through an operation, pausing operations, and seeking additional help. You also see the cell information, the target value, and the current value. As Goal Seek works, you can see the result and step through, pause, or change it as you go.
6. Click OK. Goal Seek places the value found into the specified cell.
7. If this value isn't the one you want, restore the original value by clicking the Undo button on the Standard toolbar.
8. If you can't decide what to do, click the Redo button on the Standard toolbar to recalculate the goal seek you just undid.

Using Goal Seek on Chart Data

If the value of a data marker (data series) on a chart was generated from a formula, you can change the values in a chart by using the Goal Seek tool. More specifically, you can alter the values generated from formulas in a worksheet in 3D Surface, Radar, and Area charts by using the Tools, Goal Seek option on the worksheet.

Using the Solver

The Goal Seek command is handy for problems that involve an exact target value that depends on a single unknown value. For problems that are more complex, you should use the Solver add-in. The Solver can handle problems that involve many variable cells and can help you find combinations of variables that maximize or minimize a target cell. It also specifies one or more constraints-conditions that must be met for the solution to be valid.

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The Solver is an add-in. If the Solver button does not appear on the Data tab on the Ribbon, click the Microsoft Office Button, Excel Options, Add-Ins category, and then click the Go button. Then select the Solver Add-In check box, and click OK to install it. Click Yes to confirm that you want to install the Solver add-in.

As an example of the kind of problem that the Solver can tackle, imagine you are planning an advertising campaign for a new product. Your total budget for print advertising is \$12,000,000; you want to expose your ads at least 800 million times to potential readers; and you've decided to place ads in six publications-we'll call them Publ through Pub6. Each publication reaches a different number of readers and charges a different rate per page. Your job is to reach the readership target at the lowest possible cost with the following additional constraints:

- At least six advertisements should run in each publication.
- No more than a third of your advertising dollars should be spent on any one publication.
- Your total cost for placing advertisements in Pub3 and Pub4 must not exceed \$7,500,000.

You might be able to work out this problem yourself by substituting many alternatives for the values currently in D2:D7, keeping your eye on the constraints, and noting the impact of your changes on the total expenditure figure in E8. In fact, that's what the Solver does for you-but it does it more rapidly, and it uses some analytic techniques to home in on the optimal solution without having to try every conceivable alternative.

Click the Solver button on the Data tab, a dialog box is displayed as shown in the following figure:

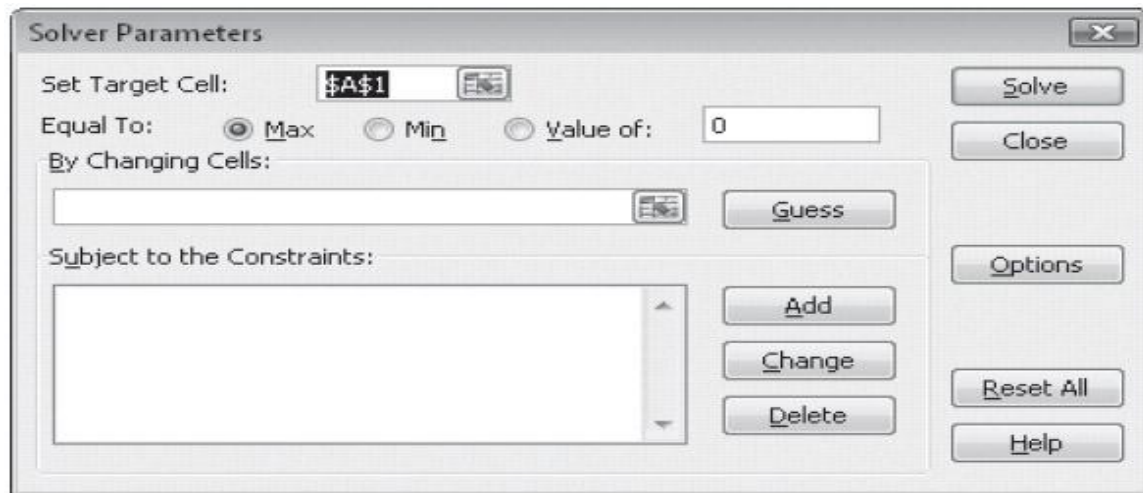


Fig – Solver Parameters Dialog Box

To complete this dialog box, you must give the Solver three sets of information: your objective, or target (minimizing total expenditure); your variables, or changing cells (the number of advertisements you will place in each publication); and your constraints (the conditions summarized at the bottom of the worksheet

Stating the Objective

In the Set Target Cell box, you indicate the goal, or target, that you want Solver to achieve. In this example, you want to minimize your total cost-the value in cell E8-so you specify your

objective by typing E8 in the Set Target Cell box (or by clicking the cell). In this example, because you want the Solver to set your target cell to its lowest possible value, you select Min as the Equal To option.

You don't have to specify an objective. If you leave the Set Target Cell box blank, then click Options, and finally select the Show Iteration Results check box, you can use the Solver to step through some or all the combinations of variable cells that meet your constraints. You will then receive an answer that solves the constraints but isn't necessarily the optimal solution.

Specifying Variable Cells

The next step is to tell the Solver which cells to change. In our example, the cells whose values can be adjusted are those that specify the number of advertisements to be placed in each publication, or cells D2:D7. Alternatively, you can click Guess, and the Solver proposes the appropriate changing cells based on the target cell you specified.

Specifying Constraints

The last step, specifying constraints, is optional. To specify a constraint, click Add in the Solver Parameters dialog box, and complete the Add Constraint dialog box. After completing the Solver Parameters dialog box, click Solve. The Solver succeeds in finding an optimal value for the objective cell while meeting all the constraints and displays the dialog box.

The values displayed on your worksheet at that time result in the optimal solution. You can leave these values in the worksheet by selecting the Keep Solver Solution option and clicking OK, or you can restore the original values by selecting the Restore Original Values option and clicking OK (or by clicking Cancel). You also have the option of assigning the solution values to a named scenario.

Saving and Reusing the Solver Parameters

If you save a workbook after using the Solver, Excel saves all the values you typed in the Solver dialog boxes along with your worksheet data. You do not need to retype the parameters of the problem if you want to continue working with it during a later Excel session.

Each worksheet in a workbook can store one set of Solver parameter values. To store more than one set of Solver parameters with a given worksheet, you must use the Save Model option. To use this option, follow these steps:

1. Click the Solver button on the Data tab.
2. Click the Options button, and then in the Solver Options dialog box, click Save Model. Excel prompts you for a cell or range in which to store the Solver parameters on the worksheet.
3. Specify a blank cell by clicking it or typing its reference, and then click OK. The Solver pastes the model beginning at the indicated cell and inserting formulas in as many of the cells below it as necessary. (Be sure that the cells below the indicated cell do not contain data.)
4. To reuse the saved parameters, click Load Model in the Solver Parameters dialog box, and then specify the range in which you stored the Solver parameters.

You'll find it easiest to save and reuse Solver parameters if you assign a name to each save model range immediately after you use the Save Model option. You can then specify that name when you use the Load Model option.

Assigning the Solver Results to Named Scenarios

An even better way to save your Solver parameters is to save them as named scenarios using the Scenario Manager. As you might have noticed, the Solver Results dialog box includes a Save Scenario button. Click this button to assign a scenario name to the current values of your variable cells. This option provides an excellent way to explore and perform further what-if analysis on a variety of possible outcomes.

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USING ADVANCE EXCEL FEATURES

Working with Macros

What Is a Macro?

As you work with Excel, you might discover yourself repeating many actions and commands. For example, every time you create a new worksheet, you might immediately enter a series of titles (such as months) across one row or format a set of numbers using the currency style.

Although you can make some repetitive work more efficient by using the toolbar or templates (discussed in Hour 6, "Using Excel Templates"), you might find it easier to create a macro to repeat a sequence of actions and commands.

Macro— A macro is a sequence of keystrokes, mouse actions, and other commands that you record for later use.

You store macros in a macro sheet, a special type of Excel worksheet that is very similar to a regular worksheet. You must have a macro sheet open to be able to use the macros written in that file.

Each macro has three parts:

- Macro name
- Macro shortcut key
- Macro steps

The macro name is a description you use to manage and run the macro. For example, a macro you create to change the font for data on the worksheet can be called `Font_change`.

The macro shortcut key is an optional key combination you can use to run the macro. For example, you can assign the shortcut key `Ctrl+Shift+F` to run the `Font_change` macro.

The macro steps are simply the commands expressed in the Visual Basic language that execute when you run the macro. These steps are a list of instructions that Excel executes in sequence, starting from the first line and moving down to the last line.

The first command should be `Sub`, a special command that tells Excel the macro has begun its operation. The last command should be `End Sub`, a special command that tells Excel the macro has finished its operation.

Macros are useful for automating repetitive or complex tasks. Although a macro is a series of programming instructions, you do not need to know anything about programming to create one. Excel offers a macro-recording feature that translates your actions into macro instructions.

Creating a Macro

By recording a series of macro instructions into a macro module or macro sheet in a workbook, you can tell Excel to perform any series of commands or actions for you. A macro can take the place of any mouse or keyboard action that you can perform in Excel. That is, a macro can cause Excel to accomplish a task by itself. You simply record a macro that shows Excel what you want to accomplish. Then Excel can repeat the task at any time.

You can create a macro by manually typing the instructions in a macro sheet or by choosing **Tools, Macro, Record**. Manually creating a macro requires you to carefully write down each step of the macro in the macro sheet. A single misspelling can affect the operation of the macro. Choosing **Tools, Macro, Record**, on the other hand, simply records each movement and

action you take while using Excel. When you have completed the action, you stop recording by choosing the Stop Recording button on the Stop Recording toolbar. If you make a mistake while recording your macro, you can edit the macro later.

For most purposes, then, you should use Tools, Macro, Record to create macros. This method ensures that your macro will work when you use it.

Naming the Macro

A macro name can have up to 256 characters with no spaces. It's best to make your macro names meaningful and short so that you and others can quickly discern which macro to use. You name the macro right after you select Tools, Macro, Record New Macro.

The default macro name that Excel assigns to a macro is the word Macro followed by a number that looks like this: Macro1, Macro2, and so on. The name appears highlighted in the Macro Name box when the Record Macro dialog box first appears. That way, you can easily type right over the default name with any name you want. Remember, a name cannot contain spaces. If you enter a space anywhere in the name, Excel will not accept the macro name.

Selecting a Keyboard Shortcut

All macro shortcut keys must include the Ctrl key in combination with one other keyboard key. You can also use the Shift key in combination with the Ctrl key when assigning the shortcut key. For instance, you might assign the key combination Ctrl+Shift+F to run the Font_change macro.

Excel reserves many Ctrl shortcut key assignments for its own use. Excel will tell you when a combination key is already assigned and won't let you use an existing shortcut key. To avoid conflicts with these existing key assignments, you should use the Ctrl+Shift key combination for your shortcut keys.

Describing the Macro

An optional step is to enter a description of your macro to explain its function. A description can be helpful for you and others who use the macro. The default description contains the date you created or last modified the macro and your user name. In the example of the Font_change macro, you might want to explain that the macro changes the font and font size for data.

Recording the Macro

A macro is recorded on using the currently selected tab of the current worksheet. When you record a macro, Excel displays the Stop Recording toolbar that contains two buttons: Stop Recording and Relative Reference. The Stop Recording button does just what it says—it stops the recording of a macro. The Relative Reference button allows you to switch between relative and absolute references. By default, Excel records absolute cell references unless you click the Relative Reference button on the Stop Recording toolbar to specify that a cell or range of cells should be a relative reference. When you choose relative reference, the Relative Reference button appears depressed on the toolbar. Click the Relative Reference button again to switch back to absolute reference. The button no longer appears depressed.

Saving the Macro

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When you save your workbook, Excel saves your macro on the macro sheet with the workbook. You don't have to do anything else to save the macro. If you accidentally close the workbook without saving changes, Excel doesn't save the macro. You have to start all over and re-create the macro.

Running the Macro

After you create a macro, you can use it to repeat its commands. Excel offers many ways to run a macro. Here are the two most common methods for running a macro:

- Select Tools, Macro, Macros, Run.
- Use the macro shortcut key (if you defined one).

The quickest way to run the macro is to use the macro shortcut key. If the macro doesn't have a shortcut key assigned to it, you must use Tools, Macro, Macros, Run.

Fixing Macro Errors

Macros don't always work perfectly. That is, you might make a mistake while recording the macro, or you might leave out a step. You don't need to worry about a macro that displays an error message because you can always fix those macro errors in Excel by editing, adding, and removing commands from the macro instructions.

A macro might need additional commands or actions, or you might want to delete some command or action from the macro. What if you want to make changes to existing macro commands and actions or correct errors in a macro that doesn't run properly? No problem. You can make any of these changes to a macro by editing the macro.

Looking at Macro Code

Macro instructions are written in Visual Basic, a fairly easy-to-use programming language. With the macro sheet in view onscreen, you can use Excel's editing commands to make changes to the Visual Basic instructions. You can remove macro commands, edit the specific contents of a cell in the macro worksheet, or even insert new commands into the middle of a macro. Of course, some changes require knowledge of Visual Basic. Specific commands that relate to actions that you want are described in the Microsoft Excel manual that comes with the software.

You can view macro code in the macro sheet by switching to that sheet. To open the macro sheet, choose Tools, Macro, Macros. In the Macro dialog box, select the Font_change macro. Click the Edit button.

The Microsoft Visual Basic window appears. You should see the Visual Basic toolbar and three window panes:

- Project— VBAProject
- Properties— Sheet1
- Visual Basic Instructions

At the far right end of the Visual Basic toolbar, notice the line and column indicator: Ln X and Col X. These indicators tell you the line and column where the insertion point is located in the active pane. To activate a pane, simply click the pane.

Editing the Macro

You can insert a command manually, remove a command, or edit a macro command on the macro sheet to make changes to the macro. You'll work with the Visual Basic Instructions pane on the right to make your changes. To get a better view of what you're doing in the Visual Basic Instructions pane, click the Maximize button in the upper-right corner of the pane. Excel enlarges the pane so that you see more macro instructions.

Fixing a Macro with Step Mode

When a macro doesn't work, the process of trying to find the problem and fixing it is called debugging.

When you use Step Mode to debug a macro, Visual Basic displays a yellow arrow in the left border of the Visual Basic Instruction pane and highlights in yellow the macro instruction on the line it's pointing to. Read the instruction carefully to see whether it contains any errors, including typos.

To use Step Mode to debug a macro, in the Macros dialog box, select the macro you want to debug. Click Step Into. If you're already in the Visual Basic Editor, choose Debug in the Visual Basic menu bar. Then you have three Step Mode choices:

- Step Into— Moves the Step Mode pointer into the instructions and executes code one statement at a time.
- Step Over— Moves the Step Mode pointer into the Code window and executes code one procedure or statement at a time.
- Step Out— Executes the remaining lines of a procedure in which the current execution point is located.

Use these Step Mode commands to step through the macro instructions and pinpoint the location of any errors.

Attaching a Macro to a Toolbar

As you build macros, you might not remember the macro names or even their shortcut names. You can use Tools, Macro, Run to choose the macros, but this method requires you to continually pull down the menu and scroll through the list of names in the Macro dialog box. A more efficient way to run a macro is to assign it to a button on a toolbar. Assigning a macro to a button makes the macro run whenever you click the button with your mouse. Attaching macros to a toolbar is a quick way to organize your macros so that any user can easily run them.

Using a Macro in Other Workbooks

It's important to know what goes on behind the scenes when you create a macro. When you create a macro, Excel stores your keystrokes and mouse actions as a set of instruction on a macro sheet. You can tell Excel to store the instructions in one of the following places:

- The active workbook
- A new workbook
- Personal Macro workbook

Excel stores your macro in the active workbook by default. If your macro works only on the current workbook, store the macro in the active workbook. If your macro works in a new workbook, create a new workbook and store your macros there. If your macro works on any

workbook in Excel, store that macro in the Personal Macro workbook. The macros in a Personal Macro workbook are available every time you start Excel. You can open the Personal Macro workbook at any time to display the macro sheet.

When you record a macro and choose Tools, Macro, Record New Macro, Excel opens the Record Macro dialog box. This dialog box is where you can specify where you want to store your macros. Click the Store Macro In drop-down arrow to look at the choices.

Select an item in the list and continue creating the macro. Excel stores your macros in the place you specify.

Understanding Macro Viruses

You've probably heard a lot of talk about viruses that your computer can catch from other computers on a network, the Internet, or disks. But what if your macros contain viruses? Viruses can contaminate your macros if the workbook is from an unsecure network or Internet site.

To prevent your computer from becoming contaminated with macro viruses, you can display a warning message whenever you try to open a workbook that contains a macro. This warning message always appears whether or not the macro actually has a virus. When the message displays, try to make sure that you know and trust the source of the workbook before you continue.

To check workbooks for macro viruses and display that warning message, choose Tools, Macro and then select Security. The Security dialog box opens. The Security Level tab should be up front. If it isn't, click the tab.

The High option lets you run signed macros from trusted sources. Unsigned macros are automatically disabled when you choose the High option. Choose the Medium option and click OK. Medium security displays the virus warning message. The Low option does not check workbooks for macros that might contain a virus. Therefore, the low security does not display the warning message. Now click OK.

When you open a workbook that contains macros and the security level is medium, Excel displays the warning message. If you click Disable Macros, Excel ignores the macros in the workbook. If you click Enable Macros, Excel lets you use the macros in the workbook.

Customizing Toolbars and Menus

Introduction to Toolbar Customization

All told, Excel comes with more than 100 built-in toolbars, made up of the following:

- Two menu bars (one for worksheets and one for chart sheets).
- Traditional-style toolbars.
- Shortcut menus (the menus that appear when you right-click a selection).

Each toolbar consists of one or more "commands." A command can take the form of an icon, text, or both. Some additional commands don't appear on any of the pre-built toolbars.

Types of Customizations

The following list is a summary of the types of customizations that you can make when working with toolbars (which also include menu bars):

- Move toolbars: Any toolbar can be moved to another location.

- Remove buttons from built-in toolbars: You may want to do this to eliminate buttons that you never use.
- Add buttons to built-in toolbars: You can add as many buttons as you want to any toolbar.
- Create new toolbars: You can create as many new toolbars as you like, with as many buttons as you like.
- Change the functionality of a button: You make such a change by attaching your own macro to a built-in toolbar button.
- Change the image that appears on any toolbar button: A rudimentary but functional toolbar-button editor is included with Excel.

Shortcut Menus

The casual user cannot modify Excel's shortcut menus (the menus that appear when you right-click an object). Doing so requires the use of VBA macros.

Moving Toolbars

A toolbar can be either floating or docked. A docked toolbar is fixed in place at the top, bottom, left, or right edge of Excel's workspace. Floating toolbars appear in an "always-on-top" window, and you can drag them wherever you like. To move a toolbar, just click its border and drag it to its new position. If you drag it to one of the edges of Excel's window, it attaches itself to the edge and becomes docked. You can create several layers of docked toolbars. For example, the Standard and Formatting toolbars are (normally) both docked along the upper edge.

If a toolbar is floating, you can change its dimensions by dragging a border. For example, you can transform a horizontal toolbar to a vertical toolbar by dragging one of its corners.

Using the Customize Dialog Box

To make any changes to toolbars, you need to be in Customization mode. In Customization mode, the Customize dialog box is displayed, and you can manipulate the toolbars in a number of ways. To get into Customization mode, perform either of the following actions:

Select View > Toolbars > Customize.

Select Customize from the shortcut menu that appears when you right-click any toolbar.

Either of these methods displays the Customize dialog box. This dialog box lists all the available toolbars, including any custom toolbars that you have created.

Adding or Removing Toolbar Buttons

As noted earlier in this chapter, you can put Excel into Customization mode by displaying the Customize dialog box. When Excel is in Customization mode, you have access to all the commands and options in the Customize dialog box. In addition, you can perform the following actions:

- Reposition a button on a toolbar.
- Move a button to a different toolbar.
- Copy a button from one toolbar to another.

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- Add new buttons to a toolbar by using the Commands tab of the Customize dialog box.

Other Toolbar Button Operations

When Excel is in Customization mode (that is, when the Customize dialog box is displayed), you can right-click a toolbar button to get a shortcut menu of additional actions for the tool. The shortcut menu that appears when you right-click a button in Customization mode.

Changing a Toolbar Button's Image

To change the image that is displayed on a toolbar button, you have several options:

- Choose 1 of the 42 images that Excel provides.
- Modify or create the image by using Excel's Button Editor dialog box.
- Copy an image from another toolbar button.

To make any changes to a button image, you must be in toolbar Customization mode. (The Customize dialog box must be visible.) Right-click any toolbar button and choose Customize from the shortcut menu that appears.

Linking Workbooks

Introducing Linking Workbook

Linking is the process of dynamically updating data in a worksheet from data in another source worksheet or workbook. When data is linked, the linked data reflects any changes you make to the original data.

Linking is accomplished through special formulas that contain references known as external references. An external reference can refer to a cell in a different worksheet in the same workbook or to a cell in any other worksheet in any other workbook.

Excel lets you link data from other worksheets and workbooks in these ways:

- Reference another worksheet in a linking formula using sheet references
- Reference several worksheets in a linking formula using 3D references
- Reference another workbook in a linking formula

When you build a linking formula, you type the formula in the cell where you want the results to appear.

Referencing another Worksheet in a Formula

If you have a lot of data and you create many worksheets to store this data, you might have occasions when a formula in one worksheet needs to use data from another sheet. These formulas are called sheet references. They're useful because you don't have to create redundant data in numerous sheets.

To refer to another cell in another sheet, place an exclamation mark between the sheet name and cell name. The syntax for this type of formula looks like =SHEET!Cell. Use the correct sheet name in place of SHEET if you have named the sheet.

Linking Several Worksheets

What if you have a formula that needs to reference a cell range that has two or more sheets in a workbook? This might happen if you have identical worksheets for different budgets, sales teams, or regions. You also might have several different worksheets that have totals calculated and entered in identical cell addresses. You can then add all these totals to get a grand total by referencing all the sheets and cell addresses in one formula.

When you have cell ranges such as this, Excel refers to them as 3D references. A 3D reference is set up by including a sheet range, which names the beginning and end sheets, and a cell range, which names the cell to which you are referring. A formula that uses a 3D reference that includes Sheet1 through Sheet5 and the cells A4:A8 might look something like this:
`=SUM(SHEET1:SHEET5!A4:A8).`

Another way to include 3D references in your formulas is to click the worksheets that you want to include in your formula. To do this, start your formula in the cell where you want the results. When you come to the point where you need to use the 3D reference, click the first worksheet tab that you want to include in your reference, hold down Shift, click the last worksheet that you want to include, and select the cells you want to reference. When you finish writing your formula, press Enter.

Linking Workbooks

When you are linking workbooks, the workbooks have some special names that you need to know about. The workbook that contains a linking formula is the dependent workbook, and the workbook that contains the linked data is the source workbook.

If you're referencing a cell in another workbook, the syntax is `[Book]Sheet!Cell`. When you enter a linking formula to reference a cell in another workbook, include the workbook name enclosed in brackets, the sheet name followed by an exclamation mark (!), and the cell reference.

Updating Links

When you are working with multiple workbooks and linking formulas, you need to know how the links are updated. If you change data in cells that are referenced in linking formulas, will the formula results be updated automatically? Yes, as long as both workbooks are open.

If the data in the source workbook is changed while the dependent workbook—the one that contains a linking formula—is closed, the linked data is not immediately updated. The next time you open the dependent workbook, Excel asks whether you want to update the data. To update all the linked data in the workbook, choose Yes. If you have links that are manually updated or you want to update the links yourself, choose No.

USING ADVANCE EXCEL FEATURES - II

Importing and Exporting Data

Importing Data

By importing data, you don't have to retype the data you want to analyze in Microsoft Excel. You can also update your Excel reports and summaries automatically from the original source database whenever the database is updated with new information.

Importing data from databases and files

You can import data to Excel from most data sources by pointing to Import External Data on the Data menu, clicking Import Data, and then choosing the data you want to import in the Select Data Source dialog box.

The Data Connection Wizard, available when you click New Source in the Select Data Source dialog box, makes it possible to import data from external data connections not available from the Select Data Source dialog box. These sources may include OLE DB data sources (including OLAP cubes and exchange servers) and any data sources a system administrator supplies. You cannot filter or join data in the Data Connection Wizard.

The default connection method when you import data using the Data Connection Wizard is through OLE DB providers. The resulting .odc (office data connection) files can be opened for viewing in Internet Explorer and edited in Excel, Notepad, and other Microsoft Office applications if the file doesn't point to an OLAP data source.

The Data Connection Wizard also provides access to a data source called a data retrieval service. A data retrieval service is a Web service installed on Windows SharePoint Services for connecting to and retrieving data. To use a data retrieval service, a client application, such as Excel, sends a query request over HTTP (HTTP: Internet protocol that delivers information on the World Wide Web. Makes it possible for a user with a client program to enter a URL (or click a hyperlink) and retrieve text, graphics, sound, and other digital information from a Web server.) to the data retrieval service on Windows SharePoint Services. The data retrieval service sends that request to the data source, and then passes the data that is returned to it back to the client application as XML. Importing data from a data retrieval service in Excel automatically creates a databound XML list in your worksheet. After adding a databound XML list to your worksheet, you can use the commands on the XML submenu of the Data menu or the List tool bar to refresh data, edit the query, or set the properties of the XML map associated with the XML list.

A default installation of Windows SharePoint Services provides a data retrieval service for connecting to data in SharePoint lists. A SharePoint site administrator can install the Microsoft Office Web Parts and Components to add additional data retrieval services for Microsoft SQL Server and Microsoft Business Solutions. The installation program for Microsoft Office Web Parts and Components is available on the Downloads on Microsoft Office Online.

To bring external data (external data: Data that is stored outside of Excel. Examples include databases created in Access, dBASE, SQL Server, or on a Web server.) into Microsoft Excel, you must have access to the data. If the external data source you want to access is not on your local computer, you might need to contact the administrator of the database for a password, user permission, or other connection information.

Importing Data with Microsoft Query

-Monica Gupta

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In most cases, you can import data by using the Import Data command as described in the section above. Use Query or another program only if you need to perform specialized query tasks such as the following:

- Filter rows or columns of data before they are brought into Excel.
- Create a parameter query (parameter query: A type of query that, when you run it, prompts for values (criteria) to use to select the records for the result set so that the same query can be used to retrieve different result sets.).
- Sort data before it is brought into Excel.
- Join multiple tables.

Microsoft Query provides a simple front end, easily accessible from within Excel, to perform these specialized query tasks.

You can use Query to set up ODBC data sources to retrieve data. In Query, you can use the Query Wizard to create a simple query (query: In Query or Access, a means of finding the records that answer a particular question you ask about the data stored in a database.), or you can use advanced criteria in Query to create a more complex query. You can access Query from Excel, or you can create a query from within the PivotTable and PivotChart Wizard.

You can also use Dynamic Data Exchange (DDE) (Dynamic Data Exchange (DDE): An established protocol for exchanging data between Microsoft Windows-based programs.) with Query. For more information about DDE, see Query Help.

To import data using Query, you must first:

- Install Query Query, including the Query Wizard, is an optional feature for Excel. Under most circumstances, you are prompted to install Query when you point to Import External Data on the Data menu and click New Database Query.
- Install ODBC drivers An ODBC driver (Open Database Connectivity (ODBC) driver: A program file used to connect to a particular database. Each database program, such as Access or dBASE, or database management system, such as SQL Server, requires a different driver.) is required to retrieve data in relational databases, text files, or Excel using Query. When you install Query, you automatically install a set of ODBC drivers. If you use a driver other than one installed with Query, you must install the driver separately.
- Install data source drivers A data source driver (data source driver: A program file used to connect to a specific database. Each database program or management system requires a different driver.) is required to retrieve OLAP source data. Query supports connecting to databases that are created by using SQL Server OLAP Services; when you installed Query, you automatically installed support for this type of OLAP database. To connect to other OLAP databases, you must install a data source driver and client software.

Importing data from the Web

You can import data originating from a Web page by pointing to Import External Data on the Data menu and clicking New Web Query. You must have access to the World Wide Web (World Wide Web (WWW): The multimedia branch of the Internet that presents not only text, but also graphics, sound, and video. On the Web, users can easily jump from item to item, page to page, or site to site by using hyperlinks.) through your company's intranet or through a modem on your computer or network, or you can make a query against local HTML or XML sources.

Importing Data with Visual Basic for Applications (VBA)

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Expertise Area: C, C++, .Net, Shell Programming, VBA, Advance Excel, XML...

You can use a Visual Basic for Applications (VBA: A macro-language version of Microsoft Visual Basic that is used to program Windows applications and is included with several Microsoft applications.) macro (macro: An action or a set of actions you can use to automate tasks. Macros are recorded in the Visual Basic for Applications programming language.) to gain access to an external data source.

Depending on the data source, you will use either ActiveX Data Objects (ActiveX Data Objects (ADO): A data access interface that communicates with OLE DB-compliant data sources to connect to, retrieve, manipulate, and update data.) or Data Access Objects (Data Access Objects (DAO): A data access interface that communicates with Microsoft Jet and ODBC-compliant data sources to connect to, retrieve, manipulate, and update data and the database structure.) to retrieve data using VBA.

If you want to use a macro that you created in Excel version 5.0 or earlier, click Add-Ins on the Tools menu, and then make sure the ODBC Add-In check box is selected.

Exporting a Text file

You can convert from a Microsoft Excel file to a text file by using the Save As command (on the File menu) in Excel. For more information, see the Help topic, Save a workbook in another file format.

Consolidating Worksheets

The term consolidation, in the context of worksheets, refers to several operations that involve multiple worksheets or multiple workbook files. In some cases, consolidation involves creating link formulas. Here are two common examples of consolidation:

- The budget for each department in your company is stored in a single workbook, with a separate worksheet for each department. You need to consolidate the data and create a company-wide budget.
- Each department head submits his or her budget to you in a separate workbook file. Your job is to consolidate these files into a company-wide budget.

These types of tasks can be very difficult or quite easy. The task is easy if the information is laid out exactly the same in each worksheet. If the worksheets aren't laid out identically, they may be similar enough. In the second example, some budget files submitted to you may be missing categories that aren't used by a particular department. In this case, you can use a handy feature in Excel that matches data by using row and column titles.

If the worksheets bear little or no resemblance to each other, your best bet may be to edit the sheets so that they correspond to one another. In some cases, simply re-entering the information in a standard format may be more efficient.

You can use any of the following techniques to consolidate information from multiple workbooks:

- Use external reference formulas.
- Copy the data and use the Paste Special command.
- Use Excel's Data > Consolidate command.
- Use a pivot table with the Multiple Consolidation Ranges option.

Building an Excel Database

Basic Database Concepts

In Excel, a database is simply a more organized set of data. By organizing the data into a database, you can use the built-in database commands to find, edit, and delete selected data without manually scrolling through the information.

Database— A tool you use to store, organize, and retrieve information. Excel treats the database as a simple list of data. You enter the database information just as you would enter data into a worksheet. When you select a command from the Data menu, Excel recognizes the list as a database.

Suppose you want to save the names and addresses of all the people on your holiday card list. You can create a database for storing the following information for each person: first name, last name, address, and so on. Each piece of information is entered into a separate field (cell) in the list. All the fields for one person in the list make a record. In Excel, a cell is a field, and a row of field entries makes a record. The column headings in the list are called field names in the database.

Before you work with a database, you should know these database terms:

- **File**— A collection of related data.
- **Field**— A column in the database.
- **Field name**— A column heading in a database. Excel uses the term column label.
- **Record**— A row in the database.

After you learn the database terms, here are two more things to think about when creating a database:

- Designing the database on paper
- Building the database with the field names and records

Starting with a Plan

Before you consider building a database in Excel, you need to plan how you want to structure the database. Whether you just think about the plan or write it down on paper, it's advisable to have a plan. That way, you'll save yourself a lot of time and effort because you are less likely to build a database that doesn't work for you.

Structuring Your Database

Consider these helpful questions and answers before structuring your database:

What is the size of the database going to be when I'm finished with it? Well, Excel gives you plenty of room on a worksheet. The size of the database can be as large as your worksheet, 256 columns by 65,536 rows.

What should I know about field names in relation to structuring my database? The field names must be placed in the first row of the database and must contain text. You cannot use values as field names. You can use a field name with a maximum of 255 characters; however, you should try to use shorter names because you can manage the database columns more easily.

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How should I handle the records in my database? Each record must have the same number of fields. But you don't have to fill in each field of the record.

How does Excel handle spaces in data that I enter in the database? Excel doesn't deal with spaces at all. First of all, you cannot use spaces in a field name, and you shouldn't use extra spaces in a record entry. That is, don't "pad" an entry with extra spaces at the beginning or end of an entry.

Do I need to be concerned with upper- and lowercase letters? Excel's answer to this question is no. You can use any combination of uppercase and lowercase letters in your field names and records. Excel ignores capitalization when sorting or searching a database.

Can you plan on using formulas to calculate data in your database? Sure you can. You can create computed fields that evaluate other fields in the database, such as a Total field that would be equal to the Cost field times the Quantity field.

Creating a Database

You build your database by entering the information into your worksheet. Enter the field names into the first row and then enter the information under the row of field names, which are your records. Now you have yourself a database.

The following steps illustrate an example of creating a new database:

1. The first step toward building a database is to enter the field names. In the My Database workbook on Sheet1, select cells B4:E4. This range is where you will enter the field names for your database.
2. Type EmpID and press Enter.
3. Type Lname and press Enter.
4. Type Fname and press Enter.
5. Type Dept and press Enter.
6. Save the workbook.
7. Click any cell to deselect the range.

Entering and Adding Data

After you create your database, you can enter your records and add more records to it any time. You append these records at the end of the current database. To make adding these records easier, you can do one of the following:

- Use a data form
- Enter the data directly in the cells on the worksheet

Working with a Data Form

The data form is a dialog box that you use to review, add, edit, and delete records in a database. This dialog box shows one record at a time, starting with the first record. Each field name has a text box that you use to enter a new word or value.

The data form also has several buttons on it that you can use to move through the database, add or delete a record, or find a particular set of records.

Here's how you create a data form. Click any cell in the database. In the My Database file, click any cell in row 4, which contains the field names. Choose Data, Form. Excel displays a message asking you where your column labels (field names) are in the worksheet.

Click OK. This step tells Excel that you want to use the first row of the selection or list as labels and not as data. Excel displays the data form in a dialog box, as shown in Figure 21.4. The dialog box's title bar contains the name of the database sheet, in this case, Sheet1. You should see field names, field text boxes, a scrollbar, the record number indicator, data form buttons, and navigation buttons.

Using the Form

The New button in the data form lets you add new records to your database. Each time you click New or press Enter, Excel adds a new, blank record to the database.

In the data form, you should see a new record with blank boxes next to the field names. Type the data in the boxes, using the Tab key to move to each box.

When you're finished typing the information in the boxes, click the New button or press Enter. Excel adds the new record to the database and presents a blank data form.

Excel adds the new records at the end of your database, starting with the first blank row beneath the last row in the database. You should see the first record in row 5, right below the field names in your database.

Adding Data Directly to the Worksheet

The second method for adding data is very simple. Just type the data directly into your worksheet. Enter the necessary information to create the database entries. The records appear in the rows beneath the field names.

Saving the Database

You save a database the same way you save a worksheet. Just click the Save button on the Standard toolbar. Excel saves your database that contains all the field names and records you entered on the worksheet.

Excel and the Internet

Adding a Hyperlink to a Worksheet

When you point to a hyperlink, Excel displays the document path (for example, <http://www.hcl.in>) to which the link points. When you click a hyperlink, Excel moves to the location to which the link points. A hyperlink appears in blue (default color) text in the worksheet.

Hyperlinks are useful when you want to browse through files on the Internet. The Web toolbar displays a list of the last 10 documents you jumped to by using the Web toolbar or a hyperlink. This feature makes it easy for you to return to these documents.

The Insert, Hyperlink option lets you create a hyperlink so that you can move to a Web page from a worksheet.

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Saving Excel Documents to the Web

You can publish an Excel document to the World Wide Web so that other people on the Web can see your work. To place Web pages on the Web, you need to have an ISP that provides you with space for Web pages, or you need access to a Web service established at your company. You can ask the Webmaster (or whoever manages the Web servers) at your company where to place your Web pages.

You can use an existing Excel document for a Web page by saving it as a Web page. Excel closes the document and reopens it in Hypertext Markup Language (HTML) format. The alternative is to create your own Web page in Excel from scratch and then format it the way you want. No matter which method you use, you can publish many types of Excel documents on the Internet—for example, an annual report or a database.

You can even add audio and video to your Web page in Excel. That way, the reader of your Web page can play a sound file or view a video while visiting the Web site. You can use the Insert, Object command to insert sound and video clips into your Web page.

Understanding HTML Formatting

Every Web page is basically a plain text file with additional formatting instructions for the text, graphics, and links. This file is called the HTML source because the instructions are written in HTML format. The way a Web page looks on the Web is similar to the way it looks in Excel's Web Page Preview.

When you save a document in HTML format, Excel saves any graphics and other objects in separate files.

Saving as a Web Document

You can convert an Excel document into a Web page by selecting File, Save as Web Page. Excel saves your workbook with the file type MHT, the Web Archive format. For example, My Web Database.mht. The MHT file type saves text and images in a single file that you can send as an attachment in an email message.

Previewing Your Document in Web Page Preview

The Web Page Preview in Excel enables you to see your document as it will look in a Web browser. A browser is a program with which you can read information on the Internet. This preview makes the data (text and numbers) easy to read because it wraps to fit the window. You cannot edit and format data in Web Page Preview.

Your Web page might look different in a browser such as Internet Explorer than it does in Excel, depending on how your browser interprets HTML codes.

To look at your document in Web Page Preview, choose File, Web Page Preview. Excel shows the document in the Web Page Preview window

Posting Your Worksheet to the Web

After you convert an Excel document to a Web page, you can post your worksheet to the Web on the Internet by sending the page to a file transfer protocol (FTP) site on the Internet. FTP is a protocol that the Internet uses to send files between your computer and other computers on the Internet. Computers that offer files for download are called FTP sites. Using FTP is a fast and reliable way to download files from other Internet computers and to upload your own files.

FTP addresses begin with FTP://. For example, FTP://FTP.HCL.COM is the FTP site. If you don't know the correct FTP site name, ask the site's system administrator.

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If you have a personal account at the FTP site, choose the User option in the Log On As area. Then enter your username and password. Otherwise, leave the default option, Anonymous, selected. Anonymous users are given access only to certain public area of a site. In most cases, you connect as an anonymous user if you want to download files. An anonymous user might not be able to upload files.

After you post the worksheet to the Web, you see the document as it would appear in a Web browser. Then you can get on the Internet while you're in Excel and view your own Web page. Other users will also be able to view your Web page.

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