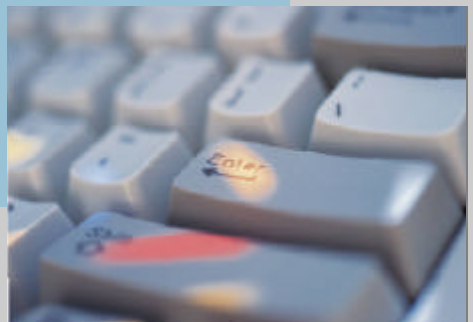


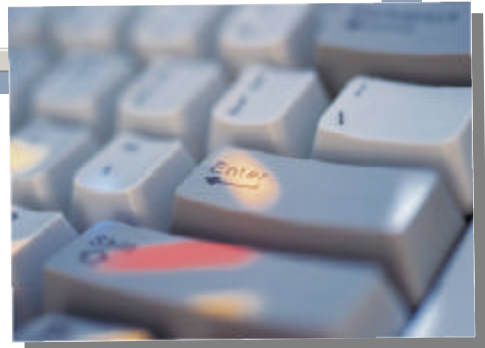
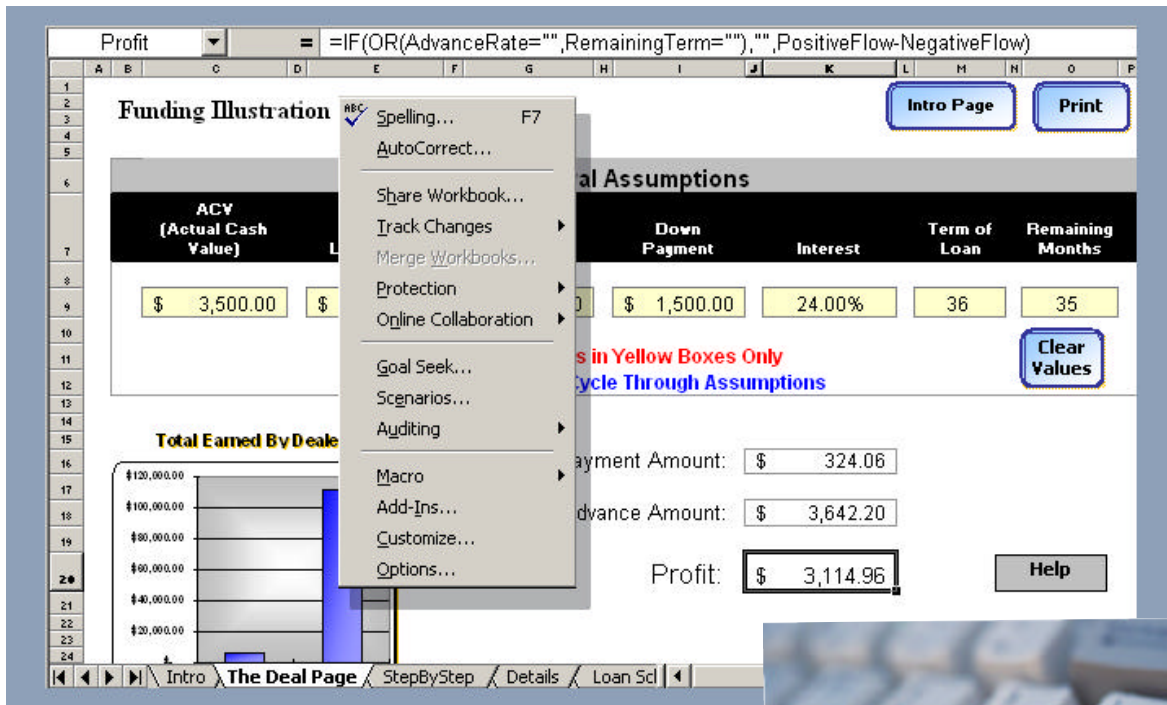
Excel Basic Training



***by
Laura Warren***

Excel

Basic Training



Laura Warren

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Introduction to Excel

CHAPTER 1

WELCOME

Excel is an advanced worksheet (or spreadsheet) product that also supports database and graphic functions. A *worksheet program* is essentially a replacement for the ledger sheet, pencil, and calculator.

Given a tabular set of numbers, there are several general kinds of tasks that you can perform to make the numbers meaningful, readable, and useful.

26.93	14.23	4.31	13.21
2.32	9.14	0.00	6.35
28.96	11.43	0.25	8.89
14.24	27.44	27.95	20.94
23.12	26.67	25.40	27.19

For example you can do the following:

- Supply labels for the rows and columns, along with a title or other text describing the table.
- Modify the format of the numbers to show what the values actually represent — for example, supply a dollar-and-cent format, a percent format, or a rounded integer format.
- Calculate additional values based on the table of numbers: totals, averages, percentages, or other statistical calculation.
- Produce a variety of pictorial charts and graphs to clarify the significance of the numbers — for example, bar charts, pie charts, or line charts.
- Treat the table as a database, in which each row represents a record of information; you might then want to select records according to stated selection criteria, for use in particular operation.
- Print the table on paper, along with associated charts or other documents.
- Store the table on disk for future use.

STARTING EXCEL

You can start **Excel** by double-clicking on the **Excel** icon on your desktop.

The first blank workbook **Excel** displays is called *Book1*. If you open another new workbook during the same work session, **Excel** names it *Book2*. You can have several workbooks open at the same time and you can subsequently save each workbook under a different name.

When you start **Excel**, your screen consists of five areas:

- the **worksheet window**, which occupies most of the screen
- the **menu bar**
- two or more **toolbars**
- the **formula bar**
- the **status bar**

Collectively, these five areas are known as the **Excel** workspace.

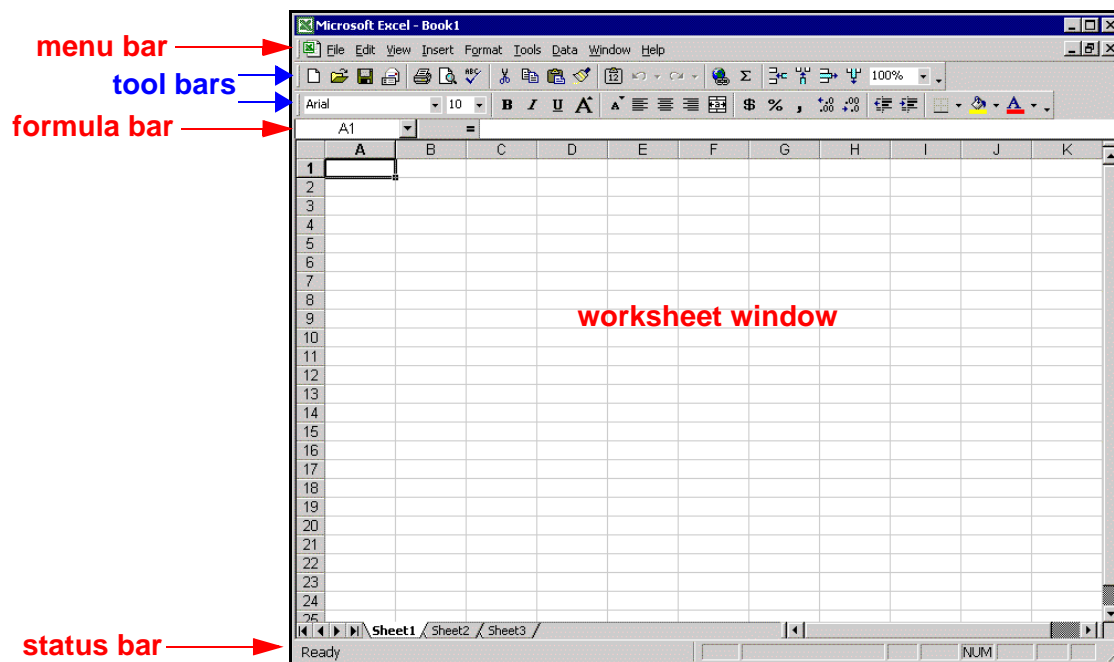


Figure 1-1 The Excel Workspace

THE WORKBOOK WINDOW

As mentioned in the previous section, the workbook window dominates the **Excel** workspace. Navigational controls appear at the bottom of the workbook window, and a title bar is displayed at the top. The window also includes borders, worksheets, and scroll bars.

Take a look at the following figure:

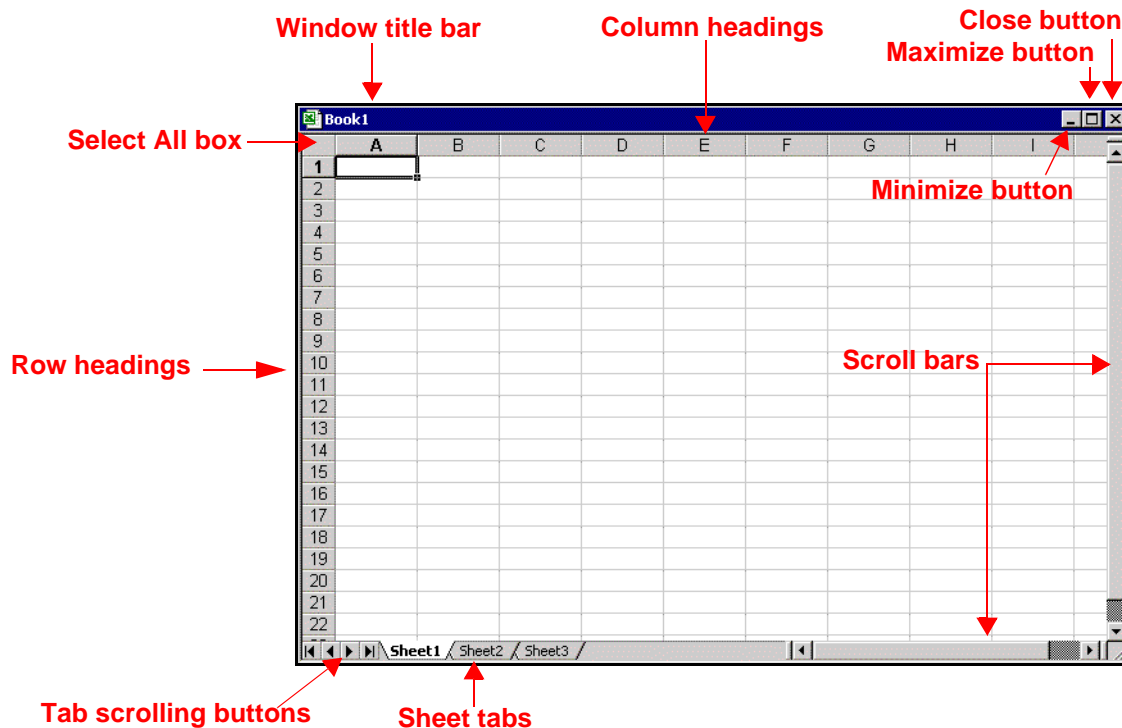


Figure 1-2 The Workbook Window

At the bottom of the workbook window are a number of controls that you can use to move from sheet to sheet in a workbook. You can use the *tab scrolling buttons* in the lower left corner to scroll through the sheet tabs in your workbook. The two tab scrolling buttons in the middle scroll the tabs one sheet at a time in the indicated direction. The two outermost tab scrolling buttons scroll directly to the *first* or *last* tab in the workbook.

When you see the tab of the sheet you want to activate, you must click the actual tab.



Hint

You can also use **CTRL+PGUP** and **CTRL+PGDN** to move from sheet to sheet.

USING MENUS

Each menu in the menu bar contains many choices, most grouped logically. The **FILE** menu, for instance, shows commands that deal with files, **EDIT** shows editing commands, and so on.

EXERCISE 1A

Exercise

You can also access menus entirely using keyboard shortcuts. To pull down a menu by using only keystrokes, follow these steps:

1. Hold down the **ALT** key and press the letter on the keyboard that corresponds to the underlined letter in the menu. To activate the **FILE** menu, for example, hold down **ALT** and press the **F** key on your keyboard.

Hint



The underlined letter of a menu option is commonly called a “hotkey.”

2. After the menu appears, choose the option you want and press the letter on your keyboard that corresponds to the menu’s hot key (you can just press the underlined letter to select a command within a menu.)

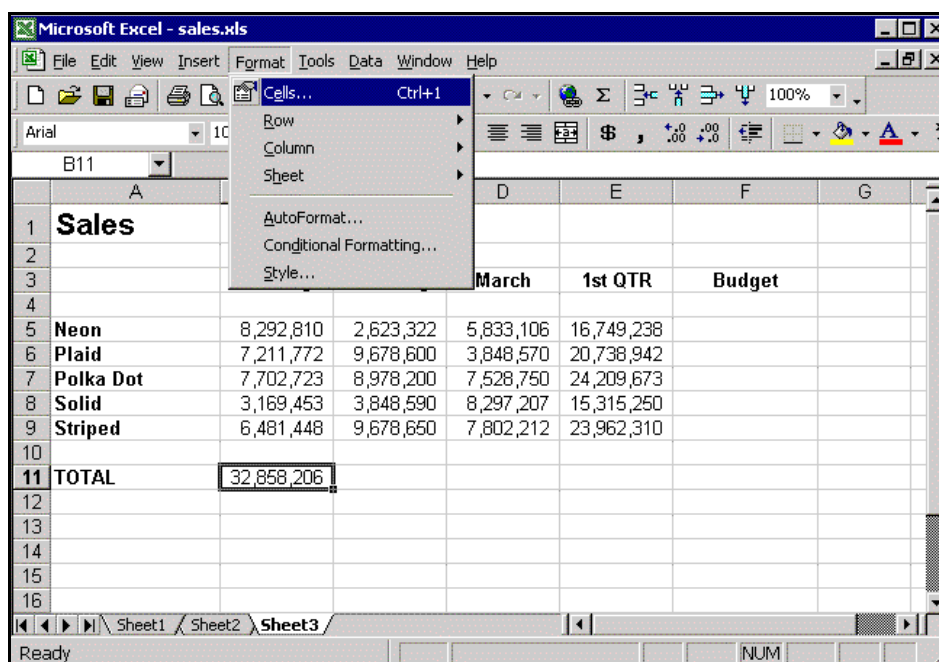


Figure 1-3 A Menu Selection

Using Shortcut Menus

After using **Excel** for a while, you'll find that you use some commands more frequently than others. This shortcut menu allows you to access these commands.

EXERCISE 1B

Exercise

1. Right-click the mouse button from anywhere in the worksheet.
2. If you're using the keyboard, press **SHIFT+F10** to display a shortcut menu.

There are several shortcut menus. The one that is displayed depends on the type of task you're performing. For example, if you're working in the worksheet, the shortcut menu contains commands for editing and formatting cell entries.

You select a command from a shortcut menu the same way you do on any other menu: point to the command and click, or press the hotkey.

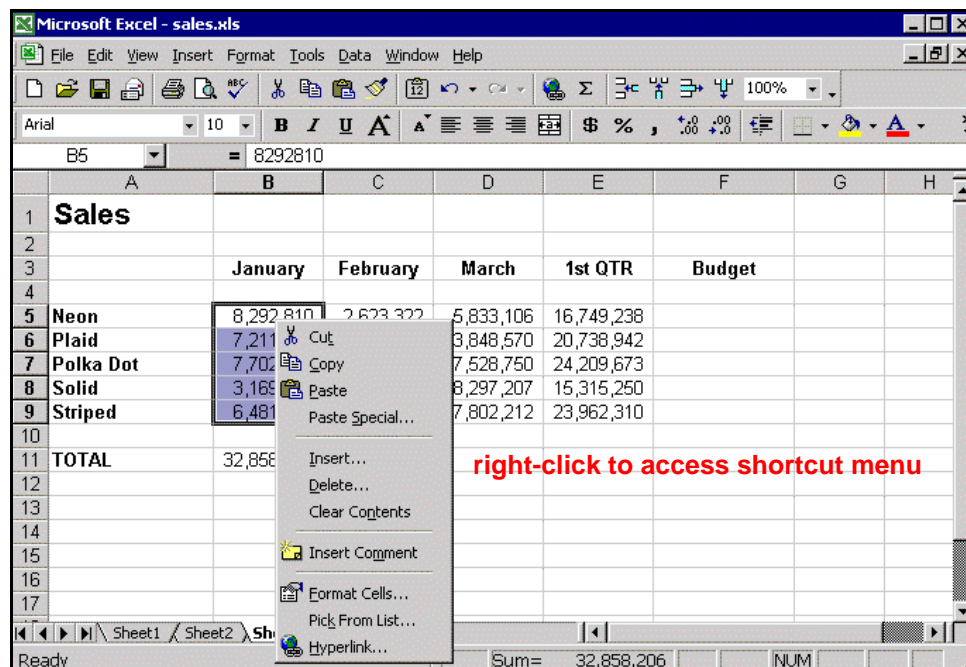


Figure 1-4 A Shortcut Menu

USING DIALOG BOXES

Menu commands that are followed by an ellipsis (for example, **DELETE...**) display dialog boxes — small windows that appear on top of the **Excel** worksheet and disappear when you are finished using them.

A dialog box asks you to provide more information about the command you have chosen, either by typing an entry or by selecting options.

For example, the dialog box shown here is displayed when you select **FILE > PRINT**.

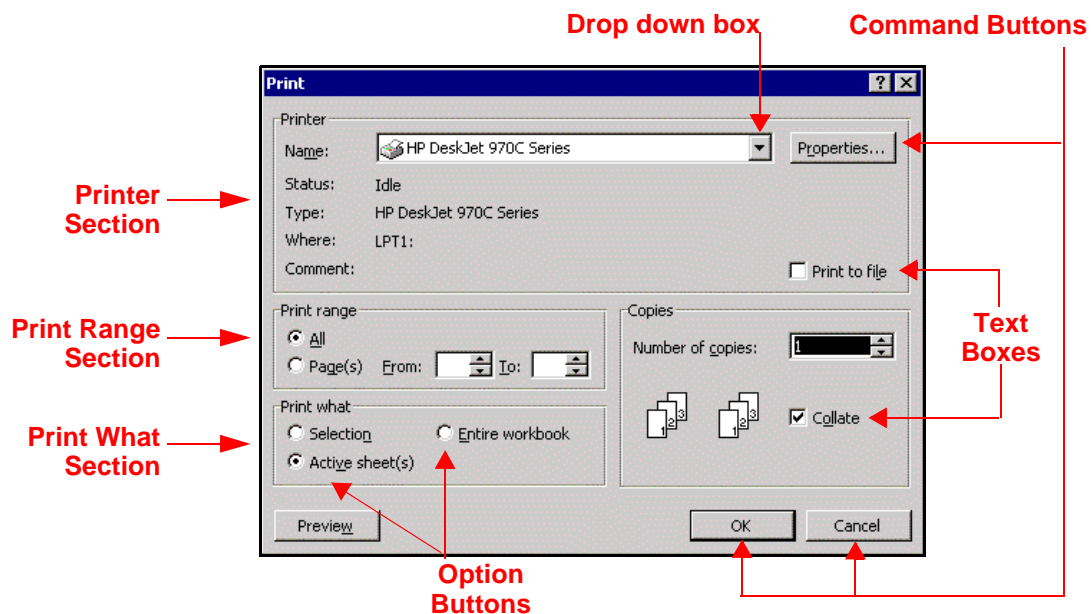


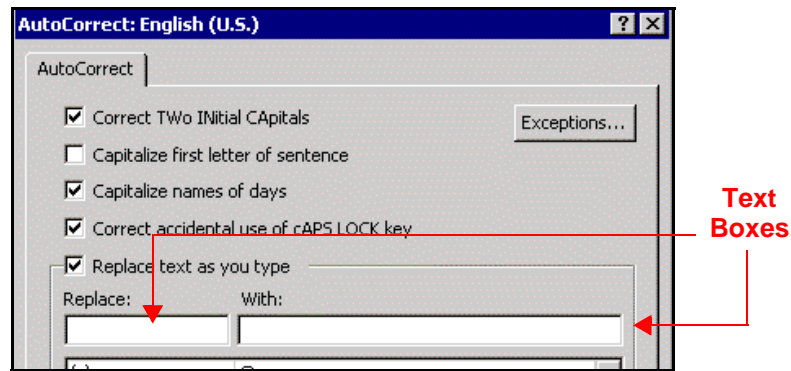
Figure 1-5 A Dialog Box

Dialog Box Elements

Dialog boxes vary in size, shape, and the number of settings and options. They may contain many different settings and, therefore, are often divided into named sections.

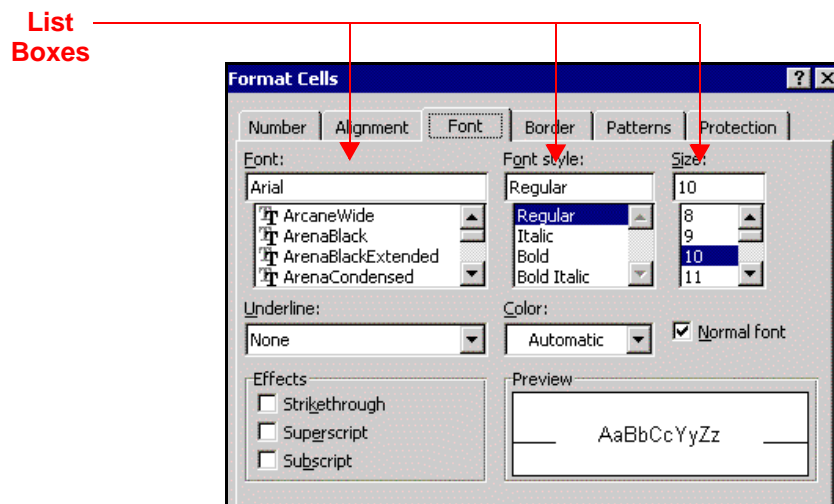
TEXT BOXES

Text boxes either are blank or contain suggested text or data. When a text box is blank, you must either type an entry or leave it blank if you don't want to use the option.



LIST BOXES

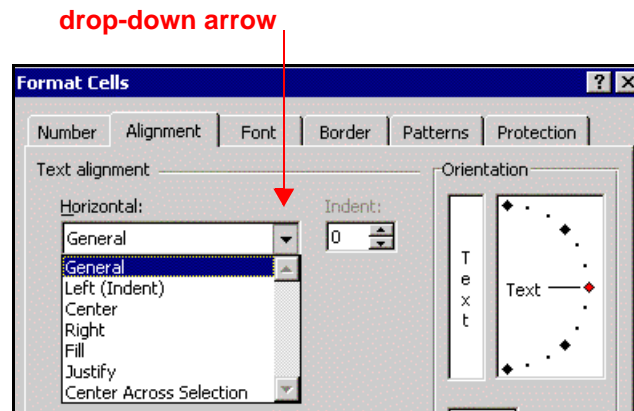
List boxes display lists of options to choose from, such as a list of printers or file names. When the list is long, the box contains a vertical scroll bar that operates the same as other Windows scroll bars.



You may select only one item from a list box.

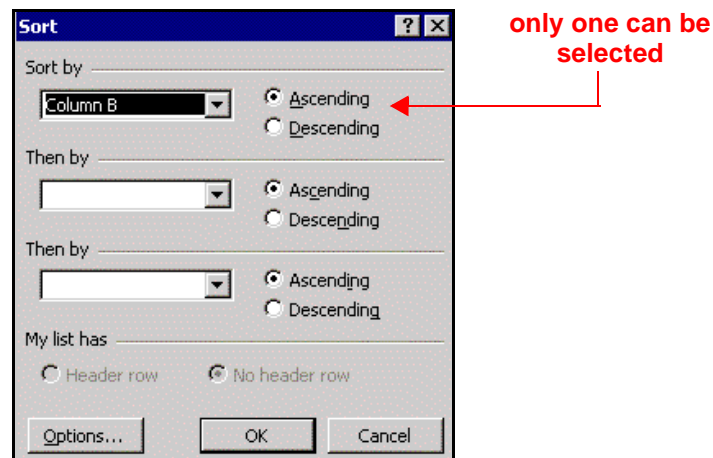
DROP-DOWN BOXES

Similar to list boxes, drop-down boxes offer a list of options to choose from, but the full list is hidden until you reveal it by selecting the drop-down arrow.



OPTION BUTTONS

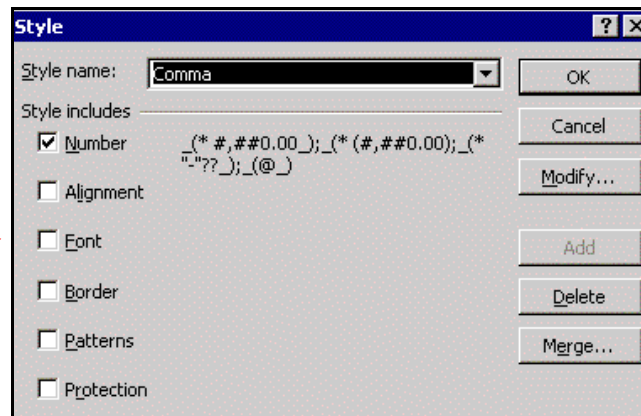
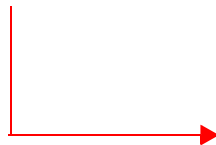
An option button is an open circle used to select one setting from a set. You can select only one option button from a set. Option buttons turn on and off when you select them.



CHECK BOXES

Settings that are preceded by an open square box are called check boxes. When the setting is selected, a check (✓) appears in the box. You may choose as many check boxes as you like in a dialog box. Check boxes turn on and off when you select them.

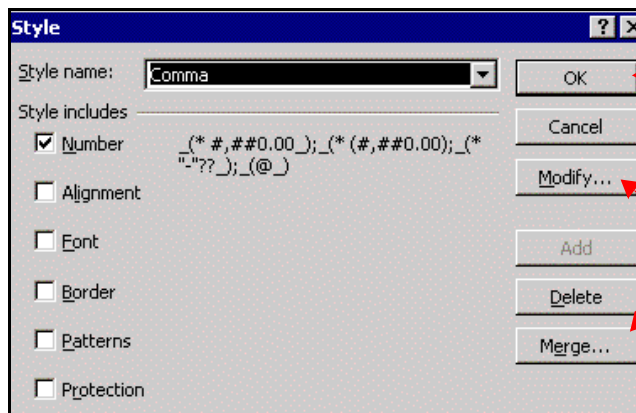
more than one
can be selected



COMMAND BUTTONS

Almost all dialog boxes contain at least 2 command buttons: **OK** and **CANCEL**. When you select **OK**, all the settings in the dialog box take effect. When you select **CANCEL**, **Excel** ignores the settings and returns to the **Excel** worksheet without making any changes.

Occasionally, dialog boxes contain command buttons that are followed by an ellipsis. These buttons open *subdialog* boxes, from which you can choose more specific settings.



Command Buttons

Command Buttons
with Ellipses

ABOUT WORKBOOKS AND WORKSHEETS

WORKBOOKS

In **Excel**, a workbook is the file in which you work and store your data. Because each workbook can contain many sheets, you can organize various kinds of related information in a single file.

WORKSHEETS

Use *worksheets* to list and analyze data. You can enter and edit data on several worksheets simultaneously and perform calculations based on data from multiple worksheets. When you create a chart, you can place the chart on the worksheet with its related data or on a separate *chart sheet*.

SHEET TABS

The names of the sheets appear on tabs at the bottom of the workbook window. To move from sheet to sheet, click the sheet tabs.

STARTING A NEW WORKBOOK

You can create a new workbook by selecting **FILE** ➤ **NEW** or by clicking on the **NEW** button in the toolbar.

EXERCISE 1C

Exercise

1. Click on the **NEW** button.

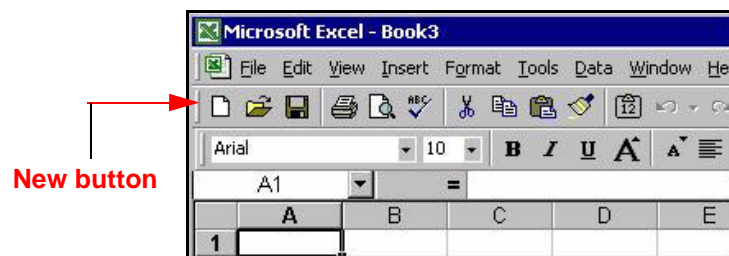
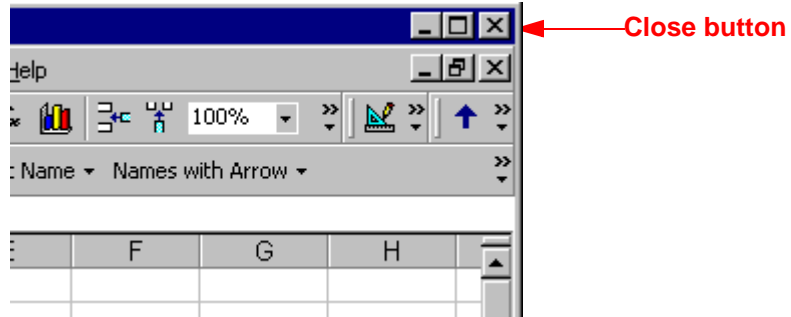



Figure 1-6 The New Workbook Button

2. Click on the document window's **CLOSE** button.



POINTS TO REMEMBER

- You can start **Excel** by double-clicking on the **Excel** icon on your desktop.
- When you start **Excel**, your screen consists of five areas:
 - the **worksheet window**, which occupies most of the screen
 - the **menu bar**
 - two or more **toolbars**
 - the **formula bar**
 - the **status bar**
- To pull down a menu by using only keystrokes, hold down the **ALT** key and press the letter on the keyboard that corresponds to the underlined letter in the menu.
- You can access the shortcut menu by pressing the right mouse button from anywhere in the worksheet.
- If you're using the keyboard, press **SHIFT+F10** to display a shortcut menu.
- A workbook is the file in which you work and store your data. Each workbook can contain many *sheets*.
- The names of the sheets appear on tabs at the bottom of the workbook window. To move from sheet to sheet, click the sheet tabs.
- You can also use **CTRL+PGUP** and **CTRL+PGDN** to move from sheet to sheet.
- You can create a new workbook by clicking on the **NEW** icon on the toolbar ().

Saving and Printing Files

CHAPTER 2

SAVING WORKSHEETS

In **Chapter 1** you learned that the title bar displays the name of the current worksheet. When you start **Excel**, the title of the new worksheet in the worksheet is Sheet1. As you open additional worksheets, **Excel** automatically names them Sheet2, Sheet3, and so on. These are temporary names that **Excel** assigns to new worksheets.

Until you save a file, none of the information you enter is stored on your PC's disk. **Excel** has two commands for saving files:

- Save
- Save As

Use the **Save As** command to save a new file or an existing file under a new name. Use **Save** to save all subsequent changes to a file under the same name.

When you save a workbook for the first time, you assign a file name and indicate where you want to store the file on your computer's hard disk or in another location. Each time you subsequently save the workbook, **Excel** updates the workbook file with your latest changes.

SAVE A NEW, UNNAMED WORKBOOK

1. On the **FILE** menu, click **SAVE AS**.
2. In the **SAVE IN** list, select the drive and folder where you want to save the workbook.
3. To save the workbook in a new folder, click **CREATE NEW FOLDER**.
4. In the **FILE NAME** box, type a name for the workbook.
5. Click **SAVE**.

SAVE AN EXISTING FILE

The easiest way to save an existing file is to click on the **SAVE** button on the toolbar.



Another easy way to save is to press **CTRL+S**.

CLOSING WORKSHEETS

On the **FILE** menu, click **CLOSE**.

To close all open workbooks without exiting the program, hold down **SHIFT** and click **CLOSE ALL** on the **FILE** menu.

TO CREATE A NEW WORKBOOK

The easiest way to create a new workbook is to click on the **NEW** button on the toolbar.



Another easy way to create a new workbook is to press **CTRL+N**.

OPEN AN EXISTING WORKBOOK

Click the **OPEN** button on the toolbar.



In the **LOOK IN** list, click the drive, folder, or FTP location that contains the workbook you want to open, and then locate and double-click the folder that contains the workbook.

Another way to open a workbook is to press **CTRL+O**. This will display the **Open File** dialog box.

PRINTING

Preparing to print

Excel provides lots of optional settings that let you adjust the final appearance of the printed page to suit your needs.


PRINT PREVIEW

The print preview feature allows you to see what your printed page will look like based on current printer and page settings. The preview feature is very helpful for checking such things as a document's page layout, page breaks, and margin and column widths.

To use the preview feature select **PRINT PREVIEW** from the **FILE** menu or click on the **PRINT PREVIEW** button on the toolbar.

EXERCISE 2A

Exercise

1. Open the file called *printing.xls*.
2. Click on the **PRINT PREVIEW** button on the toolbar (.
3. The last column does not fit and spills over into additional pages at the end of the document. You will need to make some changes before the document is ready to print the way you want it to.
4. Click the **CLOSE** button on the preview screen to return to the spreadsheet.

ADD HEADERS AND FOOTERS

Headers and **footers** are used when you want to repeat the same information at the top (header) or bottom (footer) of every page. You can select from built-in headers and footers, or you can customize your own.

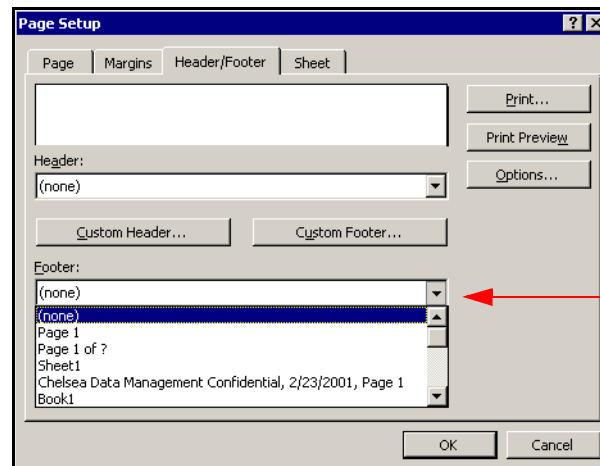
Headers and footers are limited to a single line of text. But header or footer text can be separated into segments. When you create a custom header or footer, text entered in the left-most section will be left-justified. Text entered in the middle section will be centered, and text entered in the right-most section will be right-justified.

You can insert codes to print the current date, current time, page number, and/or workbook filename by clicking a code button representing the desired item.

EXERCISE 2B

Exercise

1. On the **VIEW** menu, click **HEADER AND FOOTER**.
2. In the **HEADER** or **FOOTER** box, click the header or footer you want.



3. Click on the **PRINT PREVIEW** button to see your changes.

REPEAT ROW AND COLUMN LABELS

If the data on your worksheet has column or row labels (also called print titles), you can have **Excel** repeat these labels on every page of the printed worksheet.

EXERCISE 2C

Exercise

Set the headings to print at the top of each page.

1. On the **FILE** menu, click **PAGE SETUP**, and then click the **SHEET** tab.

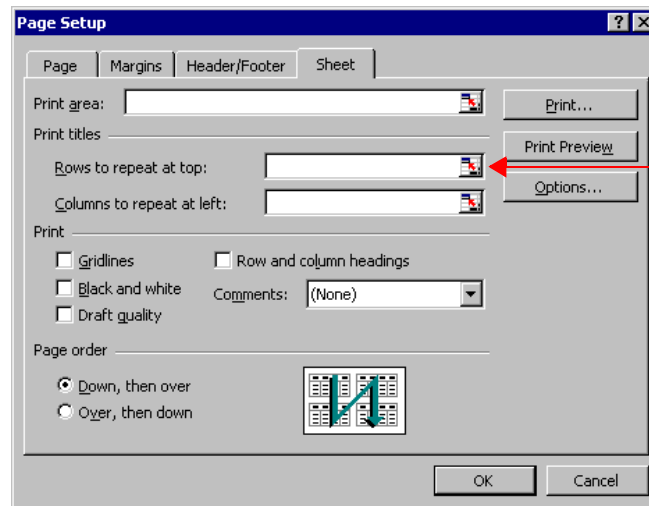


Figure 2-1 Page Setup — Sheet Tab

- To repeat column labels on every page, click **ROWS TO REPEAT AT TOP**, and then drag over the rows that contain the column labels.

Drag over rows 1 through 3

Print_Titles						
	A	B	C	D	E	F
1	Chelsea Industries					
2						
3	Date	Explanation	Deposits	Debits	Credits	Checks
4	01/01/02	Forward				\$
5	01/02/02	FROM FIRST UNION				
6	01/02/02	TO CHASE NORTH				
7	01/02/02	ADP TX/FINCL				
8	01/02/02	ADP TX/FINCL		124,876.92		\$ 523,918.36
9	01/02/02	ADP TX/FINCL		86,694.57		\$ 437,223.79
10	01/02/02	STANBY LC DEPT		29,370.96		\$ 407,852.83

Then click on this button

- When you click on the button shown above, the **Page Setup** dialog box will reappear with the rows to repeat. Click on **OK**.
- Now print preview the worksheet again and notice how the headings appear on each page.

Change the Orientation

Your worksheet may be printed in either **Portrait** (vertical) or **Landscape** (horizontal) paper orientation. Switch to landscape when you need to print many more columns of data than will fit on a portrait page. If you don't want to use landscape, you can change the layout of the printed worksheet to fit the data to the available space, or adjust the margins.

EXERCISE 2D

Exercise

1. On the **FILE** menu, click **PAGE SETUP**, and then click the **PAGE** tab.

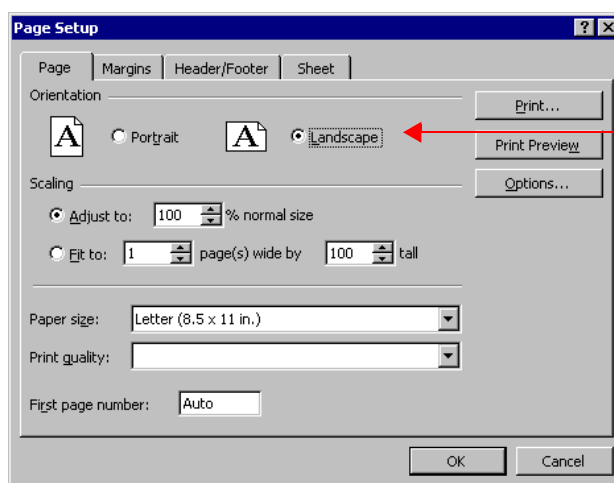


Figure 2-2 Page Setup — Page Tab


2. Change the orientation to **Landscape**.
3. Click on **OK**.
4. Preview the worksheet again and notice that the pages now fit.

Making the data fit the page

You can make the printed image fit the page or paper size by shrinking or expanding the printed image. Other changes you can make to the layout of the printed worksheet include setting the paper size, centering the data on the printed page, and controlling how the pages are numbered. These changes affect only the worksheet's printed appearance, not how it looks on the screen.

EXERCISE 2E

Exercise

1. Click on the **FITTOPAGE** tab.
2. Click on the **PRINT PREVIEW** button on the toolbar ().
3. Notice that there is slightly more information than will fit on one page.
4. From the Print Preview screen click on the **SETUP** button.

Click to open Page Setup



Figure 2-3 Access Page Setup from Preview Mode

5. From the **Page** tab set Fit to **1 page wide** by **1 page tall** and click **OK**.

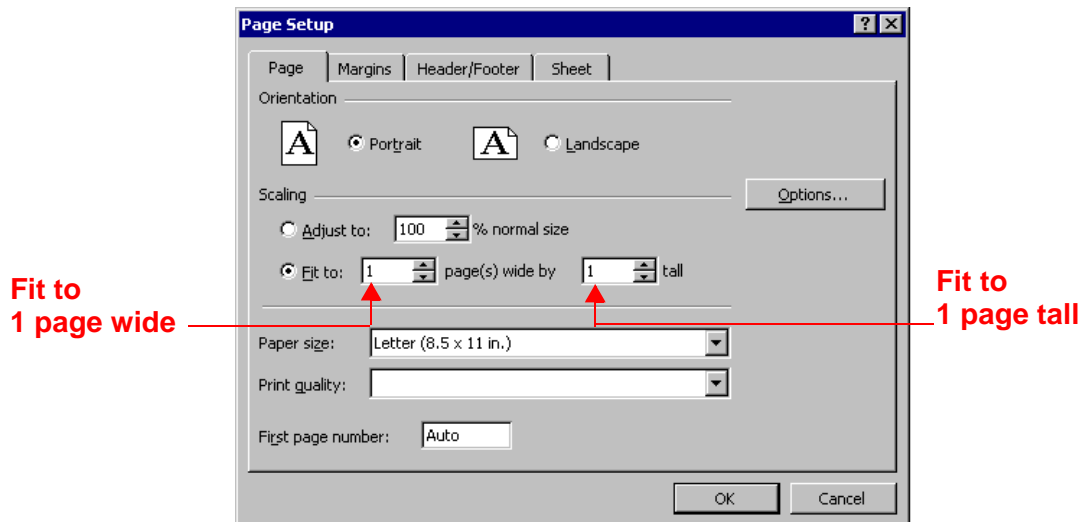


Figure 2-4 Set to Fit

Setting Page Breaks

You can instruct **Excel** to show you where page breaks will occur. Page breaks that you set are solid blue lines, and automatic page breaks set by **Excel** are dashed blue lines.

FORCING PAGE BREAKS

To end a page at a particular point and start a new page, you can set a new page break.

EXERCISE 2F

Exercise

1. To show page breaks select **TOOLS** ➤ **OPTIONS** and click on the **View** tab.

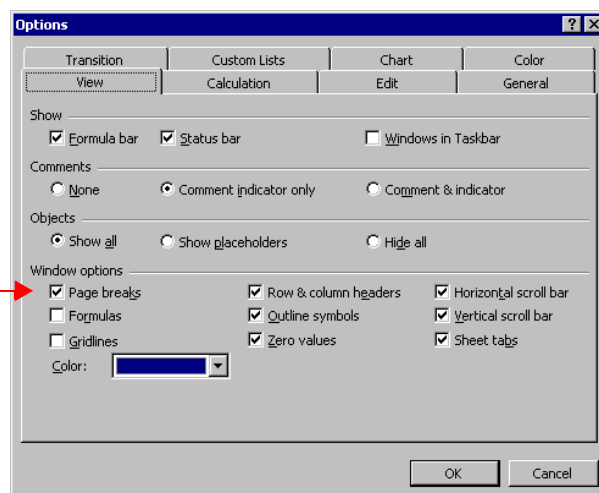



Figure 2-5 Options Dialog — View Tab

2. Click on the **Page Breaks** option and then click the **OK** button to close the dialog box.
3. Scroll down so that you can see where **Excel** has inserted automatic page breaks.
4. Click on cell A16 and choose **INSERT** ➤ **PAGE BREAK** from the menu.
5. Notice a new page break indicated by a horizontal line above row 16. Since you clicked a cell in column A, **Excel** inserted only a horizontal page break.

If you had clicked in any other column on row 16, **Excel** would have inserted both a horizontal and a vertical page break.

Print the Workbook

All your hard work pays off when you can print your final worksheet. You may want to print a copy to review and mark up editing changes, or you may print a copy to distribute to others.

To print an entire file, you can simply click the **PRINT** button. (). This instructs **Excel** to immediately start printing one copy of the entire file.

To print only certain pages or selected text in a file, to print multiple copies, or to control how the file is printed, you need to use the **Print** dialog box.

If the worksheet has a defined print area, **Excel** will print only the print area. If you select a range of cells to print and then click **Selection**, **Excel** prints the selection and ignores any print area defined for the worksheet.


1. On the **FILE** menu, click **PRINT**.
2. Under **PRINT WHAT**, select the option you want.

Tip



If you want to print more than one sheet at the same time, select the sheets before you print.

POINTS TO REMEMBER

- Use the **SAVE AS** command to save a new file or an existing file under a new name. Use **SAVE** to save all subsequent changes to a file under the same name.
- To close all open workbooks without exiting the program, hold down **SHIFT** and click **CLOSE ALL** on the **FILE** menu.
- You can create a new workbook by clicking on the **NEW** button on the toolbar or by pressing **CTRL+N**.
- To open a file, click the **OPEN** button on the toolbar or press **CTRL+O**. These methods will display the **Open File** dialog box.
- **Excel** provides lots of optional settings that let you adjust the final appearance of the printed page to suit your needs.
- Print preview shows you the printed page and lets you easily adjust columns and margins.
- You can set **Headers** and **footers** on the **Header/Footer** tab of the **Page Setup** dialog box..
- If the data on your worksheet has column or row labels (also called print titles), you can have **Excel** repeat these labels on every page of the printed worksheet. Use the **Sheet** tab of the **Page Setup** dialog box.
- Your worksheet may be printed in either **Portrait** (vertical) or **Landscape** (horizontal) paper orientation.
- To show automatic or forced page breaks select **TOOLS>OPTIONS**, click on the **View** tab, and check **Page Breaks**.
- To force a page break select the row which should start the new page and choose **INSERT >PAGE BREAK** from the menu.
- To print an entire file, you can simply click the **PRINT** button. ().
- To print only certain pages or selected text in a file, to print multiple copies, or to control how the file is printed, you need to use the **Print** dialog box.

Selecting Ranges and Navigating

CHAPTER 3

CELL REFERENCES

You might be wondering how to keep track of where you are and which cell is which. Excel uses two distinct methods of referring to cells. By default, Excel uses the convention of naming the columns starting with A and working through Z, then AA through AZ, then BA through BZ, and so on all the way to column IV — 256 columns in all.

Rows are numbered sequentially starting at 1 and proceeding through 65,536.

IDENTIFYING THE ACTIVE CELL

The active cell is the cell that is ready to receive data or a command. The cell reference identifies the location of the active cell in the worksheet by the column and row headings. The active cell has a border around it.

When you change the active cell, the *Name Box* located on the left side of the formula bar shows the new cell reference.

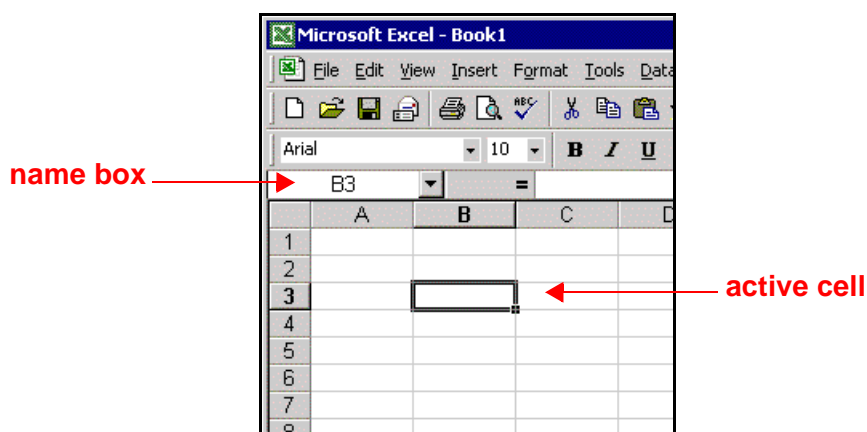


Figure 3-1 The Active Cell

You can change the active cell in a worksheet by using the mouse or the keyboard.

MOVING AROUND THE WORKSHEET

If you prefer to work with the keyboard, you can just move the cross-shaped cell pointer around with the arrow keys. However, using the mouse might be easier. Just move the cell pointer until it is over the cell you wish to highlight and click the left mouse button once.

The following table shows how to change the active cell by using the keyboard.


















One cell right	
One cell left	
One cell down	
One cell up	
One screen up	
One screen down	
One screen right	 + 
One screen left	 + 
First cell in current row	
Last cell in current row	 + 
First cell in worksheet	 + 
Last occupied cell in worksheet	 + 

Table 3-1 Change the Active Cell with the Keyboard

SELECTING GROUPS OF CELLS

Before you can work with cells, you must select a cell or a group of cells. When you select a single cell, it becomes active, and its reference appears in the **Name** box at the left end of the formula bar.

Although only one cell can be active at a time, you can often speed operations by selecting groups of cells called *ranges*. You can move among the cells in a selected range (but not those outside the range) without changing your range selection.

Selecting With The Mouse

EXERCISE 3A

Exercise

To select a single cell, point to it and click the mouse button. To select a range of cells, for example **A1:B5**, follow these steps:

1. Point to cell **A1**.
2. Hold down the left mouse button and drag down and to the right to cell **B5**.

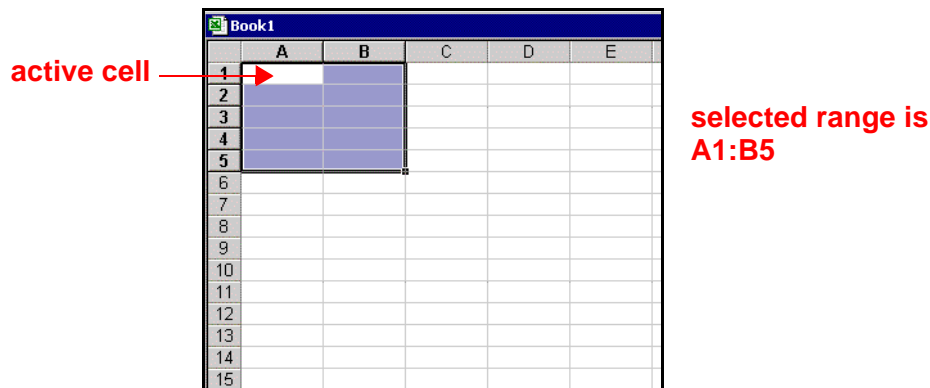


Figure 3-2 Selecting a Range

Excel describes the range in terms of the cells located at the upper left and lower right corners of the range. The active cell always occupies one corner of the range.

EXTENDING A SELECTION

Instead of dragging through all the cells you want to work with, you can indicate any two diagonal corners of the range. This technique is known as *extending a selection*.

EXERCISE 3B

Exercise

Follow these steps to select the range **A1:C10**.

1. Click on cell **A1**.
2. Hold down the **SHIFT** key and click on cell **C10**.

When you need to select a large range, you may find this technique more efficient than dragging the mouse across the entire selection.

Selecting Multiple-Area Ranges

Multiple-area ranges are cell ranges that do not encompass a single rectangular area. To select multiple-area ranges with the mouse, use the **CTRL** key.

EXERCISE 3C

Exercise

For example, to add the range **C7:E10** to the already selected range **A1:B5**, follow these steps:

1. With the previous range still highlighted, press the **CTRL** key and click on cell **C7**.
2. Drag through cell **E10**.

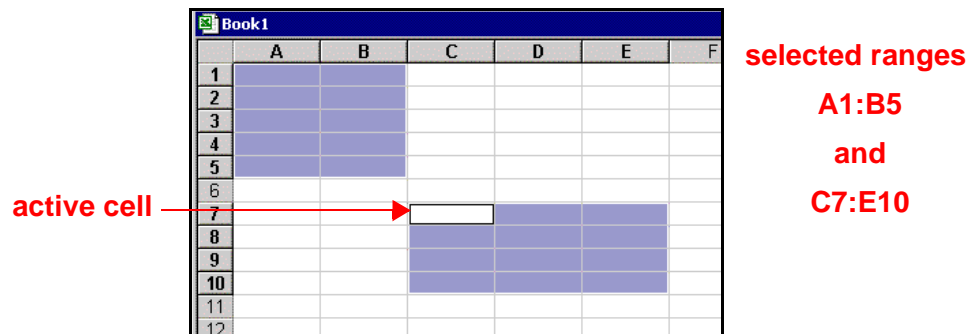


Figure 3-3 A Multiple Cell Range

Notice that there is still only one active cell.

Selecting Columns and Rows

To select an entire column or row, click the column or row heading. The first visible cell becomes the active cell. For example, to select **B1** through **B65536**, click the heading for column **B**. The first visible cell in the column is the active cell.

To select more than one adjacent row or column at a time, drag through the row or column headings, or click the heading at one edge of the range, press **SHIFT** and then click the heading at the opposite edge.

To select nonadjacent rows or columns, use **CTRL** as already described.

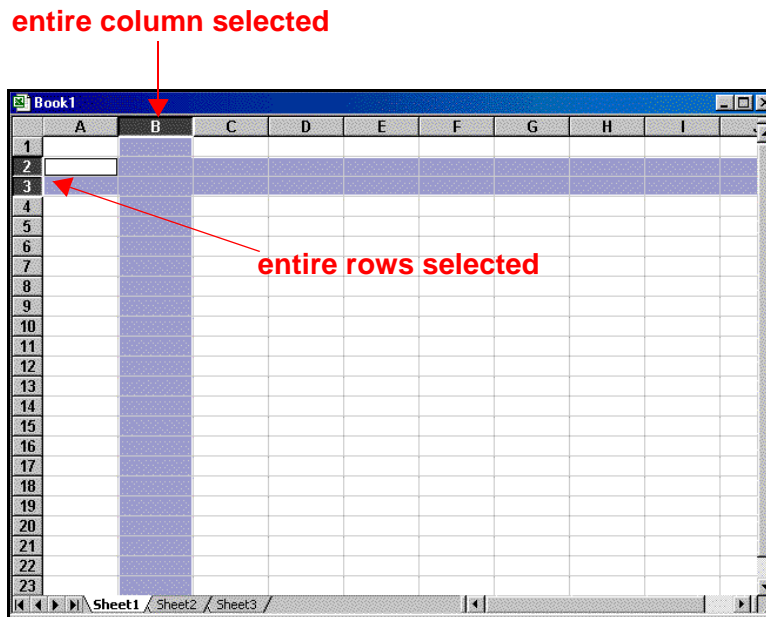


Figure 3-4 Selecting Entire Columns and Rows

Selecting the Entire Worksheet

At times you will want to select all the cells in a worksheet to change the format for the entire worksheet or to copy the contents of one worksheet to another.

To select the entire worksheet at once, simply click the **Select All** box in the upper left corner of your workbook window, where the column and row headings intersect.

Select All box

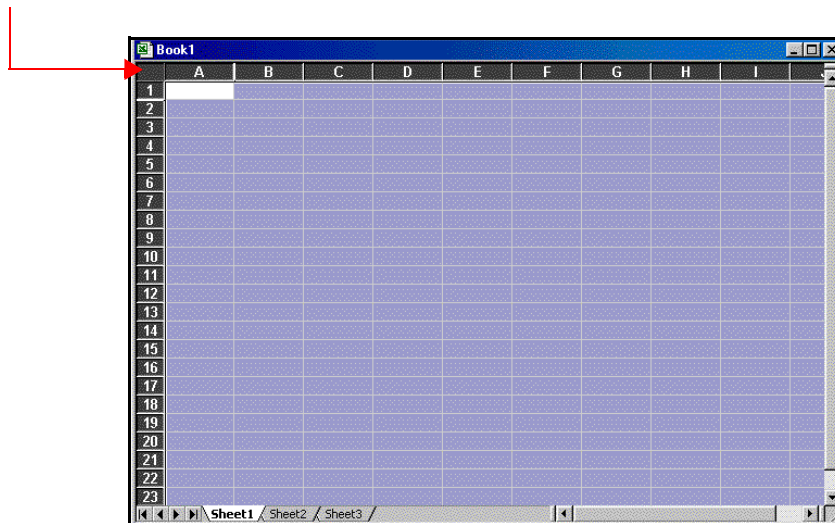


Figure 3-5 Selecting the Entire Worksheet

SELECTING CELLS WITH SPECIFIC TYPES OF CONTENTS

You can select groups of cells with specific types of cell contents.

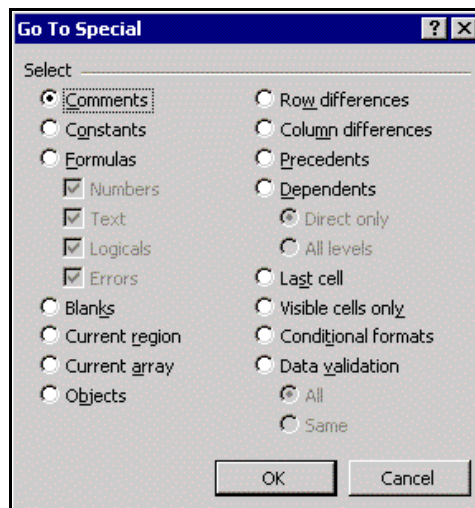


Figure 3-6 The GoTo Special dialog box

Selecting Cells with Specific Types of Contents

Press **F5** (the shortcut for **EDIT > GOTO**) and click the **Special** command button to make a multiple selection of all cells in a range or in the entire worksheet that contain any of the following cell contents

Comments	Selects all comments in the worksheet
Constants	Selects all cells whose values do not start with an equal sign or contain a formula. The check boxes below this option define the type of constant you want to go to.
Formulas	Selects all cells that contain formulas. The check boxes below this option define the type of formula you want to go to.
Blanks	Selects all blank cells through the last cell on the worksheet that contains data or formatting.
Current region	Selects a rectangular cell range around the active cell. Microsoft Excel selects a range within the boundary of any combination of blank rows and blank columns.
Current array	Selects an entire array, if the active cell is contained in an array.
Objects	Selects all graphic objects, including charts and buttons on the worksheet and in text boxes.
Row differences	Selects cells whose contents are different from the comparison cell in each row. For each row, the comparison cell is in the same column as the active cell.
Column differences	Selects cells whose contents are different from the comparison cell in each column. For each column, the comparison cell is in the same row as the active cell.
Precedents	Selects cells that are referenced by the formula in the active cell.
Dependents	Selects cells with formulas that refer to the active cell.
Last cell	Selects the last cell on the worksheet that contains data or formatting.
Visible	Selects the visible cells on a worksheet so that changes you make affect only the visible cells, not cells in hidden rows or columns.
Conditional Formats	Selects only cells with conditional formats applied. Click All to select all cells on the worksheet that have conditional formats. Click Same to select cells that have the same conditional formats as the currently selected cell.

Table 3-2 Selecting Types of Cells

SELECTING AND NAVIGATING REGIONS

A region in a range of cell entries bounded by blank cells or row and column headings. For example, the spreadsheet in **Figure 3-7** includes the following regions:

- B3:F3
- A5:E9
- A11:B12

	A	B	C	D	E	F
1	Sales					
2						
3		January	February	March	1st QTR	Budget
4						
5	Neon	8,292,810	2,623,322	5,833,106	16,749,238	
6	Plaid	7,211,772	9,678,600	3,848,570	20,738,942	
7	Polka Dot	7,702,723	8,978,200	7,528,750	24,209,673	
8	Solid	3,169,453	3,848,590	8,297,207	15,315,250	
9	Striped	6,481,448	9,678,650	7,802,212	23,962,310	
10						
11	TOTAL	32,858,206				
12	AVERAGE	6,571,641				
13						
14						
15						
16						
17						
18						
19						
20						
21						

Figure 3-7 Regions

To select or navigate regions, choose the **Options** command from the **Tools** menu, and then click the **Edit** tab. The **Allow Cell Drag and Drop** option should be selected. If it is not, select the option and then click **OK**.

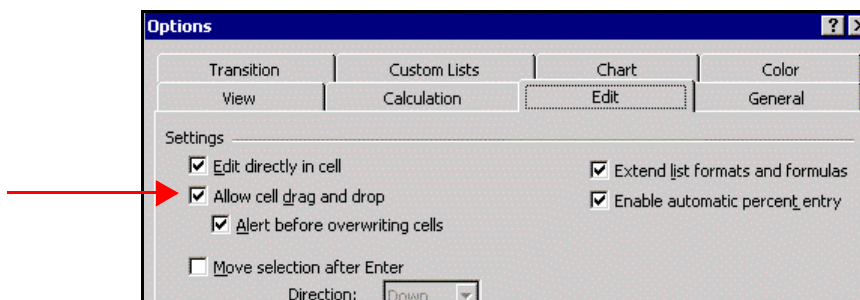


Figure 3-8 The Allow Cell Drag and Drop option

You can enter data in a cell range. To enter data quickly into several adjacent cells, first select the range of cells. You can then make cell entries, one after another, in successive cells in the range by pressing **ENTER** to move to the next cell after you finish typing.

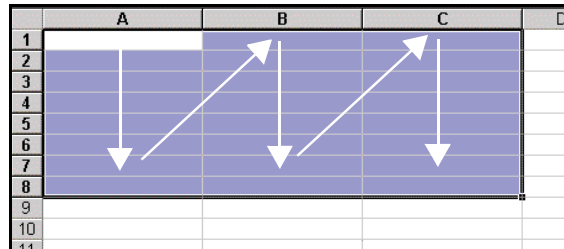


Figure 3-9 Entering Data into a Pre-Selected Range

In addition to the **ENTER** key, you can use **SHIFT+ENTER**, **TAB**, and **SHIFT+TAB**. The following table describes how you can use the keystrokes to enter data into a pre-selected range.

Press	To Activate
	The cell below the active cell
+	The cell above the active cell
	The cell one column to the right of the active cell
+	The cell one column to the left of the active cell

Table 3-3 Navigating in Pre-Selected Ranges

MOVING BETWEEN CELL REGIONS

To move through cell regions, use **CTRL** with the direction keys. For example:

- If cell **A5** is the active cell, press **CTRL** and the **RIGHT** direction key to activate cell **E5**. (See **Figure 3-10**)
- If a blank cell is active when you press **CTRL** and a direction key, Excel moves to the first cell in the corresponding direction that contains a cell entry, or to the last cell in that direction in the worksheet, if there are no cells containing entries in that direction.

Using Home and End

The **HOME** and **END** keys are valuable for selecting and navigating. The following table shows how you can use **HOME** and **END** alone and in conjunction with other keys to make selections and navigate a worksheet.







Press	To
	Move to the first cell in the current row.
 + 	Move to cell A1
 + 	Move to the last cell in the last column in the active area.
	Activate End mode. Then use the direction keys to move between cell regions.

Table 3-4 Using the Home and End Keys

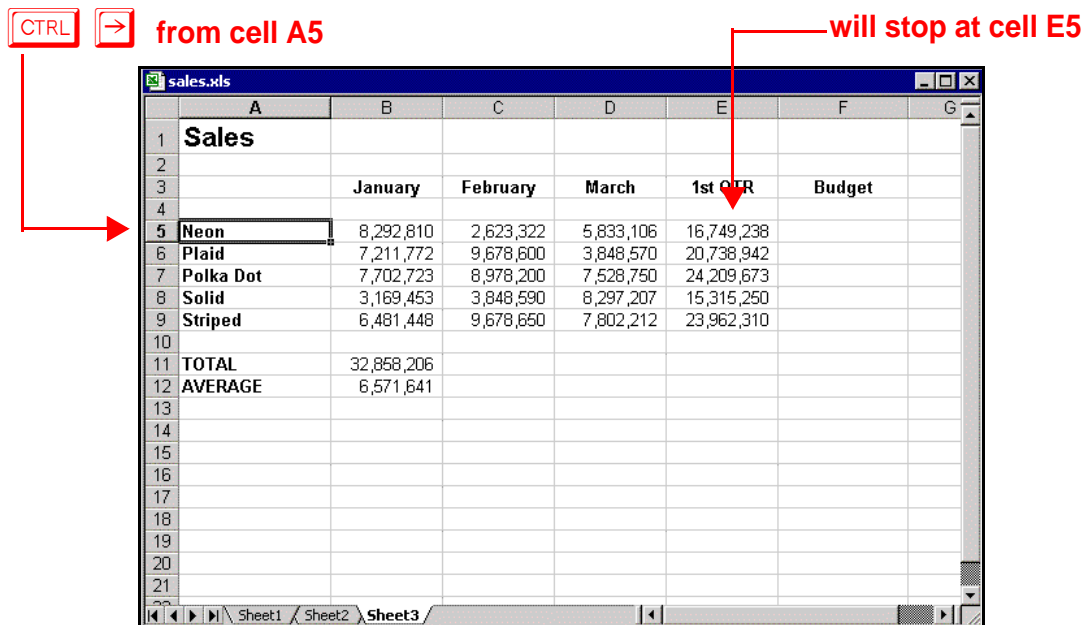


Figure 3-10 Navigating Regions

The *active area* is a rectangle that encompasses all the rows and columns in a worksheet that contain entries. For example, in **Figure 3-10**, pressing **CTRL+END** while any cell is active selects **F12** (the lowest right corner of the worksheet).

Pressing **CTRL+HOME** selects cell **A1**.

POINTS TO REMEMBER

- There can be up to 256 columns in an Excel worksheet..
- Rows are numbered sequentially starting at 1 and proceeding through 65,536.
- The active cell is the cell that is ready to receive data or a command.
- You can change the active cell in a worksheet by using the mouse or the keyboard.
- When you select a single cell, it becomes active, and its reference appears in the **Name** box at the left end of the formula bar.
- You can often speed operations by selecting groups of cells called *ranges*
- To select an entire column or row, click the column or row heading.
- Instead of dragging through all the cells you want to work with, you can indicate any two diagonal corners of the range. This technique is known as *extending a selection*.
- To select the entire worksheet at once, click the **Select All** box in the upper left corner of your workbook window.
- You can select groups of cells with specific types of cell contents by pressing **F5** (the shortcut for **EDIT > GOTO**) and clicking the **Special** command.
- The *active area* is a rectangle that encompasses all the rows and columns in a worksheet that contain entries.
- Pressing **CTRL+HOME** selects cell **A1**.

Entering and Editing Data

CHAPTER 4

TYPES OF DATA

You can enter two basic types of data in **Excel** cells:

- constants
- formulas

A *constant* is a number or text entry that you type directly into the cell. The term constant refers to the fact that the content of the cell doesn't change unless you change it.

A *formula* is a combination of numbers, mathematical operators, functions, names, and cell references that calculate a result. The following is an example of a simple formula:

=A5+A6-C3

Rather than displaying the formula itself in the cell, **Excel** displays the result of the formula. The result may change based on the values in the cells referenced by the formula.

ENTERING NUMBERS

Numbers are numeric constants upon which **Excel** can perform a calculation. Entries made up of digits (0-9) are considered numbers.

In general, a number can contain no letters or symbols. However, there are a few special non-digit characters that **Excel** allows in number entries. For example, numbers can begin with any of these symbols:

+ - . \$ %

Numbers can also include commas (if entered in the appropriate places to mark thousands), parentheses (if entered as a pair to denote a negative number), or the letters e or E (if used for scientific notation).

EXERCISE 4A

Exercise

To enter a number in a cell, follow these steps:

1. Select the cell in which you want to enter a number.
2. Type the entry. The entry you type appears in the formula bar as well as the cell.
3. Press **ENTER** or click on the *enter box* in the formula bar to confirm the entry. Press **ESC** or click on the *cancel box* to cancel the entry.

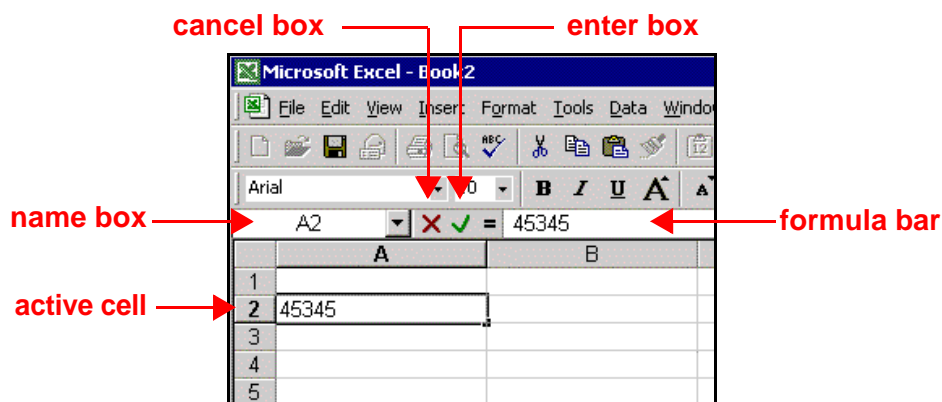


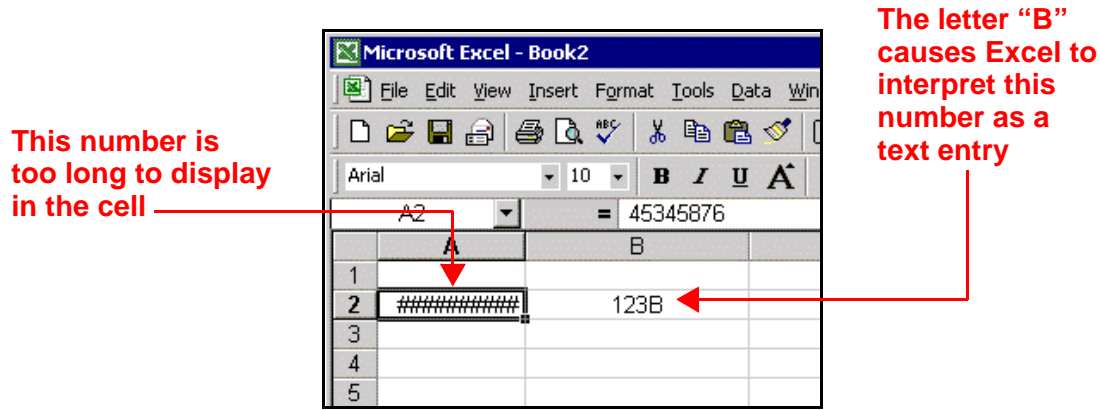
Figure 4-1 Entering a Number

When you enter the addition character to signify a positive number, **Excel** ignores the character.

To enter a negative number, type a minus sign (-) just before the number or enclose the number in parentheses.

If you enter any characters that are not allowed in number entries, **Excel** will format the data as a *text* entry.

When the number you enter exceeds the cell width, **Excel** displays the number either in scientific notation or as a series of number signs (#####) depending the length of the number. You can correct this problem by widening the column or by changing the format of the cell.



Dates and times are often entered as column or row headings in worksheets. Each is a type of constant that **Excel** interprets as a number. You can enter dates and times in a variety of *formats*, or you can use one of **Excel's** standard formats.

Format refers to the style in which the data are displayed in the cells. The entries in the following table represent **Excel's** built-in date and time formats. When you enter dates and times in any of these formats, the entry is displayed just as you typed it.

Format	Example
m/d/y	3/14/01
d-mmm-yy	14-Mar-01
d-mmm	14-Mar
mmm-yy	Mar-01
h:mm AM/PM	4:55 PM
h:mm:ss AM/PM	4:55:30 PM
h:mm (24 hour clock)	16:55
h:mm:ss (24 hour clock)	16:55:30
m/d/yy h:mm	3/14/01 4:55

Table 4-1 Built-in Date and Time Formats

ENTERING TEXT

Any entry that is not interpreted as a number, date, time, or formula is interpreted as a *text* entry. A text entry is a type of constant that contains alphabetic characters, punctuation marks and other symbols, or any combination of numbers, alphabetic characters, and symbols.

Text is a catch-all category; if **Excel** cannot determine the entry type, it makes it a text entry. The following table includes examples of text entries and the reasons they are interpreted as text rather than some other type.

Entry	Reason
Utilities	All alphabetic characters.
Overdue	A combination of alphabetic characters and symbols.
1_5_92	A combination of numbers and symbols.
12511 15th Avenue	A combination of alphabetic characters and numbers.
456PF44	A combination of alphabetic characters and numbers.
'987899	Numeric entry preceded by a single quote.
'12/21/99	Combination of numbers and symbols preceded by a single quote. Without the single quote, this entry would be interpreted as a date.

Table 4-2 Text Entries

In some cases, you may want to enter a number as a text entry (e.g., a part number or a postal ZIP code). You can force **Excel** to interpret the number as a text entry by preceding the entry with a single quote (').

EXERCISE 4B

Exercise

To enter text in a cell, follow these steps:

1. Select the cell in which you want to enter text.
2. Type your name. The entry you type appears in the formula bar as well as in the cell.

3. Press **ENTER** or click on the *enter box* in the formula bar to confirm the entry. Press **ESC** or click on the *cancel box* to cancel the entry.

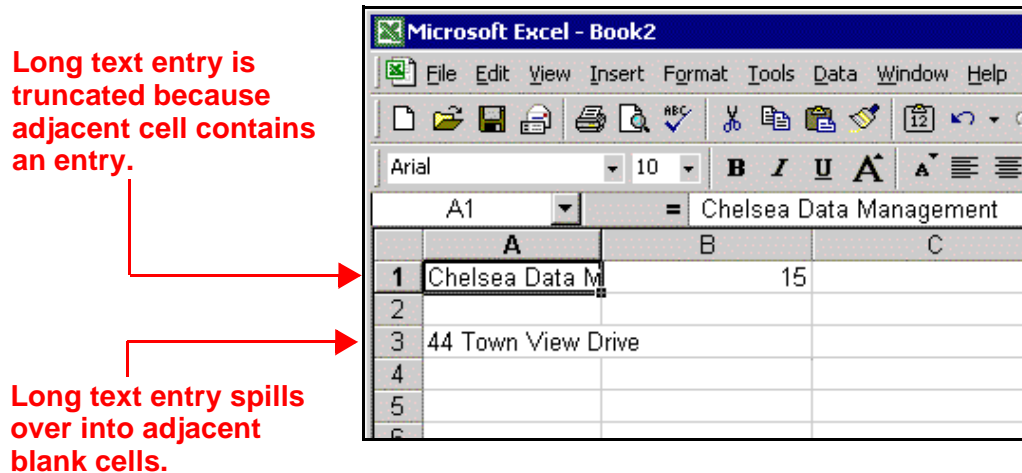


Figure 4-2 Entering Text

When the text you enter exceeds the column width, the entry will display in the next cell to the right, provided that cell is empty. If not, **Excel** stores the entry correctly but displays only those characters that will fit in the cell.

You can display the entire contents by changing the column width or by wrapping the text to a new line in the same cell.

EDITING DATA IN CELLS

You can edit cell entries in a worksheet at any time. Editing refers to the changes you make to the contents of a cell (e.g., replacing an existing entry, clearing a cell, correcting an error, or changing a cell entry).

CHANGING THE ENTIRE CONTENTS OF A CELL

When you need to change the entire contents of a cell, use these steps to replace the existing entry.

EXERCISE 4C

Exercise

1. Select the cell to edit.
2. Type the new entry. **Excel** automatically replaces the previous entry with the text you type.
3. Press **ENTER** or click on the *enter box* in the formula bar to confirm the entry. Press **ESC** or click on the *cancel box* to cancel the entry.

ERASE THE CONTENTS OF A CELL

Sometimes you want to erase the contents of a cell and leave it blank. **Excel** calls this *clearing* a cell.

EXERCISE 4D

Exercise

1. Select the cell you want to clear.
2. Select **EDIT** ➤ **CLEAR** and select one of the options (**A**ll, **F**ormats, **C**ontents, **C**omments).

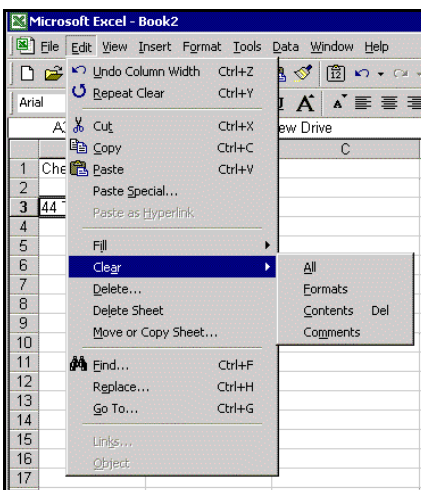


Figure 4-3 Clearing a Cell

Hint

You can press the **DELETE** key to erase the **Contents** of a cell.

EDITING THE CONTENTS OF A CELL

When a cell contains a long or complex entry, it's often easier to correct the entry than to retype it.

For these situations, you can use **Excel's edit key, F2**, which allows you to change selected characters in an entry.

EXERCISE 4E**Exercise**

Select the cell for which you want to correct or change the entry.

1. Press **F2** to activate the formula bar. **Excel** places the cursor at the end of the entry in the formula bar. Use the right and left arrows to move the cursor.

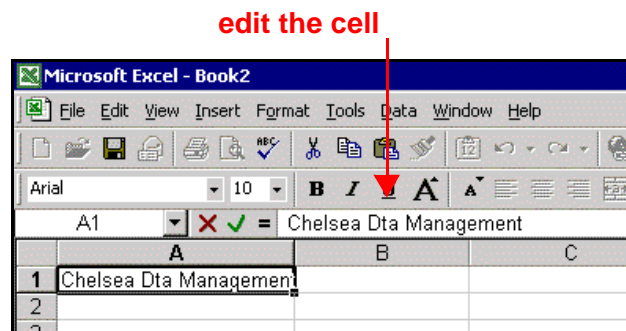


Figure 4-4 Editing a Cell Entry

2. Press **DELETE** to delete characters to the right of the cursor or **BACKSPACE** to delete characters to the left of the cursor.
3. To insert characters, move the cursor to the appropriate location and begin typing.
4. When the entry is correct, press **ENTER** or click on the enter box.



Hint

You can also use the mouse to first click the cell you want to edit, then click the mouse in the formula bar to edit the cell entry.

USING UNDO

One of **Excel's** most useful features is the **UNDO** command, which allows you to reverse the most recent actions taken. For example, if you type an entry in the wrong cell, you can restore the previous contents by using the **UNDO** command.

To reverse an entry, do one of the following:

- Select **EDIT > UNDO ENTRY** immediately after typing the entry.
- Press **CTRL+Z**.
- Click on the **UNDO** button .
- To reverse more than one action at a time, click the arrow next  and then click the actions you want to undo. The command name changes to **CAN'T UNDO** if you cannot reverse the last action.

ATTACHING CELL COMMENTS

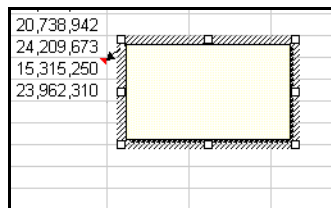
Sometimes it's useful to attach comments to the data contained in a worksheet to explain the source of the data or to provide additional information. Using **Excel's INSERT > COMMENT** command, you can attach comments to individual cells.

EXERCISE 4F

Exercise

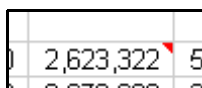
To create a comment, follow these steps:

1. Select the cell in which you want to attach a comment.
2. Select **INSERT > COMMENT**. **Excel** displays a comment box next to the cell.



3. Type the text for the comment and click outside of the box.

- Excel will place a comment marker in the cell.



comment marker in top right corner

To read a comment, follow these steps:

- Double-click on the cell containing the comment you want to read.
- The comment is displayed.

	C5	=	2623322			
	A	B	C	D	E	F
1	Sales					
2						
3		January	February	March	1st QTR	Budget
4						
5	Neon	8,292,810	2,623,322			
6	Plaid	7,211,772	9,678,600			
7	Polka Dot	7,702,723	8,978,200			
8	Solid	3,169,453	3,848,590			
9	Striped	6,481,448	9,678,650	7,802,212	23,962,310	
10						
11	TOTAL	32,858,206				
12	AVERAGE	6,571,641				
13						

Check with Accounting on this figure.


Figure 4-5 A Cell Comment

Hint



You can press **SHIFT+F2** key to create a comment. If the cell already contains a comment, pressing **SHIFT+F2** will allow you to edit the comment.

POINTS TO REMEMBER

- You can enter two basic types of data in **Excel** cells: constants and formulas.
- A *constant* is a number or text entry that you type directly into the cell.
- A *formula* is a combination of numbers, mathematical operators, functions, names, and cell references that calculate a result.
- Any entry that is not interpreted as a number, date, time, or formula is interpreted as a *text* entry.
- Editing refers to the changes you make to the contents of a cell (e.g., replacing an existing entry, clearing a cell, correcting an error, or changing a cell entry).
- To erase the contents of a cell and leave it blank select the cell you want to clear and select **EDIT > CLEAR**.
- You can also press the **DELETE** key to erase the **Contents** of a cell.
- **Excel's** *edit key*, **F2**, allows you to change selected characters in an entry.
- To reverse an entry, do one of the following:
 - Select **EDIT > UNDO ENTRY** immediately after typing the entry.
 - Press **CTRL+Z**.
 - Click on the **UNDO** button.
 - To reverse more than one action at a time, click the arrow next to , and then click the actions you want to undo. The command name changes to **CAN'T UNDO** if you cannot reverse the last action.
- Using **Excel's** **INSERT > COMMENT** command, you can attach comments to individual cells.
- You can also use **SHIFT+F2** to add a comment to a cell.

Manipulating Data

CHAPTER 5

This chapter covers copying, moving and using fill techniques.

The basic method for moving and duplicating data in a worksheet is to **CUT** and **PASTE**, or **COPY** and **PASTE** — similar but not duplicate activities. You can cut or copy data into the “Clipboard,” then paste it from the Clipboard to a new location.

To copy or move cells, you must select the *source* range — the range from which you want to copy or move cells — and the *destination* range — the range to which you copy or move cells.

Excel calls the destination range the *paste area* because you use the **PASTE** command to place the selected cells into the range. When selecting the paste area, be sure the cells are blank; otherwise they will be overwritten. It isn’t necessary to select the entire range for the paste area — just select the cell where the moved or copied block’s top left corner will be. **Excel** will copy or move the entire range accordingly.

You cut, copy and paste frequently in **Excel**, so you can save a great deal of time by learning to use the cut, copy, and paste shortcut keys.







Function	Shortcut Key	Memory Cues
Cut	 + 	Think of ‘X’ as similar to a pair of scissors, or think of crossing something out on a paper document with a big X.
Copy	 + 	‘C’ stands for Copy.
Paste	 + 	Think of the ‘V’ as an insertion point that you would make hand-editing a document.

Table 5-1 Cut, Copy, and Paste Shortcut Keys

COPYING DATA

When you copy a cell or cells, **Excel** places a duplicate of *all* the cell contents — the entry, the cell format, and any notes attached to the cells — into the paste area, leaving the cells in the source range intact.

If you don't want to copy all of these elements, **Excel** provides a special command that allows you to choose which of these (or other) elements to copy.

There are two ways to copy data using **Excel**:

- using the **COPY** and **PASTE** commands
- dragging the cells to a new location while pressing and holding down the **CTRL** key

Using the Copy Command

Exercise

Follow these steps to copy data with the **COPY** command.

EXERCISE 5A

1. Open the file called *copying.xls*.
2. Select the range of cells to copy. **Excel** shades and borders the selected cells.
3. Select **EDIT > COPY** or press **CTRL+C**. **Excel** surrounds the selected cells with a moving border. Notice that the status line tells you to select a destination.

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E
4					
5	Neon	8,292,810	2,623,322	5,833,106	16,749,23
6	Plaid	7,211,772	9,678,600	3,848,570	20,738,94
7	Polka Dot	7,702,723	8,978,200	7,528,750	24,209,67
8	Solid	3,169,453	3,848,590	8,297,207	15,315,25
9	Striped	6,481,448	9,678,650	7,802,212	23,962,31
10					
11	TOTAL	32,858,206			
12	AVERAGE	6,571,641			
13					
14					
15					
16					
17					
18					
19					
20					
21					

Annotations in the image:

- A red arrow labeled "selected cells" points to the range A5:A9.
- A red arrow labeled "status line" points to the status bar at the bottom, which displays "Select destination and press ENTER or choose Paste".

4. Select the cell in the upper left corner of the destination range.

top left corner of destination range →

	A14			
	A	B	C	D
4				
5	Neon	8,292,810	2,623,322	5,833,106
6	Plaid	7,211,772	9,678,600	3,848,570
7	Polka Dot	7,702,723	8,978,200	7,528,750
8	Solid	3,169,453	3,848,590	8,297,207
9	Striped	6,481,448	9,678,650	7,802,212
10				
11	TOTAL	32,858,206		
12	AVERAGE	6,571,641		
13				
14				
15				
16				
17				
18				
19				
20				
21				

Sheet1 / Sheet2 / Sheet3 /

Select destination and press ENTER or choose Paste

5. Select **EDIT > PASTE** or press **CTRL+V**. Excel pastes the Clipboard contents into the destination range.

pasted data →

	A	B	C	D
4				
5	Neon	8,292,810	2,623,322	5,833,106
6	Plaid	7,211,772	9,678,600	3,848,570
7	Polka Dot	7,702,723	8,978,200	7,528,750
8	Solid	3,169,453	3,848,590	8,297,207
9	Striped	6,481,448	9,678,650	7,802,212
10				
11	TOTAL	32,858,206		
12	AVERAGE	6,571,641		
13				
14	Neon			
15	Plaid			
16	Polka Dot			
17	Solid			
18	Striped			
19				
20				
21				

Using the Drag Method

Follow these steps to copy data by dragging.

EXERCISE 5B

Exercise

1. Select the range of cells to copy. **Excel** shades and borders the selected cells.
2. Press and hold the **CTRL** key.
3. Move the mouse pointer to any point on the border surrounding the cells. The usual cross mouse pointer changes to an arrow with a plus (+) sign.

	A	B	
4			
5	Neon	8,292,810	2,62
6	Plaid	7,211,772	9,67
7	Polka Dot	7,702,723	8,97
8	Solid	3,169,453	3,84
9	Striped	6,481,448	9,67
10			
11	TOTAL	32,858,206	
12	AVERAGE	6,571,641	
13			
14			
15			
16			
17			
18			
19			

notice mouse pointer

4. While continuing to hold the **CTRL** key, drag the mouse to the cell in the upper left corner of the paste area. As you drag the mouse, an outline of the cell range moves along with the mouse.

	A	B	C	D	E
4					
5	Neon	8,292,810	2,623,322	5,833,106	16,749,2
6	Plaid	7,211,772	9,678,600	3,848,570	20,738,9
7	Polka Dot	7,702,723	8,978,200	7,528,750	24,209,6
8	Solid	3,169,453	3,848,590	8,297,207	15,315,2
9	Striped	6,481,448	9,678,650	7,802,212	23,962,3
10					
11	TOTAL	32,858,206			
12	AVERAGE	6,571,641			
13					
14					
15					
16					
17					
18					
19					
20					

outline of cell range

- When the mouse is positioned correctly in the paste area, release the mouse button and the **CTRL** key. **Excel** pastes the selected cell contents into the paste area.

	A	B	C	D	E
4					
5	Neon	8,292,810	2,623,322	5,833,106	16,749
6	Plaid	7,211,772	9,678,600	3,848,570	20,738
7	Polka Dot	7,702,723	8,978,200	7,528,750	24,209
8	Solid	3,169,453	3,848,590	8,297,207	15,319
9	Striped	6,481,448	9,678,650	7,802,212	23,962
10					
11	TOTAL	32,858,206			
12	AVERAGE	6,571,641			
13				Neon	
14				Plaid	
15				Polka Dot	
16				Solid	
17				Striped	
18					
19					

PASTING TO MORE THAN ONE DESTINATION AREA

The methods just described allow you to paste one copy of the selected range to the paste area. However, it is possible to paste the copied cells to more than one area of the worksheet at once.

For example, suppose you wanted to copy column headings from row 1 to rows 5, 10, and 15. It's quicker to copy the selection to all three rows at once.

EXERCISE 5C

Exercise

Follow these steps:

- Select the range of cells to copy. **Excel** shades and borders the selected cells.
- Select **EDIT > COPY** or press **CTRL+C**. **Excel** surrounds the selected cells with a moving border. Notice that the status line tells you to select a destination.

selected cells →

	A	B	C	D	E	F	G	H
1		JAN	FEB	MAR	APR	MAY	JUN	
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								

3. Select the non-adjacent range of destination cells.

non-adjacent destination ranges →

(use CTRL key to select) →

	A	B	C	D	E	F	G
1		JAN	FEB	MAR	APR	MAY	
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							

4. Press **CTRL+V** or **ENTER**.

pasted data →

	A	B	C	D	E	F	
1		JAN	FEB	MAR	APR	MAY	
2							
3							
4							
5		JAN	FEB	MAR	APR	MAY	
6							
7							
8							
9							
10		JAN	FEB	MAR	APR	MAY	
11							
12							
13							
14							
15		JAN	FEB	MAR	APR	MAY	
16							
17							

Filling Cells

An activity that is similar to copying cells is *filling* cells with data. **Excel's** Fill commands allow you to enter repetitive data quickly. A small square, called the *fill handle*, appears at the lower right corner of the active cell's border.

You can use the fill handle to quickly and easily fill cells and create series using **Excel's** *AutoFill* feature.

EXERCISE 5D

Exercise

Follow these steps:

1. Select a single cell with information you want to duplicate.

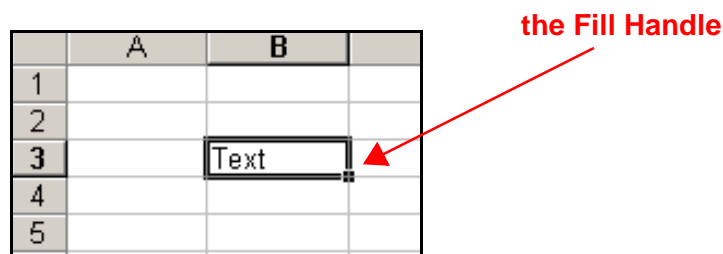
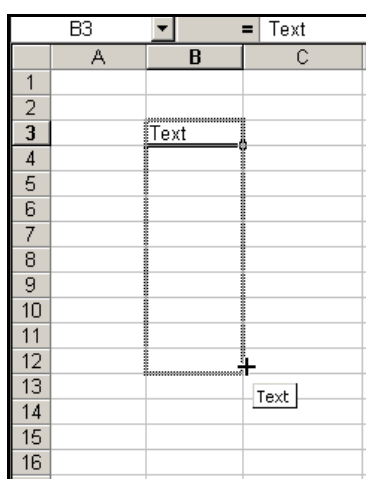


Figure 5-1 The Fill Handle

2. Click the fill handle, and then drag it down.



3. When you let go, the contents of that cell are copied to the selected range.

	A	B	C
1			
2			
3		Text	
4		Text	
5		Text	
6		Text	
7		Text	
8		Text	
9		Text	
10		Text	
11		Text	
12		Text	
13			
14			

the range is filled

Using AutoFill

If you select a text value and drag the fill handle, the text is copied to the cells where you drag, as in the example above.

However, if the selection contains both text and numeric values, the *AutoFill* feature takes over and extends the numeric component while copying the text component. You can also extend dates in this way, using a number of date formats.

EXERCISE 5E

Follow these steps:

Exercise

1. The selected cell contains the entry QTR 1.

	A	B	C	D	E	F
1						
2						
3		QTR 1				
4						
5						

2. Dragging the fill handle to the right will produce the following result.

	A	B	C	D	E	F
1						
2						
3		QTR 1	QTR 2	QTR 3	QTR 4	
4						

Experiment with these examples:

	A	B	C	D	E	F
1						
2	January					
3						
4						
5	JAN					
6						
7	2001					
8						
9	Monday					
10						
11	MON					
12						

If you drag the fill handle of each of the entries in column A, you should get the following results:

	A	B	C	D	E	F
1						
2	January	February	March	April	May	June
3						
4						
5	JAN	FEB	MAR	APR	MAY	JUN
6						
7	2001	2001	2001	2001	2001	2001
8						
9	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
10						
11	MON	TUE	WED	THU	FRI	SAT
12						

If a selection contains a number, date, or time period, you can extend the series.

For example, the initial time selections in the following table result in the series shown. Items separated by commas are in adjacent cells

Initial Selection	Extended Series
1, 2, 3	4, 5, 6
9:00	10:00, 11:00, 12:00
Mon	Tue, Wed, Thu
Monday	Tuesday, Wednesday, Thursday
Jan	Feb, Mar, Apr
Jan, Apr	Jul, Oct, Jan
Jan-99, Apr-99	Jul-99, Oct-99, Jan-00
15-Jan, 15-Apr	15-Jul, 15-Oct.
1999, 2000	2001, 2002, 2003
1-Jan, 1-Mar	1-May, 1-Jul, 1-Sep,...
Qtr3 (or Q3 or Quarter3)	Qtr4, Qtr1, Qtr2,...
Product 1, On backorder	Product 2, On backorder, Product 3, On backorder,...
text1, textA	text2, textA, text3, textA,...
1st Period	2nd Period, 3rd Period,...
Product 1	Product 2, Product 3,...

Table 5-2 Filling Data in Series

Creating Your Own Custom Fill Series

You can create a custom fill series or sorting order from existing items that you've listed on a worksheet, or you can type the list from scratch.

FROM EXISTING LIST

1. If you've already entered the list of items you want to use as a series, select the list on the worksheet.
2. On the **TOOLS** menu, click **OPTIONS**, and then click the **CUSTOM LISTS** tab.
3. To use the selected list, click **IMPORT**.

EXERCISE 5F

Exercise

Open the file called *CustomLists.xls* and follow the steps above.

FROM SCRATCH

To type a new list, select **NEW LIST** in the **CUSTOM LISTS** box, and then type the entries in the **LIST ENTRIES** box, beginning with the first entry. Press **ENTER** after each entry. When the list is complete, click **ADD**.

MOVING DATA

Excel moves cells by removing them from their source range and pasting them temporarily into the Clipboard, then pasting them into the destination range.

The steps for moving cells are very similar to those for copying cells. The result, however, is that the cells in the source range are cleared.

There are two ways to move data using **Excel**:

- using the **CUT** and **PASTE** commands
- dragging the cells to a new location

Using the Cut and Paste Commands

EXERCISE 5G

Exercise

Follow these steps to move data with the **CUT** and **PASTE** commands.

1. Select the range of cells to move. **Excel** shades and borders the selected cells.

selected cells →

	A	B	C	D
1				
2	CARD NUMBER	EMPLOYEE NAME	HOURLY RATE	
3				
4	12345	Stevens	5.55	
5	14533	Warren	7.25	
6	12816	Walton	6.35	
7	12925	Pfeffer	4.75	
8	12333	Jones	8.85	
9	12716	Jackson	5.00	
10				

2. Select **EDIT** ➤ **CUT** or press **CTRL+X**. **Excel** surrounds the selected cells with a moving border. Notice that the status line tells you to select a destination.

Manipulating Data

press Ctrl + X →

	A	B	C
1			
2	CARD NUMBER	EMPLOYEE NAME	HOURLY RATE
3			
4	12345	Stevens	5.55
5	14533	Warren	7.25
6	12816	Walton	6.35
7	12925	Pfeffer	4.75
8	12333	Jones	8.85
9	12716	Jackson	5.00
10			
11			
12			

Sheet1 / Sheet2 / Sheet3 /

Select destination and press ENTER or choose Paste

Sum=

3. Select the cell in the upper left corner of the destination range.

top left corner
of destination range →

	A	B	C	D	E
1					
2	CARD NUMBER	EMPLOYEE NAME	HOURLY RATE		
3					
4	12345	Stevens	5.55		
5	14533	Warren	7.25		
6	12816	Walton	6.35		
7	12925	Pfeffer	4.75		
8	12333	Jones	8.85		
9	12716	Jackson	5.00		
10					
11					

4. Select **EDIT > PASTE** or press **CTRL+V**. Excel pastes the Clipboard contents into the destination range.

pasted data →

	A	B	C	D
1				
2		EMPLOYEE NAME	HOURLY RATE	CARD NUMBER
3				
4		Stevens	5.55	12345
5		Warren	7.25	14533
6		Walton	6.35	12816
7		Pfeffer	4.75	12925
8		Jones	8.85	12333
9		Jackson	5.00	12716
10				

Using the Drag Method

EXERCISE 5H

Exercise

Follow these steps to move data by dragging.

1. Select the range of cells to move. **Excel** shades and borders the selected cells.
2. Move the mouse pointer to any point on the border surrounding the cells. The usual cross mouse pointer changes to a simple arrow.

notice mouse pointer

	A	B	C	D	E
1					
2	CARD NUMBER	EMPLOYEE NAME	HOURLY RATE		
3					
4	12345	Stevens	5.55		
5	14533	Warren	7.25		
6	12816	Walton	6.35		
7	12925	Pfeffer	4.75		
8	12333	Jones	8.85		
9	12716	Jackson	5.00		
10					
11					

3. Drag the range of cells to the destination area. As you drag the mouse, an outline of the cell range moves along with the mouse.

outline of cell range

	A	B	C	D	E	F
1						
2	CARD NUMBER	EMPLOYEE NAME	HOURLY RATE			
3						
4	12345	Stevens	5.55			
5	14533	Warren	7.25			
6	12816	Walton	6.35			
7	12925	Pfeffer	4.75			
8	12333	Jones	8.85			
9	12716	Jackson	5.00			
10						
11						

E2:E9

4. When the mouse is positioned correctly in the paste area, release the mouse button. **Excel** pastes the selected cell contents into the destination area.

pasted data

	A	B	C	D	E	F
1						
2	CARD NUMBER		HOURLY RATE		EMPLOYEE NAME	
3						
4	12345		5.55		Stevens	
5	14533		7.25		Warren	
6	12816		6.35		Walton	
7	12925		4.75		Pfeffer	
8	12333		8.85		Jones	
9	12716		5.00		Jackson	
10						
11						

AUTOCORRECT

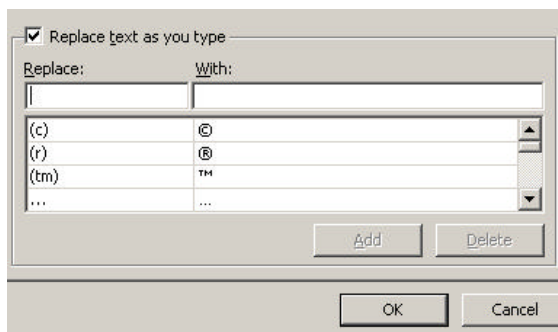
The AutoCorrect feature can correct common typing errors as you work. For example, you can specify that Excel change “adn” to “and” and change “their is” to “there is.”

However, you can also create your own shortcuts for entering long text entries.

EXERCISE 5I

Exercise

1. Select **TOOLS > AUTOCORRECT OPTIONS...** from the menu.



2. In the **Replace** box enter your initials (for example, lcw, or if you prefer, a shortcut for your company name, xyz).
3. In the **With** box enter your full name (for example, Laura Christina Warren or XYZ Corporation).
4. Click the **ADD** button.
5. Click the **OK** button.
6. Select an empty cell and type your three initials or your company name shortcut. Your full name or your company name will be entered into the cell.

USING CTRL+ENTER

You can enter data into more than one cell at a time using CTRL+ENTER. This can be text or number entries or even formulas.

EXERCISE 5J

Exercise

1. Open the file named **FillBlanks.xls**. Notice in this file that labels are only entered in a column the first time they appear. This makes the information easier to read. But if you want to use any of the database features (Sort, AutoFilter, PivotTables, etc.) you need to fill in the missing labels.

	A	B	C	D	E	F	G
1	Customer	Account	N Payment	N Payment	Due Date	Payment Schedule	Contract Amount Paid
2	178	Maria	1	7/4/2003	Semi-Monthly	\$350.00	TRUE
3			2	7/20/2003			
4			3	8/4/2003			
5			4	8/20/2003			
6			5	9/4/2003			
7			6	9/20/2003			
8			7	10/4/2003			
9			8	10/20/2003			
10			9	11/4/2003			
11			10	11/20/2003			
12			11	12/4/2003			FALSE
13			12	12/20/2003			
14	180	Eleni	1	7/1/2003	Monthly	\$315.00	TRUE
15			2	8/1/2003			
16			3	9/1/2003			
17			4	10/1/2003			
18			5	11/1/2003			
19			6	12/1/2003			FALSE
20			7	1/1/2004			
21			8	2/1/2004			
22			9	3/1/2004			

2. You need to first select all the blank cells. Select **EDIT > Go To.** from the menu and click the **SPECIAL** button.
3. Select the **BLANKS** option button

Manipulating Data

1	Customer	AccountN	PaymentN	PaymentDueDate	PaymentSchedule	ContractAmount	Paid	FullyPaid
2	178	Maria	1	7/4/2003	SemiMonthly	\$350.00	TRUE	TRUE
3			2	7/20/2003				
4			3	8/4/2003				
5			4	8/20/2003				
6			5	9/4/2003				
7			6	9/20/2003				
8			7	10/4/2003				
9			8	10/20/2003				
10			9	11/4/2003				
11			10	11/20/2003				
12			11	12/4/2003			FALSE	FALSE
13			12	12/20/2003				
14	180	Eleri	1	7/1/2003	Monthly	\$315.00	TRUE	TRUE
15			2	8/1/2003				
16			3	9/1/2003				
17			4	10/1/2003				
18			5	11/1/2003				
19			6	12/1/2003			FALSE	FALSE
20			7	1/1/2004				
21			8	2/1/2004				
22			9	3/1/2004				
23			10	4/1/2004				

Notice that Excel has only selected the blank cells.

- You want each empty cell to contain the values from the first nonempty cell above it. You want to point to the cell immediately above each cell.
- The current cell is A3. Type an equal sign (=) and press the UpArrow key to point at cell A2.

The cell reference A2 (when found on A3) actually means “one cell above me in the same column.”

NA	A	B	C	D
1	Customer	AccountN	PaymentN	PaymentDueDate
2	178	Maria	1	7/4
3	=A2		2	7/20
4			3	8/4
5			4	8/20
6			5	9/4
7			6	9/20
8			7	10/4

The formula bar should read =A2.

- Press **CTRL+ENTER**.

When more than one cell is selected, if you type a formula and press **CTRL+ENTER**, the formula is copied into all the cells of the selection. If you press **ENTER** without holding down the **CTRL** key, the formula goes into the one active cell only..

The filled-in cells now contain a formula. You need to convert these formulas to values.

7. Press **CTRL+SHIFT+*** to select the current region.
8. Choose **EDIT+COPY** from the menu or press **CTRL+C**.
9. Choose **EDIT+PASTE SPECIAL** from the menu and click the **VALUES** option..

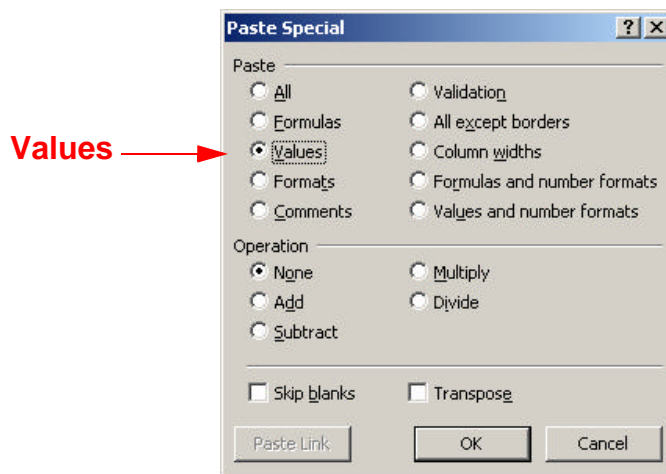


Figure 5-2 The Values Option on the Paste Special Dialog Box

10. Click the **OK** button.

EDIT OR ENTER THE SAME DATA ON MULTIPLE SHEETS

When you select a group of sheets and then change data on one of them, the same changes are applied to all the selected sheets. Data may be replaced in the process.

EXERCISE 5K

In this exercise you will enter and edit data on all the sheets of a workbook.

Exercise

1. Open the file named **RollUp.xls**.
2. Select all the sheets by right-clicking on a sheet tab and choosing **SELECT ALL SHEETS**.

	January	February	March	April
Neon	2,741,371	6,095,696	8,836,967	9,179,584
Plaid	10,114,137	4,021,756	14,135,693	24,710,948
Polka Dot	9,362,219	7,867,544	17,249,763	9,319,634
Solid	4,021,777	8,670,581	12,692,368	15,069,913
Striped	10,114,189	8,153,312	18,267,501	16,256,605
TOTAL	36,573,683	34,808,788	71,182,481	74,526,685

3. Now that all the sheets have been selected, enter 2006 in cell **A2**.
4. Look at the other sheet tabs. Now change the color of cell A2 on any of the sheets.
5. Left align the year number on any of the sheets.
6. To cancel a selection of multiple sheets, click any unselected sheet. Since there are no unselected sheets, right-click the tab of a selected sheet, and then click **UNGROUP SHEETS** on the shortcut menu.

POINTS TO REMEMBER

- The basic method for moving and duplicating data in a worksheet is to **CUT** and **PASTE**, or **COPY** and **PASTE**.
- There are two ways to copy data using **Excel**:
 - using the **COPY** and **PASTE** command
 - dragging the cells to a new location while pressing and holding down the **CTRL** key
- To copy data by dragging, select the range of cells to copy, press and hold down the **CTRL** key and when the mouse is positioned correctly in the paste area, release the mouse button and the **CTRL** key.
- You can use the fill handle to quickly and easily fill cells and create series using **Excel's Fill** features.
 - Select a single cell with information you want to duplicate, click the fill handle, and then drag it down
 - If the selection contains both text and numeric values, the *AutoFill* feature takes over and extends the numeric component while copying the text component.
- You can create a custom fill series or sorting order from existing items that you've listed on a worksheet, or you can type the list from scratch.
- There are two ways to move data using **Excel**:
 - using the **CUT** and **PASTE** commands
 - dragging the cells to a new location

Worksheet Structure

CHAPTER 6

Quite often, you'll find after creating a worksheet, that you want to insert cells between existing cells to make room for additional data, or you'll want to delete cells entirely from a worksheet.

This chapter covers the following methods of restructuring your workbooks:

- inserting and deleting rows
- inserting and deleting columns
- inserting and deleting ranges
- inserting and deleting sheets
- rearranging sheets

INSERTING ROWS AND COLUMNS

One of the easiest ways to improve the appearance of your worksheet is to manipulate your rows and columns. It's quite common to insert an entire row or column (for example, to add expense items or additional months to a worksheet).

When you insert a row or rows, the rows just below the insertion point are automatically shifted down. Columns to the right of an inserted column are automatically shifted to the right.

To insert a single row, select any cell in the row where you want the new row inserted. For example, if you want a new row between rows 11 and 12, select any cell in row 12.

To insert a single column between two existing columns, select any cell at the rightmost of the two columns. For instance, select any cell in column D to insert a column between columns C and D.

Inserting Rows

EXERCISE 6A

Exercise

Follow these steps to insert a single row using the menu:

1. Open the training file named ***Chapter6.xls***.
2. Select any cell in the column where you want a new row inserted.
3. Select **INSERT > ROW**.
4. A new row will be inserted.

Follow these steps to insert multiple rows using the menu:

1. Select the same number of cells for the number of rows you want to insert.
2. Select **INSERT > ROW**.
3. Excel inserts the rows you specified.

Inserting Columns

EXERCISE 6B

Exercise

Follow these steps to insert a single column using the menu:

1. Select any cell in the row where you want a new column inserted.
2. Select **INSERT > COLUMN**.
3. A new column will be inserted.

Follow these steps to insert multiple columns using the menu:

1. Select the same number of cells for the number of columns you want to insert.
2. Select **INSERT > COLUMN**.
3. Excel inserts the columns you specified.

DELETING ROWS AND COLUMNS

You can also delete entire rows or columns in a worksheet. When you delete rows, all rows below the row you delete are shifted up to fill in the worksheet. All columns to the right of the column you delete are shifted to the left.

To delete a single row, select any cell in the row you want to delete. To delete a single column, select any cell in the column.

Deleting Rows

EXERCISE 6C

Exercise

Follow these steps to delete a single row using the menu:

1. Select any cell in the column where you want to delete a row.
2. Select **EDIT > DELETE**. The following dialog box will appear:

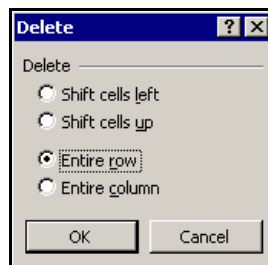


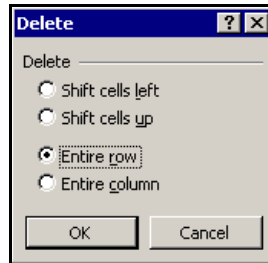
Figure 6-1 The Delete Cells Dialog Box

3. Select **ENTIRE ROW** and click **OK**.
4. Excel deletes the row you specified.

Follow these steps to delete multiple rows using the menu:

1. Select the same number of cells for the number of rows you want to delete.

2. Select **EDIT > DELETE**. The following dialog box will appear:



3. Select **ENTIRE ROW** and click **OK**.
4. Excel deletes the rows you specified

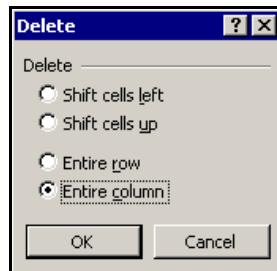
Deleting Columns

Follow these steps to delete a single column using the menu:

EXERCISE 6D

Exercise

1. Select any cell in the row where you want to delete a column.
2. Select **EDIT > DELETE**. The following dialog box will appear:

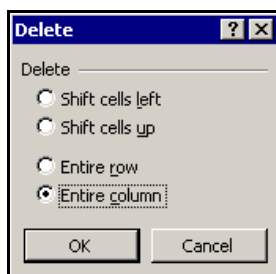


3. Select **ENTIRE COLUMN** and click **OK**.
4. Excel deletes the column you specified.

Follow these steps to delete multiple columns using the menu:

1. Select the same number of cells for the number of columns you want to delete.

2. Select **EDIT > DELETE**. The following dialog box will appear:



3. Select **ENTIRE COLUMN** and click **OK**.
4. Excel deletes the columns you specified.

ROW AND COLUMN SHORTCUTS

The following table lists shortcuts for inserting and deleting rows and columns.

Operation	Shortcut
Insert a Row	Select an entire row and press <div>CTRL</div> <div>+</div>
Delete a Row	Select an entire row and press <div>CTRL</div> <div>-</div>
Delete Several Rows	Select the entire rows you want to delete and press <div>CTRL</div> <div>-</div>
Delete a Column	Select an entire column and press <div>CTRL</div> <div>-</div>
Delete Several Columns	Select the entire columns you want to delete and press <div>CTRL</div> <div>-</div>

Table 6-1 Insertion and Deletion Shortcuts















Operation	Shortcut
Insert Several Rows	Select the entire rows for the number of rows you want to insert and press  
Insert a Column	Select an entire column and press  
Insert Several Columns	Select the entire columns for the number of columns you want to insert and press  
Delete a Row	Select an entire row and press  
Delete Several Rows	Select the entire rows you want to delete and press  
Delete a Column	Select an entire column and press  
Delete Several Columns	Select the entire columns you want to delete and press  

Table 6-1 Insertion and Deletion Shortcuts

Take a look at the following examples.

Inserting Shortcuts

In the following spreadsheet Column D is selected.

	A	B	C	D		F	G	H	I
1									
2									
3									
4		111	222	333	444	555	666	777	
5		111	222	333	444	555	666	777	
6		111	222	333	444	555	666	777	
7		111	222	333	444	555	666	777	
8		111	222	333	444	555	666	777	
9		111	222	333	444	555	666	777	
10		111	222	333	444	555	666	777	
11		111	222	333	444	555	666	777	
12		111	222	333	444	555	666	777	
13		111	222	333	444	555	666	777	
14		111	222	333	444	555	666	777	
15									
16									

When **CTRL +** is pressed, a column is inserted and the currently selected column will be pushed to the right.

	A	B	C	D	E	F	G	H	I
1									
2									
3									
4		111	222	333		444	555	666	777
5		111	222	333		444	555	666	777
6		111	222	333		444	555	666	777
7		111	222	333		444	555	666	777
8		111	222	333		444	555	666	777
9		111	222	333		444	555	666	777
10		111	222	333		444	555	666	777
11		111	222	333		444	555	666	777
12		111	222	333		444	555	666	777
13		111	222	333		444	555	666	777
14		111	222	333		444	555	666	777
15									
16									

Worksheet Structure

In this example two columns (D and E) are selected.

	A	B	C			F	G	H	I
1									
2									
3									
4		111	222	333	444	555	666	777	
5		111	222	333	444	555	666	777	
6		111	222	333	444	555	666	777	
7		111	222	333	444	555	666	777	
8		111	222	333	444	555	666	777	
9		111	222	333	444	555	666	777	
10		111	222	333	444	555	666	777	
11		111	222	333	444	555	666	777	
12		111	222	333	444	555	666	777	
13		111	222	333	444	555	666	777	
14		111	222	333	444	555	666	777	
15									

When **CTRL +** is pressed, two columns are inserted and the currently selected columns will be pushed to the right.

	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4		111	222			333	444	555	666	777
5		111	222			333	444	555	666	777
6		111	222			333	444	555	666	777
7		111	222			333	444	555	666	777
8		111	222			333	444	555	666	777
9		111	222			333	444	555	666	777
10		111	222			333	444	555	666	777
11		111	222			333	444	555	666	777
12		111	222			333	444	555	666	777
13		111	222			333	444	555	666	777
14		111	222			333	444	555	666	777
15										

To insert a row, select an entire row and press **CTRL +**. The selected row will move down to make room for the new one.

To insert more than one row, select as many rows as you want to insert and press **CTRL +**. The selected rows will move down to make room for the new ones.

Deleting Shortcuts

In the following spreadsheet Row 6 is selected.

	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4		111	111	111	111	111	111	111	111	
5		222	222	222	222	222	222	222	222	
6		333	333	333	333	333	333	333	333	
7		444	444	444	444	444	444	444	444	
8		555	555	555	555	555	555	555	555	
9		666	666	666	666	666	666	666	666	
10		777	777	777	777	777	777	777	777	
11		888	888	888	888	888	888	888	888	
12		999	999	999	999	999	999	999	999	
13										

When **CTRL -** is pressed, the current row is deleted and lower rows will be moved up.

	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4		111	111	111	111	111	111	111	111	
5		222	222	222	222	222	222	222	222	
6		444	444	444	444	444	444	444	444	
7		555	555	555	555	555	555	555	555	
8		666	666	666	666	666	666	666	666	
9		777	777	777	777	777	777	777	777	
10		888	888	888	888	888	888	888	888	
11		999	999	999	999	999	999	999	999	
12										
13										

To delete more than one row, select as many rows as you want to delete and press **CTRL -**. The selected rows will be deleted and lower rows will be moved up.

To delete a column, select an entire column and press **CTRL -**. The selected column will be deleted and columns to the right will be moved left.

To delete more than one column, select as many columns as you want to delete and press **CTRL -**. The selected columns will be deleted and columns to the right will be moved left.

INSERTING CELLS

In some cases, you may want to insert copied cells between existing cells. To make room for the copied cells, you could insert a new row or column first, but you might not want an entire row or column.

To solve this problem, Excel provides a special command, **INSERT > COPIED CELLS...**, that allows you to insert copied cells without replacing entries in the existing cells and without adding new rows or columns to the worksheet.

The following worksheet may look strange, but it should illustrate how this command works.

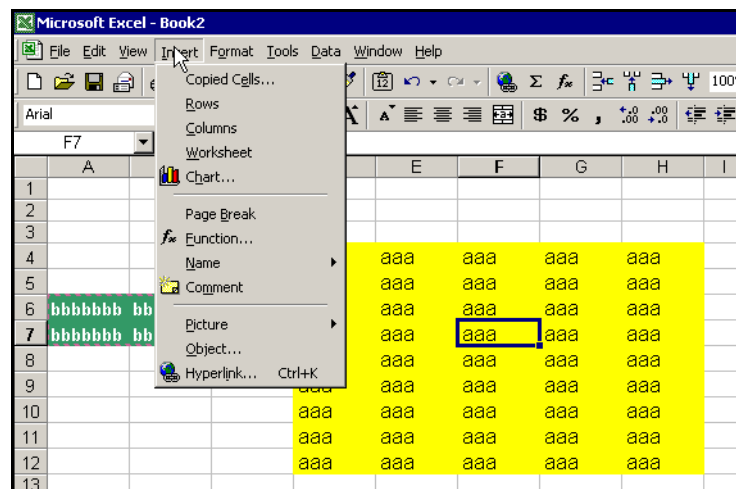
	A	B	C	D	E	F	G	H	I
1									
2									
3									
4				aaa	aaa	aaa	aaa	aaa	
5				aaa	aaa	aaa	aaa	aaa	
6	bbbbbb	bbbbbb		aaa	aaa	aaa	aaa	aaa	
7	bbbbbb	bbbbbb		aaa	aaa	aaa	aaa	aaa	
8				aaa	aaa	aaa	aaa	aaa	
9				aaa	aaa	aaa	aaa	aaa	
10				aaa	aaa	aaa	aaa	aaa	
11				aaa	aaa	aaa	aaa	aaa	
12				aaa	aaa	aaa	aaa	aaa	
13									
14									

The cells in the green range (A6:B7) will be inserted within the yellow range.

EXERCISE 6E

Exercise

1. Select **A6:B7** and press **CTRL+C** (copy).
2. Select cell **F8** and choose **INSERT > COPIED CELLS...**.



3. The following dialog will appear:

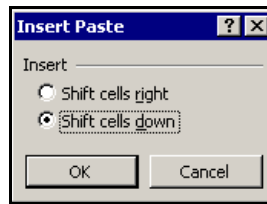


Figure 6-2 The Insert Paste Dialog Box

4. Make sure that **SHIFT CELLS DOWN** is selected and click **OK**.

	A	B	C	D	E	F	G	H	I
1									
2									
3									
4				aaa	aaa	aaa	aaa	aaa	
5				aaa	aaa	aaa	aaa	aaa	
6	bbbbbbb	bbbbbbb		aaa	aaa	aaa	aaa	aaa	
7	bbbbbbb	bbbbbbb		aaa	aaa	bbbbbbb	bbbbbbb	aaa	
8				aaa	aaa	bbbbbbb	bbbbbbb	aaa	
9				aaa	aaa	aaa	aaa	aaa	
10				aaa	aaa	aaa	aaa	aaa	
11				aaa	aaa	aaa	aaa	aaa	
12				aaa	aaa	aaa	aaa	aaa	
13						aaa	aaa		
14						aaa	aaa		
15									
16									

5. Notice that only the 4-cell green range was inserted into the yellow range. Only the cells beneath that range were pushed down.

Tip



You can also use this procedure to insert blank space into your worksheet.

DELETING CELLS

In some cases, you may want to delete cells between existing cells without deleting entire rows or columns. The following worksheet will illustrate.

EXERCISE 6F

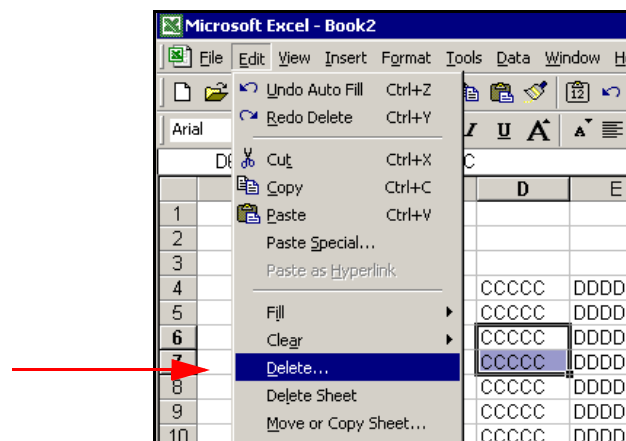
Exercise

1. In the following worksheet, suppose that you wanted to delete the cells in the range **D6:D7**.

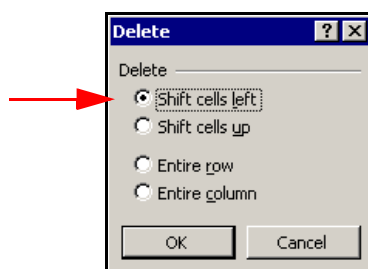
	A	B	C	D	E	F	G
1							
2							
3							
4		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
5		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
6		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
7		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
8		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
9		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
10		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
11							

cells in
red box
will be
deleted

2. Highlight the range **D6:D7** and select **EDIT > DELETE**.



- The following dialog will appear:



- This time select **SHIFT CELLS LEFT** and click **OK**.

	A	B	C	D	E	F	G
1							
2							
3							
4		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
5		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
6		AAAAA	BBBBB	DDDDD	EEEEEE		
7		AAAAA	BBBBB	DDDDD	EEEEEE		
8		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
9		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
10		AAAAA	BBBBB	CCCCC	DDDDD	EEEEEE	
11							

cells were
shifted
to left

Notice that the space taken by the deleted cells was shifted left.

CONTROLLING SHEETS

Insert a New Worksheet

To add a single worksheet using the menu, you can click **WORKSHEET** on the **INSERT** menu. To add multiple worksheets, hold down **SHIFT**, and then click the number of worksheet tabs you want to add in the open workbook. Then click **WORKSHEET** on the **INSERT** menu.

EXERCISE 6G

Exercise

The easiest way to create new sheets in an existing workbook is to use the pop-up menu. Follow these steps:

1. Right-click on one of the sheet tabs. The following menu will pop up.

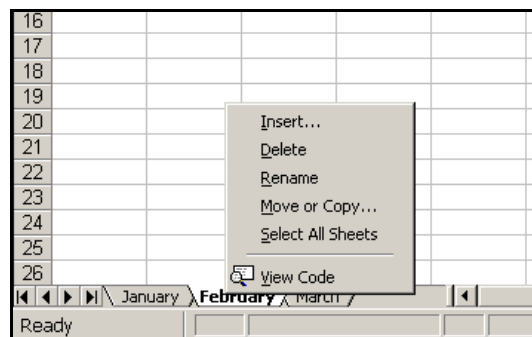
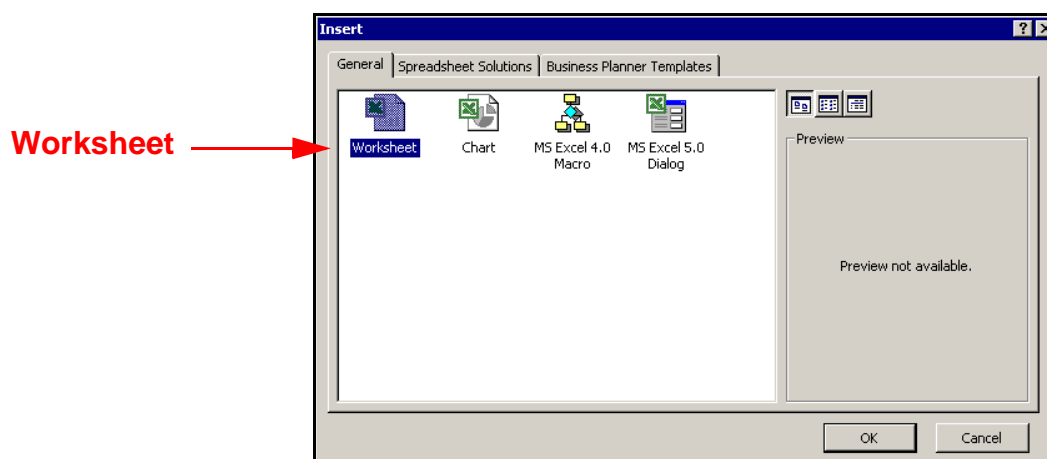


Figure 6-3 The Pop-up Sheet Menu

2. Choose **INSERT**. You will see the following dialog box.



3. Choose **WORKSHEET** and click on **OK**.

Delete a Worksheet**EXERCISE 6H****Exercise**

To delete a sheet or sheets using the menus, follow these steps:

1. Select the sheet you want to delete. If you want to delete more than one sheet, **CTRL**-click to select additional sheets.
2. Pull down the **EDIT** menu and choose **DELETE SHEET**.

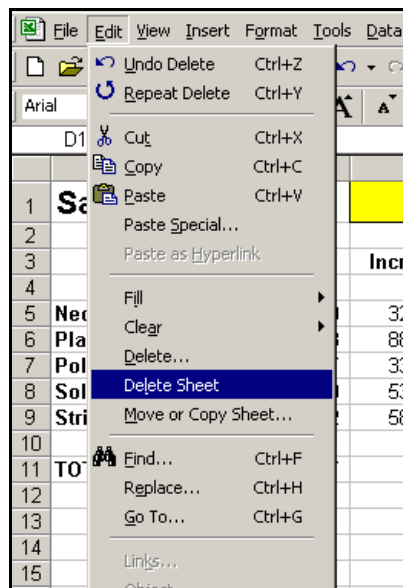
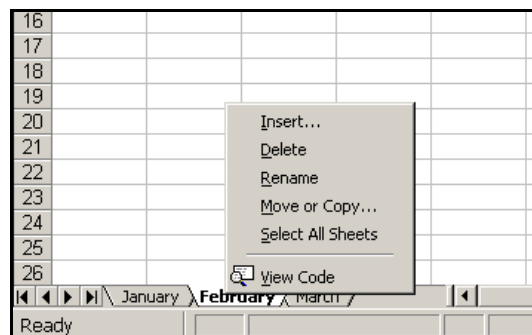


Figure 6-4 The Delete Sheet Option on the Edit Menu

Tip

The easiest way to delete sheets is to use the pop-up menu. Follow these steps:

1. Select the sheet or sheets you want to delete. Right-click on one of the sheet tabs and select **DELETE**.



RENAME SHEET TABS

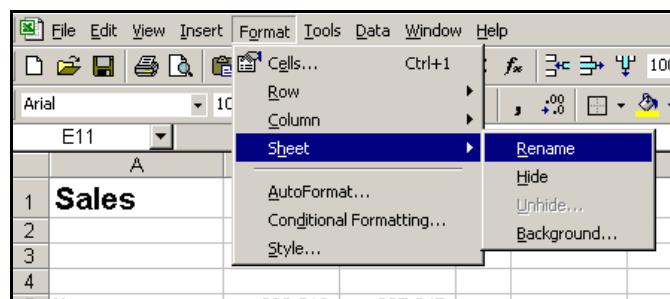
You probably will find it difficult to manage your sheets with the default names of Sheet1, Sheet2, Sheet3, and so on. Fortunately, Excel enables you to rename the tabs for each sheet so that each sheet has a more meaningful name.

EXERCISE 6I

Exercise

To rename tabs using the menu, follow these steps:

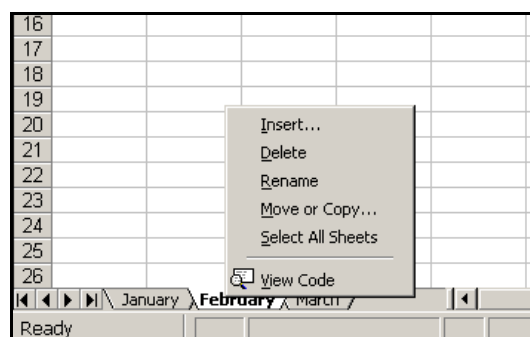
1. Select the sheet you wish to rename.
2. Pull down the **FORMAT** menu and choose **SHEET**. Choose **RENAME** from the cascading menu.



3. Type the new sheet name.

Another way to rename sheets is to use the pop-up menu. Follow these steps:

1. Select the sheet you want to rename. Right-click on the sheet tabs and select **RENAME**.



2. Type the new sheet name.

Tip



The easiest way to rename a sheet is by double-clicking on the sheet tab and replacing the name.

REARRANGING SHEETS

To rearrange sheets in your workbook, click on the sheet you want to move, hold down the left mouse button, and drag to the right or left. A small arrow indicates where the sheet will be “dropped” when you release the mouse button.

drag sheet to here and ‘drop’

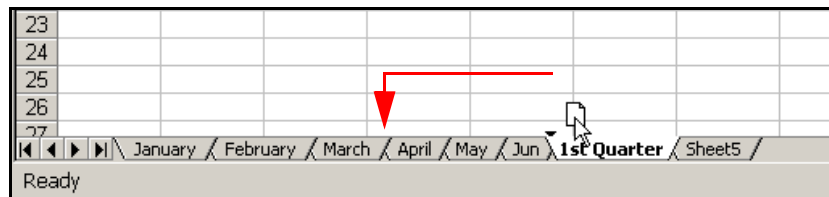


Figure 6-5 Dragging a Sheet to a New Location

EXERCISE 6J

Exercise

To move a tab follow these steps:

1. Select the sheet you wish to move.
2. Drag it to a different location.

POINTS TO REMEMBER

- When you insert a row or rows, the rows just below the insertion point are automatically shifted down.
- When you insert a column, columns to the right of the insertion point are automatically shifted to the right.
- When you delete rows, all rows below the row you delete are shifted up to fill in the worksheet.
- When you delete columns, all columns to the right of the column you delete are shifted to the left.
- You can insert copied cells between existing cells by choosing **INSERT > COPIED CELLS...**
- You can delete cells between existing cells by choosing **EEDIT > DELETE**
- You can add worksheets by choosing **WORKSHEET** on the **INSERT** menu.
- You can delete a worksheet by choosing **EEDIT > DELETE SHEET.**
- You can rename a sheet by double-clicking on the sheet tab and replacing the name.
- You can move a sheet by clicking on the tab name and dragging it to another location.

Range Names and Sorting

CHAPTER 7

One of the most useful, but least used, features of **Excel** is the ability to assign names to parts of the worksheet. In **Excel**, you can name ranges of cells, constant values, and formulas.

The following are some of the examples of naming ranges:

- If you name cells or ranges of cells, you can then use those names in your formulas. It is far easier to remember to type `=Amount * Quantity` than to type `=D5*A5`.
- Using names improves the ability to audit your worksheets. When you use names in your formulas, you can see easily that the formula `=Amount * Quantity` is correct, but it is not as apparent that `=D5*A5` is correct.
- You can assign a constant value to a name. For instance, if you work with many financial statements from many different companies, you can assign the name *Number_of_Periods* the value of 12 or 13, depending on how many accounting periods the company uses. Then, use the *Number_of_Periods* in place of the number 12 or 13.

When you need to use the same worksheet for a company with a different number of accounting periods, just change the value of the *Number_of_Periods* constant, and then all the formulas that use the name automatically are based on the new value.

- When you need to jump around a large worksheet, it is easier to use the name to which you want to jump with the **GoTo** command (**F5**), as opposed to using, for example, BZ147. You can press **F5** for the **GoTo** command, then just enter **Sales**.
- Using names can reduce the potential for errors. If you type in a formula with the column or the row even slightly wrong, **Excel** can give you the answer based on what is in the wrong cell, and you might think that the answer is correct. If you use a name incorrectly, however, **Excel** gives you a #NAME? error.

CREATING NAMES

As you create and work with names, remember the following rules:

- **What characters are allowed?** The first character of a name must be a letter or an underscore character. Remaining characters in the name can be letters, numbers, periods, and underscore characters.
- **Can names be cell references?** Names cannot be the same as a cell reference, such as Z\$100 or R1C1.
- **Can more than one word be used?** Yes, but spaces are not allowed. Underscore characters and periods may be used as word separators — for example, Sales_Tax or First.Quarter.
- **How many characters?** A name can contain up to 255 characters.
- **Are names case sensitive?** Names can contain uppercase and lowercase letters. **Excel** does not distinguish between uppercase and lowercase characters in names. For example, if you have created the name Sales and then create another name called SALES in the same workbook, the second name will replace the first one.

ABOUT LABELS AND NAMES IN FORMULAS

Worksheets often have labels at the top of each column and to the left of each row that describe the data within the worksheet. You can use these labels within formulas when you want to refer to the related data. You can also create descriptive names that are not labels on the worksheet to represent cells, ranges of cells, formulas, or *constants*.

Use labels to represent cells When you create a formula that refers to data in a worksheet, you can use the column and row labels in the worksheet to refer to the data.

NAME A CELL OR A RANGE OF CELLS

Manually

To manually name a range, follow these steps.

1. Select the cell or range of cells that you want to name.

Range Selected is A12:G22

A12		=	ID#					
A	B	C	D	E	F	G		
1								
10								
11								
12	ID#	Company Name	Street	City	State	Zip	Phone	
13	119	ABC Corp.	12 Main Street	Boston	MA	01338	617-832-9900	
14	120	Arnie's Eats	72 Beantown Avenue	New York	NY	10021	212-992-8457	
15	122	RTC, Inc.	666 Hunger Lane	Trenton	NJ	08035	609-364-5577	
16	137	ATT	800 Collings Drive	Philadelphia	PA	23885	215-755-3141	
17	298	Forest Hills	10 Peaceful Lane	Chicago	IL	48339	312-777-6363	
18	303	IBM	82 Eyemso Blue Street	Albany	NY	13481	518-667-2500	
19	321	Fido Trust	22 Gold Street	Mobile	AL	37999	205-998-1200	
20	457	Kintara's	450 Suffolk Street	Sacramento	CA	97624	415-888-1022	
21	532	Stamper's	79 Canal Street	San Antonio	TX	78209	512-777-1234	
22	766	Aqway	173 Stockhorne Avenue	St. Louis	MO	57384	314-882-9100	
23								
24								

2. Click the **Name** box at the left end of the formula bar.

Name box →

A12		=
	A	B
10		
11		
12	ID#	Company Name
13	119	ABC Corp.
14	120	Arnie's Eats

3. Type the name for the cells.

name of range →

company_list	=
A	B
10	
11	
12	ID#
13	119
14	120
15	122

4. Press **ENTER**.

Automatically

When you select a range that includes column and/or row headings, **Excel** uses those headings to name the range.

EXERCISE 7A

Exercise

Follow these steps:

1. Open the spreadsheet called *range_names.xls*.

	A	B	C	D	H
1	First Quarter Sales Report				
2					
3					
4					
5					
6		JAN	FEB	MAR	
7	John	234.34	453.88	377.99	
8	Paul	456.56	422.19	298.14	
9	George	523.77	511.12	386.55	
10	Ringo	118.66	255.00	499.02	
11	Total				
12					
13					

2. Highlight the range **A6:D10**.

	A	B	C	D	H
5					
6		JAN	FEB	MAR	
7	John	234.34	453.88	377.99	
8	Paul	456.56	422.19	298.14	
9	George	523.77	511.12	386.55	
10	Ringo	118.66	255.00	499.02	
11	Total				
12					
13					

- On the menu select **INSERT > NAME** and when the popout menu appears choose **CREATE**. The following dialog box will appear:

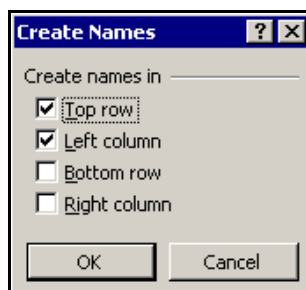


Figure 7-1 The Create Names Dialog Box

- Since you have selected a range with row and column labels, leave the **TOP ROW** and **LEFT COLUMN** checks. Click **OK**.
- Click on the **Name** box arrow to see the list of names you just created.

named range list

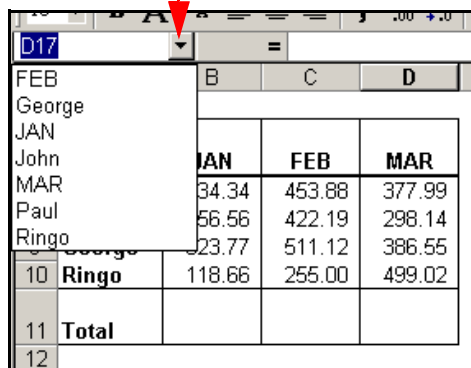


Figure 7-2 Range Name List

SELECTING A RANGE FROM THE RANGE NAME LIST

If you click on one of the names in that list, **Excel** will highlight the range for you.

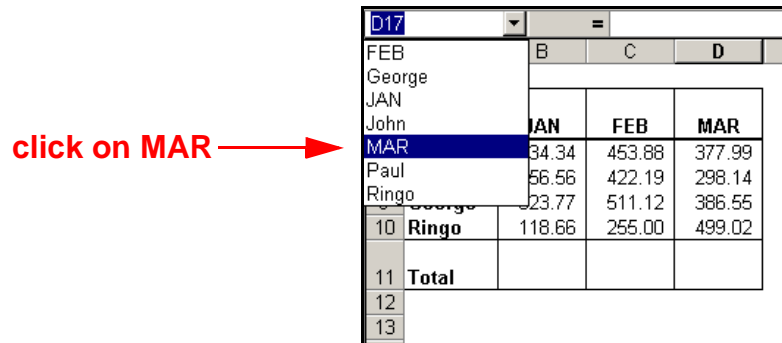
EXERCISE 7B

Exercise

Follow these steps:

Range Names and Sorting

1. Open up the **Name** list by clicking on the drop-down arrow to the right of the **Name** box.
2. Click on **MAR** in the list.

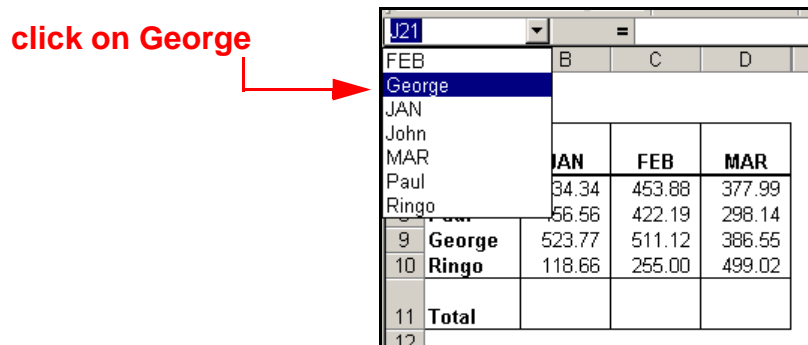


3. The MAR range will be highlighted in the spreadsheet.

the MAR range highlighted →

	A	B	C	D
4				
5				
6		JAN	FEB	MAR
7	John	234.34	453.88	377.99
8	Paul	456.56	422.19	298.14
9	George	523.77	511.12	386.55
10	Ringo	118.66	255.00	499.02
11	Total			
12				

4. Open up the **Name** list by clicking on the drop-down arrow to the right of the **Name** box.
5. Click on **George** in the list.



6. The **George** range will be highlighted in the spreadsheet.

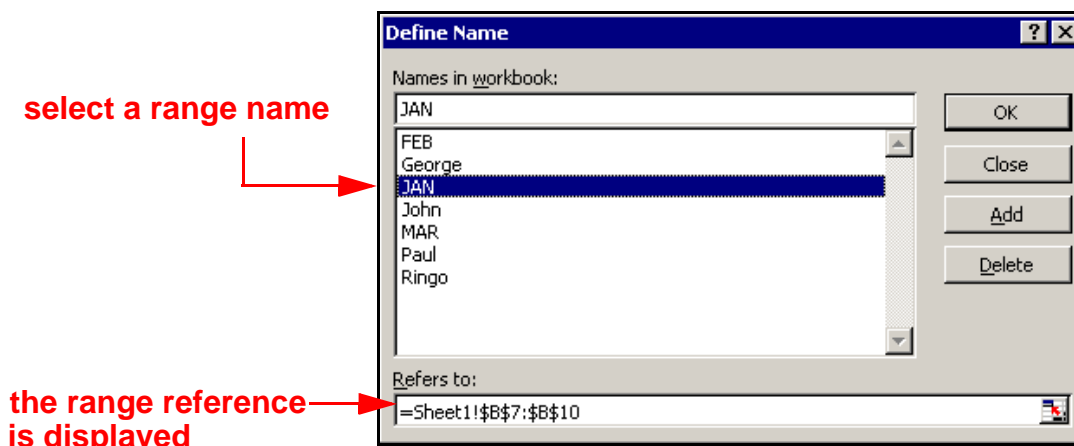
George		=	523.77	
	A	B	C	D
4				
5				
6		JAN	FEB	MAR
7	John	234.34	453.88	377.99
8	Paul	456.56	422.19	298.14
9	George	523.77	511.12	386.55
10	Ringo	118.66	255.00	499.02
11	Total			
12				

the George range highlighted

Note 

You will use these range names in the next chapter, **Formulas and Functions**.

You can see a list of all range names and the ranges they refer to by selecting **INSERT > NAME > DEFINE**.



Creating a List of Named Ranges in your Worksheet

You can also create a list of the available names in a workbook. Locate an area with two empty columns on the worksheet (the list will contain two columns — one for the name and one for a description of the name).

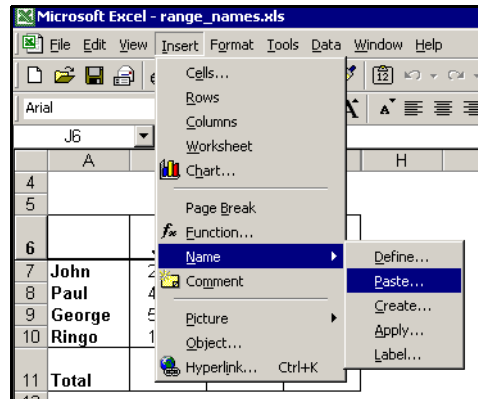
EXERCISE 7C

Exercise

Follow these steps:

Range Names and Sorting

1. Select a cell that will be the upper-left corner of the list.
2. On the **INSERT** menu, point to **NAME**, and then click **PASTE**.



3. In the **PASTE NAME** dialog box, click **PASTE LIST**

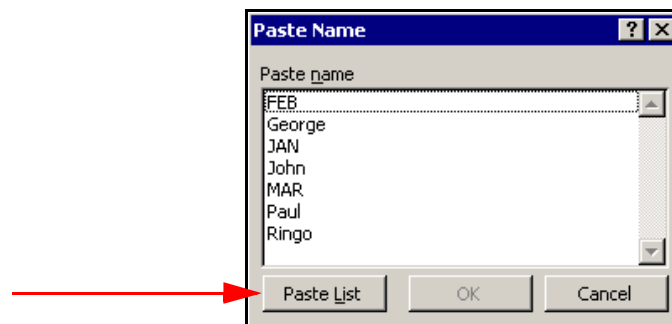


Figure 7-3 The Paste Range Name Dialog Box

4. When you click **PASTE LIST**, a table will be created in your worksheet that includes each range name and the range it refers to.

	I	J	K	L	M
4					
5					
6		FEB	=Sheet1!\$C\$7:\$C\$10		
7		George	=Sheet1!\$B\$9:\$D\$9		
8		JAN	=Sheet1!\$B\$7:\$B\$10		
9		John	=Sheet1!\$B\$7:\$D\$7		
10		MAR	=Sheet1!\$D\$7:\$D\$10		
11		Paul	=Sheet1!\$B\$8:\$D\$8		
12		Ringo	=Sheet1!\$B\$10:\$D\$10		
13					

SORTING LISTS AND OTHER RANGES

Excel provides numerous ways to sort worksheet ranges. You can sort by rows or columns, in ascending or descending order, and with capitalization considered or ignored.

- When you sort by rows, the rows of your list are rearranged, while the columns remain in the same order.
- When you sort by columns, the columns of your list are rearranged, while the rows remain in the same order.

EXERCISE 7D

Exercise

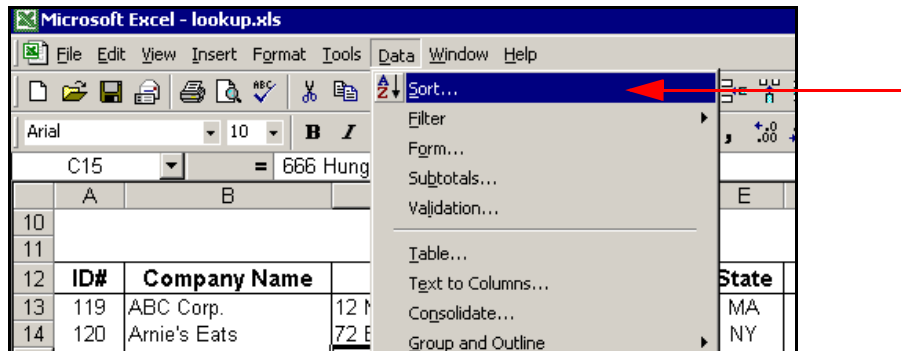
Here are the steps to follow to sort a database.

1. Open up the spreadsheet called *lookup.xls*. Rows 12 through 22 of that spreadsheet contain the following list.

	A	B	C	D	E	F	G
10							
11							
12	ID#	Company Name	Street	City	State	Zip	Phone
13	119	ABC Corp.	12 Main Street	Boston	MA	01338	617-832-9900
14	120	Arnie's Eats	72 Beantown Avenue	New York	NY	10021	212-992-8457
15	122	RTC, Inc.	666 Hunger Lane	Trenton	NJ	08035	609-364-5577
16	137	ATT	800 Collings Drive	Philadelphia	PA	23885	215-755-3141
17	298	Forest Hills	10 Peaceful Lane	Chicago	IL	48339	312-777-6363
18	303	IBM	82 Eyemso Blue Street	Albany	NY	13481	518-667-2500
19	321	Fido Trust	22 Gold Street	Mobile	AL	37999	205-998-1200
20	457	Kintara's	450 Suffolk Street	Sacramento	CA	97624	415-888-1022
21	532	Stamper's	79 Canal Street	San Antonio	TX	78209	512-777-1234
22	766	Agway	173 Stockhorne Avenue	St. Louis	MO	57384	314-882-9100
23							

Range Names and Sorting

2. Select any cell within the list and select **DATA > SORT** from the menu.



3. Excel will select the entire list and display the following dialog box:

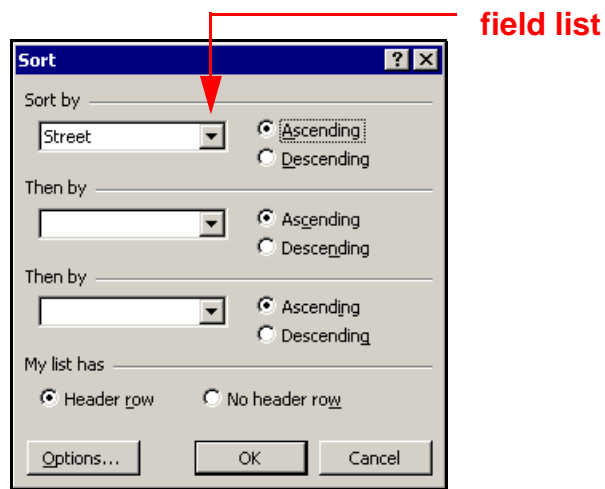
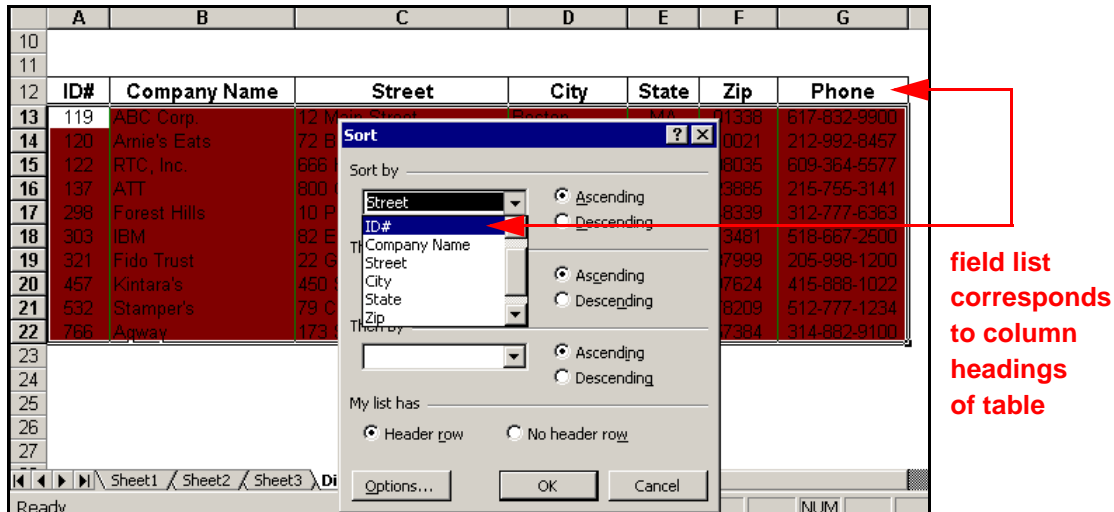


Figure 7-4 The Data Sort Dialog Box

- Click on the drop down arrow indicated in **Figure 7-4** . A list of the field name (column headings) will appear.



- When you choose a name from the **Sort by** list, and then click **OK**, the rows of the table will be sorted by that field. For this example, first select **State**.

list is sorted by State

	A	B	C	D	E	F	G
10							
11							
12	ID#	Company Name	Street	City	State	Zip	Phone
13	321	Fido Trust	22 Gold Street	Mobile	AL	37999	205-998-1200
14	457	Kintara's	450 Suffolk Street	Sacramento	CA	97624	415-888-1022
15	298	Forest Hills	10 Peaceful Lane	Chicago	IL	48339	312-777-6363
16	119	ABC Corp.	12 Main Street	Boston	MA	01338	617-832-9900
17	766	Agway	173 Stockhome Avenue	St. Louis	MO	57384	314-882-9100
18	122	RTC, Inc.	666 Hunger Lane	Trenton	NJ	08035	609-364-5577
19	120	Arnie's Eats	72 Beantown Avenue	New York	NY	10021	212-992-8457
20	303	IBM	82 Eyemso Blue Street	Albany	NY	13481	518-667-2500
21	137	ATT	800 Collings Drive	Philadelphia	PA	23885	215-755-3141
22	532	Stamper's	79 Canal Street	San Antonio	TX	78209	512-777-1234

Try sorting the list by other fields, and in descending order.

POINTS TO REMEMBER

- You can name ranges of cells, constant values, and formulas. The advantages of using named cells include the following:
 - You can then use those names in your formulas.
 - Using names improves the ability to audit your worksheets.
 - You can assign a constant value to a name.
 - It is easier to use the name to which you want to jump with the **GoTo** command (**F5**).
 - Using names can reduce the potential for errors.
- Remember the following rules for naming ranges:
 - The first character of a name must be a letter or an underscore character.
 - Names cannot be the same as a cell reference, such as Z\$100 or R1C1.
 - Spaces are not allowed.
 - **Excel** does not distinguish between uppercase and lowercase characters in names.
- When you select a range that includes column and/or row headings, **Excel** uses those headings to name the range.
- If you click on one of the names in range name box, **Excel** will highlight the range for you.
- You can create a list of the available names in a workbook. On the **INSERT** menu, point to **NAME**, and then click **PASTE**.
- You can sort worksheet ranges. Select any cell within the range and select **DATA** ➤ **SORT** from the menu.

Formulas and Functions

CHAPTER 8

The real value of **Excel** lies in its ability to calculate the value of a cell based on values in other cells. This is accomplished by *formulas*. Formulas tell **Excel** exactly how to calculate a cell value from data in other cells.

Changing one value on the worksheet can initiate a complex chain of calculations that will change cells in the entire worksheet, as well as other worksheets that may be linked to the worksheet.

PARTS OF A FORMULA

All formulas begin with an *equals sign* (=).

The equals sign tells **Excel** that the entry is a formula rather than a number or text entry. In simple formulas, the equals sign is usually followed by a cell reference, such as **B25** or **C13**. The cell reference tells **Excel** where to get the value on which the calculation will be made.

Cell references are usually separated by an operator such as + for addition or / for division. The following table lists these operators:

Operator	Function	Example
+	Addition	=B2+C25
-	Subtraction	=B3-F19
*	Multiplication	=C25*3
/	Division	=JanuarySales/10
^	Exponentiation	=15^2*.5

Table 8-1 Operators Used in Formulas

As you type the formula, it appears in the **cell** and in the **formula bar**. After a formula is entered, the answer is displayed in the cell and the formula is displayed in the formula bar.


Creating a Formula

You can create a formula in any cell in a worksheet by typing cell references or by pointing to them. To select the references cells to be used in the formula, click on the cell using the mouse, or use the arrow keys.

EXERCISE 8A

Exercise

In the following exercise you will create several formulas.

1. Start a new worksheet by clicking on the **NEW** icon ().
2. Enter the labels and values in the exact cell locations shown in the illustration.
3. Enter the formulas, as shows in the indicated cells.
4. Enter the appropriate formulas to complete the spreadsheet.

	A	B	C	D	E	F	G	H	I
1			List Price	Disc %	Disc Amt	Sale Price	Sales Tax	Total	
2									
3	Red Gown		745	5%	=D3*C3	=C3-E3	=F3*0.08	=G3+F3	
4	Blue Jacket		985	10%					
5	Black Slacks		395	2.50%					
6									

5. Use any of the copy methods to duplicate the formulas in columns E, F, G, and H.

FUNCTIONS

A function is a built-in formula that performs a special calculation automatically.

For example, the SUM function can be used with a range of cells to add all values in the range specified.

Instead of typing =A1+A2+A3+A4+A5+A6+A7+A8+A9+A10

You can type =SUM(A1:A10)

Functions appear in formulas in the following order:

1. the function **name** (in either uppercase or lowercase)
2. an open parenthesis (
3. the number, cell, or range of cells to be selected
4. a closed parenthesis)

A function may be used by itself, or it may be combined with other functions.

Types of Functions

Excel categorizes functions into the following groups:

Group	Description
Financial	Calculates interest, depreciation, return on investment, and other types of financial information.
Date & Time	Enable you to look up dates and times and to perform mathematical calculations on dates and times with ease. For example, calculate the number of days between 2 dates, the difference of two times, etc.
Math & Trigonometry	Useful with basic engineering and math problems, such as calculating the cosine or tangent of a number.
Statistical	Enable you to analyze the data you have stored in your spreadsheets. You can use them to determine trends and make statistical decisions.
Lookup & Reference	Enable you to access cells on your worksheet by address, row, and column.
Database	Helps with database information, like selecting the minimum value in a list.
Text	Helps you manipulate text data.
Logical	Calculates results based on certain conditions in your worksheet.
Information	Returns general information about the cells in your worksheet, such as formatting or the contents of a cell.
Engineering	Useful for engineering analysis.

Table 8-2 Function Groups

Using Arguments

The information you provide to a function is called an *argument*. A function can include more than one argument, because different kinds of information might be needed to calculate the desired answer. Each function includes a predetermined set of arguments, always separated by commas.

EXERCISE 8B

Exercise

In the following exercise you will add some functions to the spreadsheet you created earlier in the chapter.

1. Enter the text **TOTAL** in cell C7.
2. Enter the text **AVERAGE** in cell C8.
3. Enter the functions, as shows in the indicated cells.

	A	B	C	D	E	F	G	H	I
1			List Price	Disc %	Disc Amt	Sale Price	Sales Tax	Total	
2									
3	Red Gown		745	5%	37.25	707.75	56.62	764.37	
4	Blue Jacket		985	10%	98.5	886.5	70.92	957.42	
5	Black Slacks		395	2.50%	9.875	385.125	30.81	415.935	
6									
7	TOTAL		=SUM(C4:C6)						
8	AVERAGE		=AVERAGE(C4:C6)						
9									

4. Use any of the copy methods to duplicate the formulas to columns E, F, G, and H.

The argument in both the SUM and the AVERAGE function is the range of cells to be summed or averaged, in both cases, **C3:C5**.

THE AUTOSUM BUTTON

The SUM function is used more often than any other function. To make this function more accessible, **Excel** includes a button on the Standard toolbar, shown here.

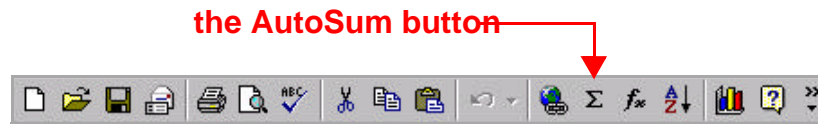


Figure 8-1 The AutoSum Button

EXERCISE 8C

Exercise

1. Open the file called *AutoSum.xls*.
2. Notice the example shown here. Numbers have been entered in the range B5:B9. The active cell is B11, below the list of numbers.

SUM X ✓ = =SUM(B5:B10)			
	A	B	C
1	Sales		
2			
3		January	
4			
5	Neon	8,292,810	
6	Plaid	7,211,772	
7	Polka Dot	7,702,723	
8	Solid	3,169,453	
9	Striped	6,481,448	
10			
11	TOTAL	=SUM(B5:B10)	
12			

3. Click on the **AUTOSUM** button.

When the **AUTOSUM** button is clicked, the entire formula is inserted for you and **Excel** suggests a range to sum. Often the suggested range is correct, but if not, you can simply drag through the correct range before you press **ENTER**.

Using AutoSum On a Range of Cells

You can use the **AUTO SUM** button on more than one cell at a time. Notice the next example where totals are needed for all six months of data.

EXERCISE 8D

Exercise

- Click on the tab called **MultipleColumns**.

Click on this tab

	A	B	C	D	E	F	G	H
1	Sales							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	8,292,810	2,623,322	5,833,106	10,780,653	7,021,991	6,416,634	
7	Plaid	7,211,772	9,678,600	3,848,570	9,375,304	7,467,486	5,768,489	
8	Polka Dot	7,702,723	8,978,200	7,528,750	10,013,540	6,775,875	5,722,039	
9	Solid	3,169,453	3,848,590	8,297,207	4,120,289	3,463,713	7,528,750	
10	Striped	6,481,448	9,678,650	7,802,212	8,425,882	5,249,795	8,297,207	
11								
12	TOTAL							
13								
14								
15								

- Select all cells for January through June on the Total line.

highlight cells and then click AutoSum

	A	B	C	D	E	F	G	H
1	Sales							
2								
3		January	February	March	April	May	June	
4								
5	Neon	8,292,810	2,623,322	5,833,106	10,780,653	7,021,991	6,416,634	
6	Plaid	7,211,772	9,678,600	3,848,570	9,375,304	7,467,486	5,768,489	
7	Polka Dot	7,702,723	8,978,200	7,528,750	10,013,540	6,775,875	5,722,039	
8	Solid	3,169,453	3,848,590	8,297,207	4,120,289	3,463,713	7,528,750	
9	Striped	6,481,448	9,678,650	7,802,212	8,425,882	5,249,795	8,297,207	
10								
11	TOTAL							
12								

Figure 8-2 AutoSum On Range of Cells

- Click on the **AUTO SUM** button. All columns will show totals.

B11		=SUM(B5:B10)						
	A	B	C	D	E	F	G	H
1	Sales							
2								
3		January	February	March	April	May	June	
4								
5	Neon	8,292,810	2,623,322	5,833,106	10,780,653	7,021,991	6,416,634	
6	Plaid	7,211,772	9,678,600	3,848,570	9,375,304	7,467,486	5,768,489	
7	Polka Dot	7,702,723	8,978,200	7,528,750	10,013,540	6,775,875	5,722,039	
8	Solid	3,169,453	3,848,590	8,297,207	4,120,289	3,463,713	7,528,750	
9	Striped	6,481,448	9,678,650	7,802,212	8,425,882	5,249,795	8,297,207	
10								
11	TOTAL	32,858,206	34,807,362	33,309,845	42,715,668	29,978,861	33,733,118	
12								

RELATIVE AND ABSOLUTE CELL ADDRESSING

As you have seen from the examples above, when you copy formulas, the cell references adjust for you. This is known as *relative* addressing.

However, in some cases, a value in a formula must remain constant when copied to other locations. This is referred to as *absolute* addressing.

EXERCISE 8E

Exercise

1. Open the file called *absolute.xls*.
2. Enter a formula in cell **C5** to multiply cell **B5** by cell **C1**.

	A	B	C	D
1	Sales		112%	
2				
3		2000	Increase	
4				
5	Neon	292,810	=B5*C1	
6	Plaid	788,228		
7	Polka Dot	297,277		
8	Solid	480,380		
9	Striped	518,552		
10				
11	TOTAL	2,377,247		
12				

formula entered
=B5*C1

3. Copy the formula down. The following will result:

	A	B	C	D
1	Sales		112%	
2				
3		2000	Increase	
4				
5	Neon	292,810	327,947	
6	Plaid	788,228	-	
7	Polka Dot	297,277	#VALUE!	
8	Solid	480,380	-	
9	Striped	518,552	#####	
10				
11	TOTAL	2,377,247		
12				

The error occurs because the reference to cell C1 has been adjusted when the formula is copied. Notice how the formula references were adjusted.

	A	B	C	D
1	Sales		112%	
2				
3		2000	Increase	
4				
5	Neon	292,810	=B5*C1	
6	Plaid	788,228	=B6*C2	
7	Polka Dot	297,277	=B7*C3	
8	Solid	480,380	=B8*C4	
9	Striped	518,552	=B9*C5	
10				
11	TOTAL	2,377,247		
12				

For this formula to have worked correctly, an *absolute* cell reference should have been entered in the first formula.

	A	B	C	D
1	Sales		112%	
2				
3		2000	Increase	
4				
5	Neon	292,810	=B5*C\$1	
6	Plaid	788,228		
7	Polka Dot	297,277		
8	Solid	480,380		
9	Striped	518,552		
10				
11	TOTAL	2,377,247		
12				

formula entered
=B5*C\$1

4. This is accomplished by inserting a dollar symbol (\$) before the row reference, so that when the formula is copied down, the row value in the formula remains constant.

	A	B	C	D	E
1	Sales		112%		
2					
3		2000	Increase		
4					
5	Neon	292,810	327,947	=B5*\$C\$1	
6	Plaid	788,228	882,815	=B6*\$C\$1	
7	Polka Dot	297,277	332,950	=B7*\$C\$1	
8	Solid	480,380	538,026	=B8*\$C\$1	
9	Striped	518,552	580,778	=B9*\$C\$1	
10					
11	TOTAL	2,377,247			
12					

only part of the formula was adjusted

UNDERSTANDING AND USING PERCENTAGES

Although Excel has many built-in functions, sometimes you need to build a formula yourself. This section will cover the following ways to calculate percentages:

- calculating an increase or decrease from one value to another value
- calculating the percentage one value is of another value
- calculating a percentage of a value

EXERCISE 8F

Exercise

1. Open the file called *percentages.xls*.

	A	B	C	D	E	F
1						
2						
3						
4			Last Year	This Year	% Increase or Decrease	% Product Contributed Towards This Year's Total
5		Prod A	250	300		
6		Prod B	175	170		
7		Prod C	460	900		
8		Prod D	220	250		
9		Total	1,105	1,620		
10						
11		20%				
12		of This Year's				
13		Total				
14						

2. In cell E4 you need to calculate the percentage increase or decrease from this year to last year.

The following principle applies:

(This Period minus Last Period) divided by Last Period

3. Keeping in mind the above, enter the following formula in cell E4:

=(D4-C4)/C4

Remember to use the parentheses to force the subtraction first.

4. Copy the formula for Products B, C, and D.
5. In cell E4 you need to calculate the percentage Product A is of the total for the year. Enter the following formula:

=D4/\$D\$9

6. Copy the formula for Products B, C, and D.
7. In cell D13 you need to calculate 20% of this year's total. Enter the following formula:

=D9*B11

The following table summarizes the three methods just used.

Operation	Example
calculating an increase or decrease from one value to another value	(this period minus last period) divided by last period
calculating the percentage one value is of another value	first value divided by second value (Product A divided by Total)
calculating a percentage of a value	value multiplied by percentage factor (Total multiplied by percentage)

Table 8-3 Ways of Calculating Percentages

THE FUNCTION WIZARD

When you want to use a built-in function, **Excel's** Function Wizard button is the best approach.

For example, to calculate the payment for a loan you can use the PMT Function.

The PMT() Function

PMT calculates the payment required to pay back a loan in a specified period of time. It can also be used to calculate how much money must be deposited, or paid, on a regular basis to achieve an investment goal. The syntax is as follows:

=PMT(rate, number of periods, present value, future value, type)

- **Rate:** The first argument is the interest *rate* of the borrowed money, expressed as a percentage rate per payment period.
- **Nper:** This argument specifies the number of *payment periods* for the transaction. A three-year loan with monthly payments has 36 periods.
- **PV:** The *Present Value* defines the amount of money borrowed or loaned at the beginning of the transaction. Generally, use a negative value if you're borrowing money and a positive value if you're loaning money. Whether you use a positive or negative present value doesn't change the numerical result of the calculation, it just affects whether the answer is displayed as a positive or negative payment.
- **FV:** The *Future Value* defines the amount of value remaining at the end of the loan. This might be used for a loan with a balloon payment at the end of its term, or a lease with a purchase option (also called a *residual*). The FV argument is optional. If you don't provide it, Excel will assume the FV is zero.
- **Type:** The *Type* argument, also optional, defines whether payments on the loan are made at the beginning of each payment period or at the end of each payment period. (In financial terms, payments made at the beginning of each period are said to be *in advance* and payments made at the end of a payment period are said to be *in arrears*.) The Type argument is given in two possible ways: blank or 0 means the payments are at the end of each payment period; a 1 means the payments are at the beginning of each period.

EXERCISE 8G

Exercise

1. Open the file called *pmt.xls*.
2. Select the cell where you want to enter the function. In this case cell B7.

	A	B
1		
2		
3	Interest Rate	12.50%
4	Years to Pay	10
5	Loan Amount	25,000
6		
7	Monthly Payment	
8		

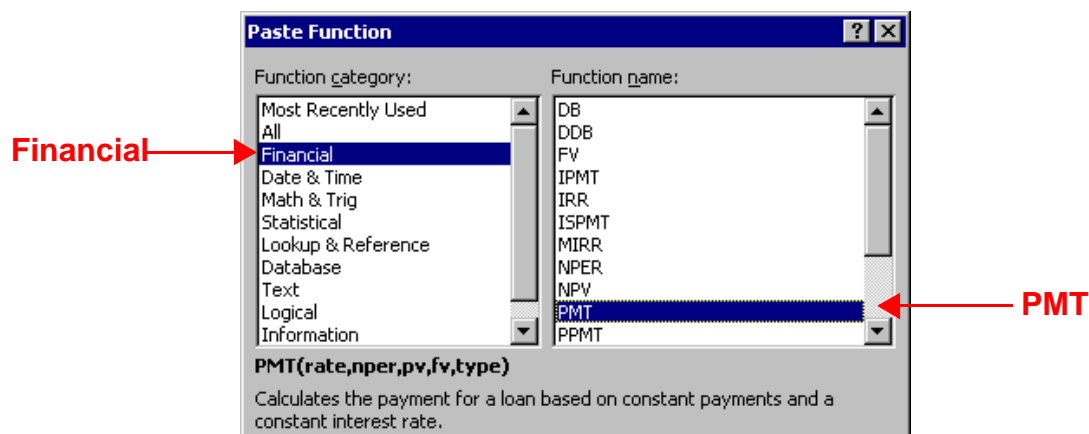
3. Click on the Function Wizard button.

the Function Wizard button



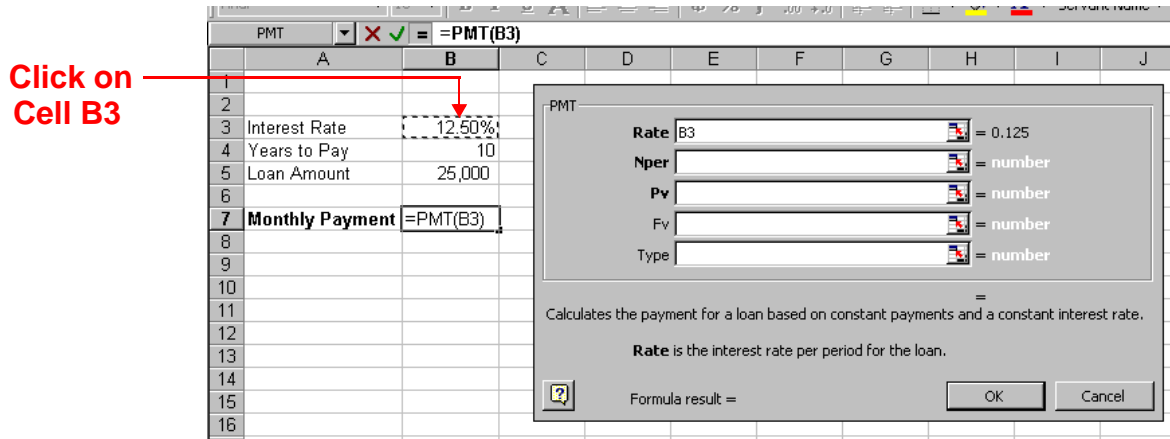
Figure 8-3 The Function Wizard Button

4. When the first Function Wizard dialog box appears, select **Financial** from the **Function Category** list box.
5. Select **PMT** from the **Function Name** list box and click **OK**.

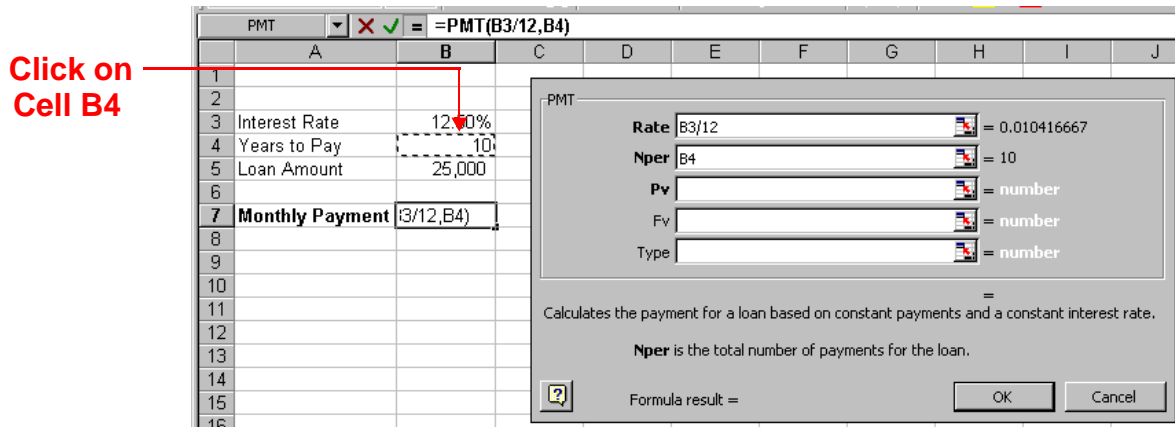


6. The next Function Wizard dialog will appear. Drag the dialog box to the right so that you can see the worksheet cells.

7. With the **Rate** edit box selected, click on the interest rate cell (B3).



8. Edit the entry by adding **/12** (the yearly interest divided by 12 months.) It should read **B3/12** when you are done.
9. Click in the **Nper** edit box, then click on the **Years to Pay** cell (B4).



10. Edit the entry by adding ***12** (to find the number of months.) It should read **B4*12** when you are done.

11. Finally, click in the **Pv** edit box, then click on cell **B5 (Loan Amount)**. The window should look like the following:

PMT

Rate B3/12 = 0.010416667

Nper B4*12 = 120

Pv B5 = 25000

Fv = number

Type = number

= -365.9404217

Calculates the payment for a loan based on constant payments and a constant interest rate.

Type is a logical value: payment at the beginning of the period = 1; payment at the end of the period = 0 or omitted.

Formula result = (\$365.94)

OK Cancel

Figure 8-4 The Function Wizard Window

12. Click on the **OK** button. The formula is entered in the selected cell, and the resulting value is displayed on the worksheet.



Notice that while you are entering the various arguments in the function, the lower area of the box includes an explanation of each argument.

13. Change the values in the cells to see the formula recalculate.

THE NOW() AND TODAY() FUNCTIONS

These two functions allow you to enter the current date and time into your worksheets. When you enter either of these functions, Excel draws the current date and time from your computer's system clock and enters it into the worksheet. These 2 functions change only when the worksheet is calculated. Use them only when you want the dates and times

NOW()

NOW() is entered as a combined date/time value. For example, if you entered the function =NOW() into a worksheet at precisely 3:52:20 PM on January 25, 2006, it would return the value 38742.661342. Excel uses the 1900 date system, in which serial numbers correspond to the dates January 1, 1900, through December 31, 9999.

- The integer portion of this value, 38742, specifies January 25, 2006.
- The decimal portion of this entry, 661342, specifies 3:52:20 PM.

Today()

When you want to return the date only, use the TODAY() function. It returns the serial number of the current date.

Locking In the Current Date and Time

The result of any NOW() and TODAY() function is updated each time your worksheet is recalculated. Recalculation occurs every time you make a change in your worksheet. This means that every cell that contains one of these functions will display the date and/or time that the worksheet is recalculated — not the date and/or time the function was entered.

If you want to “freeze” the current value of either of these functions, use the Paste Special values method. Copy the cell, and select **EDIT > PASTE SPECIAL** from the menu. The following dialog will appear:

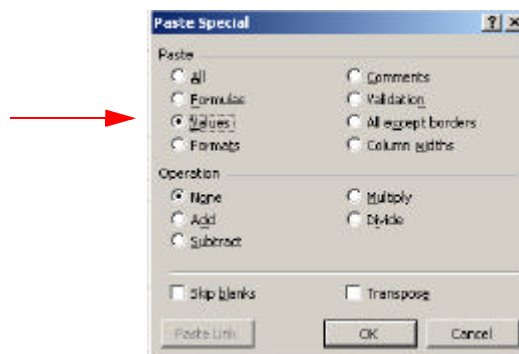


Figure 8-5 The Paste Special Dialog Box

This will cause Excel to replace the NOW() or TODAY() function with the current value of the function. Because it is no longer a function, it will not change when you subsequently recalculate the worksheet.



Use this shortcut:

Highlight the cell, press **F2** (Edit) and then press **F9** (Recalculate).

EXERCISE 8H

Exercise

1. Create a new file.
2. Enter =NOW() into any cell.
3. Enter =TODAY() into any cell.
4. Freeze either function by using Paste Special or the shortcut above.

THE DATEVALUE() FUNCTION AND DATE ARITHMETIC

When spreadsheets are created from database or text files, the result may be a spreadsheet with dates entered as text. The DateValue() function will convert these text dates into serial date values.

The syntax of this function is either of the following:

=DATEVALUE(text)

=DATEVALUE(cell reference of text date)

EXERCISE 8I

Exercise

1. Open the file named *DateValues.xls*.

Due Date (Text)	Due Date (Serial)	30 Days Overdue
January 20, 2001	=DATEVALUE(A5)	=B5+30
February 15, 2005		
December 30, 1999		
October 19, 2005		
September 26, 2005		
September 30, 2005		
October 1, 2003		
12/15/99		
1/31/2006		

2. In cell B5 enter a formula to convert the text date to the left into a serial value by typing =DateValue(A5).
3. Format the serial value by selecting **FORMAT > CELLS** and selecting the **NUMBER** tab. Choose one of the Date formats.
4. Copy the formula down.
5. In cell C5 enter a formula which will add 30 days to the Due Date by typing =B5+30.
6. Copy the formula down.

THE IF() FUNCTION

A commonly used function is the IF() function. The IF() function is one of the *logical* functions. It sets up a conditional statement to test data. For example, it may be created to perform one calculation if the condition is true, and perform another calculation if the condition is false.

The syntax for an IF() function is as follows. Notice that there are 3 arguments.

=IF(condition, true instruction, false instruction)

A conditional test is an equation that compares two numbers, functions, formulas, labels, or logical values.

The following condition operators can be used in an IF() function:

Operator	Definition
=	Equal to
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to
<>	Not equal to

Table 8-4 Conditional Operators

The following exercise will demonstrate the use of the IF() function. Column C displays the hours worked for 6 employees in one particular week. This company considers a regular work week to be 40 hours. Hours worked over that amount will earn the employee 1½ times the hourly wage.

You need a way to calculate how many overtime hours each employee worked. Subtracting 40 from the regular hours will only work if the employee worked at least 40 hours, otherwise a negative value will appear in the overtime hours column.

The IF() function will subtract 40 from the regular hours IF hours worked is 40 or more. Otherwise, the value for overtime hours will be 0.

Formulas and Functions

EXERCISE 8J

Exercise

1. Open the file called *if.xls*.

	A	B	C	D	E	F	G	H
1								
2	Employee Name	Hourly Rate	Hours Worked	Overtime Hours	Regular Hours	Overtime Pay	Regular Pay	Total
3								
4	Stevens	5.55	40					
5	Warren	12.25	45					
6	Walton	6.35	50					
7	Pfeffer	10.75	35					
8	Jones	8.85	42					
9	Jackson	9.00	20					
10								
11	TOTALS							
12								

2. One way to calculate overtime hours would be to subtract 40 from hours worked. The formula would be **C4-40** for the first employee.

	D4		=	C4-40		
	A	B	C	D	E	F
1						
2	Employee Name	Hourly Rate	Hours Worked	Overtime Hours	Regular Hours	Overtime Pay
3						
4	Stevens	5.55	40	0		
5	Warren	12.25	45			
6	Walton	6.35	50			
7	Pfeffer	10.75	35			
8	Jones	8.85	42			
9	Jackson	9.00	20			
10						
11	TOTALS					

=C4-40

This results in a correct answer of 0 overtime hours.

3. Copy the formula to the rest of the employees.

Notice the negative values when the value for **Hours Worked** is less than 40.

D7		=	=C7-40		
	A	B	C	D	E
1					
2	Employee Name	Hourly Rate	Hours Worked	Overtime Hours	Regular Hou
3					
4	Stevens	5.55	40	0	
5	Warren	12.25	45	5	
6	Walton	6.35	50	10	
7	Pfeffer	10.75	35	-5	
8	Jones	8.85	42	2	
9	Jackson	9.00	20	-20	
10					

negative values

The answer is to use a formula that subtracts 40 from **Hours Worked** only if hours worked is greater than 40.

4. Create an IF() function for the values in Column D (Overtime Hours).



The formula in cell **D4** should be:

=IF(C4>40,C4-40,0)

In other words:

=IF(hours worked greater than 40, subtract 40 from hours worked, otherwise overtime hours are 0)

Enter the necessary formulas to complete the example.

5. The formula in cell **E4** should be: **=C4-D4**
(hours worked minus overtime hours)
6. The formula in cell **F4** should be **=D4*B4*1.5**
overtime hours multiplied by hourly rate multiplied by 1.5
7. The formula in cell **G4** should be **=B4*E4**
regular hours multiplied by hourly rate

Formulas and Functions

8. The formula in cell **H4** should be **=F4+G4**
overtime pay plus regular pay
9. Highlight all of the formulas you just entered (see the next figure).

D4	=IF(C4>40,C4-40,0)							
	A	B	C	D	E	F	G	H
1								
2	Employee Name	Hourly Rate	Hours Worked	Overtime Hours	Regular Hours	Overtime Pay	Regular Pay	Total
3								
4	Stevens	5.55	40	0	40	0.00	222.00	222.00
5	Warren	12.25	45					
6	Walton	6.35	50					
7	Pfeffer	10.75	35					
8	Jones	8.85	42					
9	Jackson	9.00	20					
10								

click on fill handle at lower right

10. Drag the fill handle through row 9.

D4	=IF(C4>40,C4-40,0)							
	A	B	C	D	E	F	G	H
1								
2	Employee Name	Hourly Rate	Hours Worked	Overtime Hours	Regular Hours	Overtime Pay	Regular Pay	Total
3								
4	Stevens	5.55	40	0	40	0.00	222.00	222.00
5	Warren	12.25	45					
6	Walton	6.35	50					
7	Pfeffer	10.75	35					
8	Jones	8.85	42					
9	Jackson	9.00	20					
10								
11	TOTALS							

drag fill handle down through row 9

11. When you let go, all formulas will be copied.

	A	B	C	D	E	F	G	H
1								
2	Employee Name	Hourly Rate	Hours Worked	Overtime Hours	Regular Hours	Overtime Pay	Regular Pay	Total
3								
4	Stevens	5.55	40	0	40	0.00	222.00	222.00
5	Warren	12.25	45	5	40	91.88	490.00	581.88
6	Walton	6.35	50	10	40	95.25	254.00	349.25
7	Pfeffer	10.75	35	0	35	0.00	376.25	376.25
8	Jones	8.85	42	2	40	26.55	354.00	380.55
9	Jackson	9.00	20	0	20	0.00	180.00	180.00
10								

STATISTICAL FUNCTIONS

You can use **Excel's** built-in statistical functions to analyze a group (or *population*) of measurements. This section will cover the most often used statistical functions.

EXERCISE 8K

Exercise

The following exercise will demonstrate the use of statistical functions. All of the functions have only one argument: the range of cells.

1. Add the labels in cells **A12** through **A15** to the example you completed in the last exercise.

Add these labels →

	A	B	C	D	E
1					
2	Employee Name	Hourly Rate	Hours Worked	Overtime Hours	Regular Hours
3					
4	Stevens	5.55	40	0	40
5	Warren	12.25	45	5	40
6	Walton	6.35	50	10	40
7	Pfeffer	10.75	35	0	35
8	Jones	8.85	42	2	40
9	Jackson	9.00	20	0	20
10					
11	TOTALS	52.75	232.00	17.00	215.00
12	AVERAGE				
13	COUNT				
14	HIGHEST RATE				
15	LOWEST RATE				
16					

2. The function in cell B12 will calculate the average.
=AVERAGE(B4:B9)
3. The function in cell B13 will count the values in the range.
=COUNT(B4:B9)
4. The function in cell B14 will find the highest value in the range.
=MAX(B4:B9)
5. The function in cell B15 will find the lowest value in the range.
=MIN(B4:B9)

CONDITIONAL COUNTING WITH COUNTIF()

The COUNTIF function lets you count how many values in a range of cells match criteria you specify.

The COUNTIF function uses the following syntax:

=COUNTIF(range, criteria)

- The first argument is **range**, and this means the range of cells you want to count.
- The **criteria** is what you want Excel to look for when it is counting.

EXERCISE 8L

Exercise

You can use the COUNTIF function to count only the students whose grades are above 75.

1. Open the file called *countif.xls*.

	A	B	C	D	E	F	G	H	I	J
1	Test Scores									
2										
3		Laura	Martha	Marion	Joe	Moe	Larry	Curly	George	# Students Who Rec'd Grade Over 75
4	Math	76	89	43	48	51	76	87	56	
5	English	55	95	79	61	47	87	91	73	
6	Science	85	82	39	58	52	85	57	45	
7	History	45	91	56	72	49	56	78	56	
8	Geography	51	84	54	64	47	64	67	67	
9	Art	43	63	49	62	39	89	64	63	
10	Computer Studies	63	95	45	59	41	92	89	52	
11	French	35	91	65	26	28	51	92	56	
12										
13	Overall Average	54.1	85.0	53.6	56.3	44.3	72.5	78.1	58.5	
14										

2. Enter the following formula into cell J4.

=CountIf(B4:I4,">= 75")

This formula says, look in cells B4 to I4. Then check for a score of greater than or equal to 75. If you find this score, keep a **Count**.

3. So 4 students achieved a mark of 75 or above for Math. To do the rest of the scores, you can use AutoFill.

The following table demonstrates a variety of uses for the COUNTIF function. The formulas assume that you have a range called *table*. The

second argument can be a reference to a cell that contains the search criteria.

Formula	Return Value
=COUNTIF(table,12)	The number of cells that contain the value 12.
=COUNTIF(table,1)+COUNTIF(table,25)	The number of cells that contain 1 or 25.
=COUNTIF(table,"<0")	The number of cells that contain a negative number.
=COUNTIF(table,"<>0")	The number of nonzero values.
=COUNTIF(table,"yes")	The number of cells that contain the word <i>yes</i> (not case-sensitive).
=COUNTIF(table,"*")	The number of cells that contain any text.
=COUNTIF(table,"*s*")	The number of cells that contain the letter <i>s</i> (not case-sensitive).
=COUNTIF(table,"???")	The number of three-letter words.

Table 8-5 Examples of Common Uses for the COUNTIF Function

CONDITIONAL SUMMING WITH SUMIF()

You can calculate a total for rows that meet a specific criterion. The SUMIF function uses the following syntax:

=SUMIF(range, criteria,sum_range)

- The first argument is **range**, and this means the range of cells you want to sum.
- The **criteria** is the criteria in the form of a number, expression, or text that defines which cells will be added. For example, criteria can be expressed as 32, "32", ">32", "apples".
- **Sum_range** are the actual cells to sum. The cells in sum_range are summed only if their corresponding cells in range match the criteria. If sum_range is omitted, the cells in **range** are summed.

EXERCISE 8M

Exercise

In this example Total Production will be summed for employees broken down based on who their supervisor is, Moe, Larry, or Curly.

1. Open the file called *sumif.xls*.

	A	B	C	D	E	F	G	H	I
2	XYZ Productions								
3									
4									
5	Weekly Production Output								
6									
7	Employee Name	Supervisor	Pay Rate	Mon	Tue	Wed	Thu	Fri	Total Production
8	Dawson	Moe	\$ 7.50	89	76	0	73	54	292
9	Johns	Larry	\$ 8.75	74	86	58	60	46	324
10	Bronson	Moe	\$ 8.45	58	49	76	91	61	335
11	Martin	Moe	\$ 6.90	69	84	62	89	50	354
12	Parker	Curly	\$ 8.15	64	89	82	59	38	332
13	Stern	Curly	\$ 9.20	85	76	73	73	58	365
14	Reed	Moe	\$ 7.95	79	88	65	86	52	370
15	Welch	Curly	\$ 8.75	68	58	95	73	76	370
16	Summers	Moe	\$ 6.50	75	85	88	60	70	378
17	Roberts	Larry	\$ 9.45	65	94	84	81	67	391
18	Warren	Curly	\$ 10.25	91	67	94	85	75	412
19	Lewis	Larry	\$ 8.10	76	94	90	86	72	418
20									
21									
22	Total Production:				Shift 1 (Moe)	<input type="text"/>			
23					Shift 2 (Larry)	<input type="text"/>			
24					Shift 3 (Curly)	<input type="text"/>			
25									
26									

2. Enter the following formula into cell G22:

=SUMIF(B8:B19,"Moe",I8:I19)

3. Enter the following formula into cell G23:

=SUMIF(B8:B19,"Larry",I8:I19)

4. Enter the following formula into cell G24:

=SUMIF(B8:B19,"Curly",I8:I19).

Instead of typing the criterion in a formula, you can refer to a cell. For example, the formula in step 2 above could be changed to:

=SUMIF(B8:B19,E22,I8:I19)

if cell E22 contained the text "Moe"

USING RANGE NAMES IN FORMULAS

When you create a formula that refers to data in a worksheet, you can use the column and row labels in the worksheet to refer to the data. In the last chapter, **Range Names and Sorting**, you saw how to use column and row labels to name ranges.

EXERCISE 8N

Exercise

Follow these steps to see how you can use the range names in formulas:

1. Return to the spreadsheet *range_names.xls*.
2. Remember that you created the following range names in Chapter 6:
 - John
 - Paul
 - George
 - Ringo
 - Jan
 - Feb
 - Mar
3. Select cell **E7** and enter `=sum(john)`.

	A	B	C	D	E	F
4						
5						
6		JAN	FEB	MAR	Total	
7	John	234.34	453.88	377.99	=SUM(John)	
8	Paul	456.56	422.19	298.14		
9	George	523.77	511.12	386.55		
10	Ringo	118.66	255.00	499.02		
11	Total					
12						

4. When you press **ENTER**, notice the result. **Excel** has calculated the sum of all the cells in the range “John.”

E7	=SUM(John)					
	A	B	C	D	E	F
4						
5						
6		JAN	FEB	MAR	Total	
7	John	234.34	453.88	377.99	1,066.21	
8	Paul	456.56	422.19	298.14		
9	George	523.77	511.12	386.55		
10	Ringo	118.66	255.00	499.02		
11	Total					
12						

Formulas and Functions

5. Select cell **E8** and enter =sum(paul)
6. Select cell **E9** and enter =sum(george)
7. Select cell **E10** and enter =sum(ringo)
8. Your spreadsheet should look like this.

	A	B	C	D	E	F
4						
5						
6		JAN	FEB	MAR	Total	
7	John	234.34	453.88	377.99	1,066.21	
8	Paul	456.56	422.19	298.14	1,176.89	
9	George	523.77	511.12	386.55	1,421.44	
10	Ringo	118.66	255.00	499.02	872.68	
11	Total	=SUM(JAN)				
12						

9. Select cell **B11** and enter =sum(jan)
10. Select cell **C11** and enter =sum(feb)
11. Select cell **D11** and enter =sum(mar)
12. Note that you can also combine the column/row headings in a cell reference. Select any blank cell and type =feb paul.

G7		=FEB Paul						
	A	B	C	D	E	F	G	H
3								
4								
5								
6		JAN	FEB	MAR	Total			
7	John	234.34	453.88	377.99	1,066.21		422.19	
8	Paul	456.56	422.19	298.14	1,176.89			
9	George	523.77	511.12	386.55	1,421.44			
10	Ringo	118.66	255.00	499.02	872.68			
11	Total	1333.33						
12								
13								

Notice that the cell references the intersection of the **Paul** and **FEB** ranges. You can use this cell reference anywhere in the spreadsheet.

THE VLOOKUP() FUNCTION

The look-up and reference functions provided in **Excel** enable you to access cells on your worksheet by address, row, and column. You can use these functions to look up information that is in a table format.

The syntax for a VLOOKUP() function is as follows. Notice that there are 4 arguments.

**=VLOOKUP(value to be looked up, range of lookup list,
column number, look up closest value)**

The fourth argument is an optional one. Enter **0** for that argument if you want **Excel** to look up the exact match for the lookup value. Omit the fourth argument and **Excel** will look up the closest match to the lookup value.

EXERCISE 80

Exercise

The following example will illustrate the look of the VLOOKUP function. This spreadsheet contains a table of information in cells **A12:G22**.

There is also an entry area in cell **C3**. You will create formulas in rows 5 through 9 so that whenever an **ID #** is entered in the yellow area (cell **C3**), the appropriate information from the table (with range name *company_list*) is filled into the blue area (rows 5 through 10).

1. Open the spreadsheet named *vlookup.xls*.

	A	B	C	D	E	F	G
1							
2							
3		Enter Customer ID#					
4							
5		Company Name					
6		Street					
7		City, State, Zip					
8							
9		Phone					
10							
11							
12	ID#	Company Name	Street	City	State	Zip	Phone
13	119	ABC Corp.	12 Main Street	Boston	MA	01338	617-832-9900
14	120	Arnie's Eats	72 Beantown Avenue	New York	NY	10021	212-992-8457
15	122	RTC, Inc.	666 Hunger Lane	Trenton	NJ	08035	609-364-5577
16	137	ATT	800 Collings Drive	Philadelphia	PA	23885	215-755-3141
17	298	Forest Hills	10 Peaceful Lane	Chicago	IL	48339	312-777-6363
18	303	IBM	82 Eyemso Blue Street	Albany	NY	13481	518-667-2500
19	321	Fido Trust	22 Gold Street	Mobile	AL	37999	205-998-1200
20	457	Kintara's	450 Suffolk Street	Sacramento	CA	97624	415-888-1022
21	532	Stamper's	79 Canal Street	San Antonio	TX	78209	512-777-1234
22	766	Agway	173 Stockhome Avenue	St. Louis	MO	57384	314-882-9100

2. In cell **C5** type the following: `=VLOOKUP(C3,company_list,2,0)`
 - the first argument, **C3**, tells **Excel** to look in that cell for the ID#
 - the second argument, **company_list**, tells **Excel** to look up the ID# number in that range
 - the third argument, **2**, tells **Excel** to look up the information from column number 2 in the list (Company Name).
 - the fourth argument, **0**, tells **Excel** it needs to find the exact match to the ID (not the closest match)
3. In cell **C6** type the following: `=VLOOKUP(C3,company_list,3,0)`
 - the first argument, **C3**, tells **Excel** to look in that cell for the ID#
 - the second argument, **company_list**, tells **Excel** to look up the ID# number in that range
 - the third argument, **3**, tells **Excel** to look up the information from column number 3 in the list (Street)
 - the fourth argument, **0**, tells **Excel** it needs to find the exact match to the ID (not the closest match)



You should probably see #N/A where you typed the formulas. This is because cell **C3** does not contain a value yet.

4. In cell **C7** type the following: `=VLOOKUP(C3,company_list,4,0)`
 - the first argument, **C3**, tells **Excel** to look in that cell for the ID#,
 - the second argument, **company_list**, tells **Excel** to look up the ID# number in that range
 - the third argument, **4**, tells **Excel** to look up the information from column number 4 in the list (City)
 - the fourth argument, **0**, tells **Excel** it needs to find the exact match to the ID (not the closest match)
5. In cell **D7** type the following: `=VLOOKUP(C3,company_list,5,0)`
 - the first argument, **C3**, tells **Excel** to look in that cell for the ID#
 - the second argument, **company_list**, tells **Excel** to look up the ID# number in that range
 - the third argument, **5**, tells **Excel** to look up the information from column number 5 in the list (State)

- the fourth argument, **0**, tells **Excel** it needs to find the exact match to the ID (not the closest match)
6. In cell **E7** type the following: **=VLOOKUP(C3,company_list,6,0)**
- the first argument, **C3**, tells **Excel** to look in that cell for the ID#
 - the second argument, **company_list**, tells **Excel** to look up the ID# number in that range
 - the third argument, **6**, tells **Excel** to look up the information from column number 6 in the list (Zip)
 - the fourth argument, **0**, tells **Excel** it needs to find the exact match to the ID (not the closest match)
7. In cell **C9** type the following: **=VLOOKUP(C3,company_list,7,0)**
- the first argument, **C3**, tells **Excel** to look in that cell for the ID#
 - the second argument, **company_list**, tells **Excel** to look up the ID# number in that range
 - the third argument, **7**, tells **Excel** to look up the information from column number 6 in the list (Phone)
 - the fourth argument, **0**, tells **Excel** it needs to find the exact match to the ID (not the closest match)

Your spreadsheet should look something like the following:

C9		=VLOOKUP(C3,company_list,7)				
	A	B	C	D	E	F
1						
2						
3		Enter Customer ID#				
4						
5		Company Name	#N/A			
6		Street	#N/A			
7		City, State, Zip	#N/A	#N/A	#N/A	
8						
9		Phone	#N/A			
10						
11						
12	ID#	Company Name	Street	City	State	Zip
13	119	ABC Corp.	12 Main Street	Boston	MA	01338
14	120	Arnie's Eats	72 Beantown Avenue	New York	NY	10021
15	122	PTC, Inc.	666 Hunger Lane	Trenton	NJ	08635

8. Now choose one of the ID numbers in the list and type it into cell C3.

Watch how the information gets filled in.

Enter Customer ID#

Company Name

Street

City, State, Zip

Phone

ID#	Company Name	Street	City	State	Zip	Phone
119	ABC Corp.	12 Main Street	Boston	MA	01338	617-832-9900
120	Arnie's Eats	72 Beantown Avenue	New York	NY	10021	212-992-8457
122	RTC, Inc.	666 Hunger Lane	Trenton	NJ	08035	609-364-5577
137	ATT	800 Collings Drive	Philadelphia	PA	23885	215-755-3141
298	Forest Hills	10 Peaceful Lane	Chicago	IL	48339	312-777-6363
303	IBM	82 Eyemso Blue Street	Albany	NY	13481	518-667-2500
321	Fido Trust	22 Gold Street	Mobile	AL	37999	205-998-1200
457	Kintara's	450 Suffolk Street	Sacramento	CA	97624	415-888-1022
532	Stamper's	79 Canal Street	San Antonio	TX	78209	512-777-1234
766	Agway	173 Stockhome Avenue	St. Louis	MO	57384	314-882-9100

9. If you type another ID number into cell C3, the lookup information in the blue area will be replaced.

THE HLOOKUP() FUNCTION

The only difference between VLOOKUP() and HLOOKUP() is the layout of the lookup table. If the lookup values are contained in the first row across rather than the first column down, you use HLOOKUP() instead.

The syntax for a HLOOKUP() function is as follows. Notice that there are 4 arguments.

=HLOOKUP(value to be looked up, range of lookup list, row number, look up closest value)

EXERCISE 8P

Exercise

The following example will illustrate the look of the HLOOKUP function. This spreadsheet contains a table of information in cells **A6:G17**. It also contains a dropdown data validation list in cell C2 which contains the month names. Selecting a month from cell C2 will cause the values in the range E20:e28 to change.

1. Open the spreadsheet named *hlookup.xls*.

Expense	JAN	FEB	MAR	APR	MAY	JUN
Salaries	4,500	4,800	5,180	6,000	6,650	700
Payroll Taxes	450	480	518	600	685	600
Insurance	100	200	300	400	500	600
Advertising	750	1,000	600	800	750	500
Auto/Truck	250	253	276	289	304	319
Office Supplies	150	170	175	180	200	250
Telephone	250	250	310	325	350	380
Utilities	300	330	363	399	439	450
Total	6,750	7,533	7,622	8,893	9,659	3,799

	FEB
Salaries	4,800
Payroll Taxes	480
Insurance	200
Advertising	1,000
Auto/Truck	253
Office Supplies	170
Telephone	250
Utilities	330
Total	7,533

The formulas have already been entered for you in range E20:E28.

```

E20      =HLOOKUP($C$2,$A$7:$G$15,1,0)
E21      =HLOOKUP($C$2,$A$7:$G$15,2,0)
E22      =HLOOKUP($C$2,$A$7:$G$15,3,0)
E23      =HLOOKUP($C$2,$A$7:$G$15,4,0)
E24      =HLOOKUP($C$2,$A$7:$G$15,5,0)
E25      =HLOOKUP($C$2,$A$7:$G$15,6,0)
E26      =HLOOKUP($C$2,$A$7:$G$15,7,0)
E27      =HLOOKUP($C$2,$A$7:$G$15,8,0)
E28      =HLOOKUP($C$2,$A$7:$G$15,9,0)

```

2. Use the drop-down arrow to the right of cell C2 to select a month from the list.
3. Notice the values in the range E20:E29 change.

FORMULAS REFERENCING MULTIPLE SHEETS

This section discusses various ways to link data between different sheets, whether they are in the same workbook or different workbooks.

Term	Definition
3-D Reference	A reference to another sheet in the current workbook. These references are updated automatically when Excel recalculates the workbook.
Source Document	When linking different files, this document contains the source data.
Dependent Document	When linking different files, the dependent document is the one that relies on data in other documents.
External Reference	A cell reference that refers to cells in a different workbook.
Remote Reference	A remote reference refers to data in a file that was created by an application other than Excel. This data might be graphic data from a drawing program or word processing data.

Table 8-6 Linked Data Terms

3D References

Just as you can perform calculations on two-dimensional ranges, you can create formulas that span worksheets. In this example, you will see how you can use multiple sheets in a workbook for details and then summarize them in yet another sheet.

EXERCISE 8Q

Exercise

1. Open the spreadsheet named *rollup.xls*.

rollup.xls

	A	B	C	D	E	F	G
1	Northern Region						
2							
3							
4		January	February	March	April	May	June
5							
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561
11							
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669
13							
14							
15							
16							

Sheet tabs

Northern Southern Eastern Western Total

- The sheet tabs along the bottom indicate that there are sheets for Southern, Eastern, and Western divisions of this company. In addition, there is a Total sheet. Click on the tabs to see each one. Following is the Total sheet.

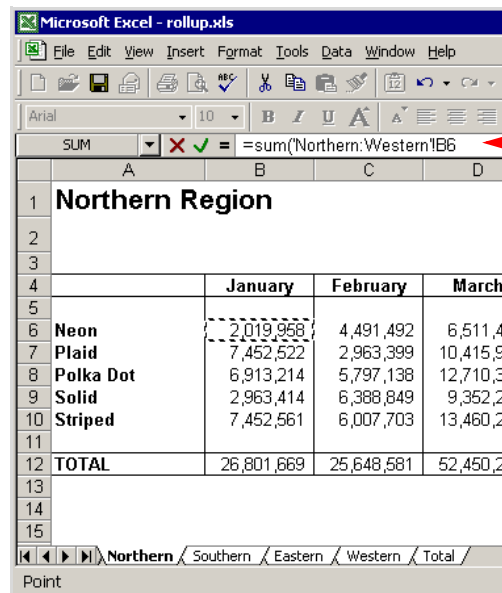
	January	February	March	April	May	June
Neon						
Plaid						
Polka Dot						
Solid						
Striped						
TOTAL	-	-	-	-	-	-

- Select Cell B6 in the Totals sheet. Type = sum(
- Immediately after typing the opening parenthesis, click on the Northern tab and select cell B6. Your spreadsheet should look like this:

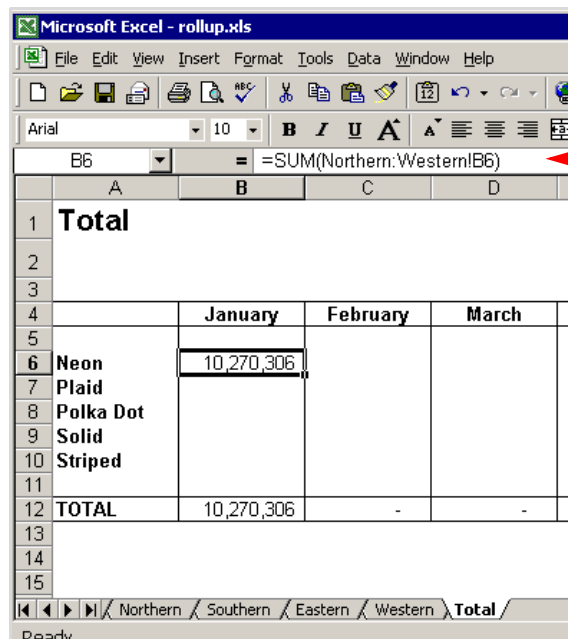
	January	February	March
Neon	2,019,958	4,491,492	6,511,4
Plaid	7,452,522	2,963,399	10,415,9
Polka Dot	6,913,214	5,797,138	12,710,3
Solid	2,963,414	6,388,849	9,352,2
Striped	7,452,561	6,007,703	13,460,2
TOTAL	26,801,669	25,648,581	52,450,2

Press Shift key and click on Western tab

- Hold down the **SHIFT** key and click on the **Western** tab.



- Make sure that the formula bar contains the following:
=sum('Northern:Western'!B6)
- Press **ENTER**. Notice that the **Total** tab reappears with the completed formula, which now contains the closing parenthesis.





Note This formula calculates the sum of cell **Northern B6** through **Western B6**. It is basically a 3D formula.

8. Copy this formula down and across to complete the **Total** spreadsheet.

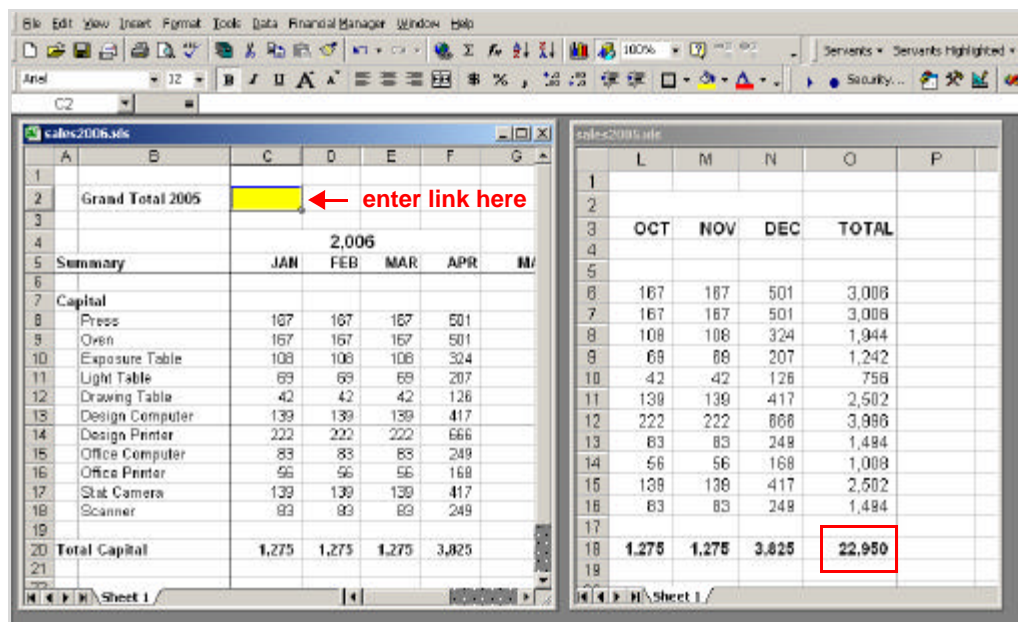
Referencing Multiple Files

To link workbooks, the easiest method is by using the mouse. Make sure that the file with the cell you want linked is open. When you get to the point in the formula where you need to enter a cell reference from the other workbook, click the appropriate cell and continue with the formula. Excel inserts the complete reference, including the sheet name, into the Formula Bar.

EXERCISE 8R

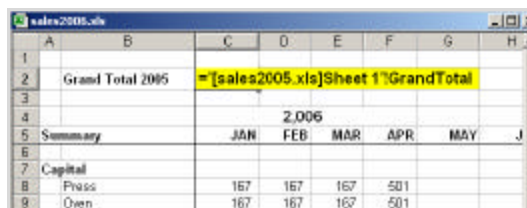
Exercise

1. Open the files names *Sales2005.xls* and *Sales2006.xls*.
2. Use the **WINDOW** menu to arrange them next to one another.



3. Select cell **C2** in the *Sales2005* file and start typing a formula by clicking on the = symbol.

- Now click on cell O18 in the *Sales2005* file and press **ENTER**. Cell O18 has been given the name **GrandTotal**. Your formula should look like this:



The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H
1								
2		Grand Total 2005	=[sales2005.xls]Sheet 1!GrandTotal					
3								
4				2,006				
5	Summary		JAN	FEB	MAR	APR	MAY	J
6								
7	Capital							
8	Press		167	167	167	501		
9	Oven		167	167	167	501		

After you press **ENTER**, Excel returns to the file that contained the formula, and the data from the other file now appears in the cell. This data is said to be *dynamic*. In other words, if you change the source cell, the destination cell (which contains the formula) instantly changes to reflect the new number.

Also, as you can see, Excel entered the formula in the format:

=[WorkbookFilename]SheetName!CellOrRangeName

When the workbook you want to reference is not open in Excel, the full path name of the workbook is added to the beginning of the reference, as in the following example:

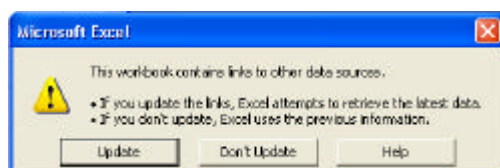
= 'C:\MyData\Sales2005.xls'!GrandTotal



Make sure that the entire sequence of path name, workbook file name, and sheet name is enclosed with single quote marks before the exclamation point.

Also, if the workbook you are linking is located in the same directory as the dependent workbook, you do not need to type the path name.

When opening a workbook that contains links to other Excel workbooks you see the following message:



- If you click on **YES**, Excel automatically goes into the referenced workbooks to find the most recent data and updates all the formulas that access that data.

- If you select **No**, Excel simply shows you the most recent answer that was stored the last time you save the dependent workbook. The links to the other workbook are still present, but are not necessarily accurate if the other workbooks are updated. You might want to choose the No button when you are working with a very large workbook that contains many links to many different workbooks. If you don't need the most current data, you can save time by telling Excel to skip the update process.

USING #N/A AS A PLACEHOLDER

You may have seen the #N/A error when a required value is not available. It often occurs in the various lookup functions.

However, you can use the #N/A error to your advantage. #N/A is the error value that means “no value is available.”

For example, if you are building a worksheet that already contains calculations on a range of data that is incomplete, you can enter #N/A manually into cells that do not yet contain data, but that will at some later point.

After you have entered #N/A into a cell, formulas and functions that refer to that data will return #N/A instead of trying to calculate results based on erroneous or incomplete data. In this way, the #N/A entry and value becomes a sort of placeholder during the process of building a worksheet.

When a formula refers to a cell containing #N/A, the formula returns the #N/A error value.

Excel includes an =NA() function that accomplishes the same thing. It is provided for compatibility with other spreadsheet programs (like @NA in Lotus 123).

EXERCISE 8S

Exercise

1. Open the spreadsheet named *na.xls*.

	A	B	C	D	E	F	G	H
1	Budget							
2								
3		JAN	FEB	MAR	APR	MAY	JUN	Totals
4								
5	Income	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$15,000.00
6								
7	Food	350.00	490.00	455.00	428.75	542.50	490.00	2,756.25
8	Car Loan	350.00	350.00	350.00	350.00	350.00	350.00	2,100.00
9	Insurance	210.00	210.00	210.00	210.00	210.00	210.00	1,260.00
10	Phone	131.25	81.25		122.50	96.25	113.75	525.00
11	Rent	875.00	875.00	875.00	875.00	875.00	875.00	5,250.00
12	Electric	113.75	96.25	145.25	157.50	122.50	145.25	780.50
13								
14	Net Income	\$ 470.00	\$ 417.50	\$ 464.75	\$ 356.25	\$ 303.75	\$ 316.00	\$ 2,328.25
15								
16	40% Credit Union	\$ 188.00	\$ 167.00	\$ 185.90	\$ 142.50	\$ 121.50	\$ 126.40	\$ 931.30
17	60% Bank Account	\$ 282.00	\$ 250.50	\$ 278.85	\$ 213.75	\$ 182.25	\$ 189.60	\$ 1,396.95
18								

Notice that the value in cell D10 is missing. On a small spreadsheet like this one, the missing value is easy to spot. However, it might get lost on a larger spreadsheet and any totals or calculations would be incomplete.

2. Enter #N/A into cell D10. (You could alternately enter =NA().)

	A	B	C	D	E	F	G	H
1	Budget							
2								
3		JAN	FEB	MAR	APR	MAY	JUN	Totals
4								
5	Income	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$15,000.00
6								
7	Food	350.00	490.00	455.00	428.75	542.50	490.00	2,756.25
8	Car Loan	350.00	350.00	350.00	350.00	350.00	350.00	2,100.00
9	Insurance	210.00	210.00	210.00	210.00	210.00	210.00	1,260.00
10	Phone	131.25	81.25	#N/A	122.50	96.25	113.75	#N/A
11	Rent	875.00	875.00	875.00	875.00	875.00	875.00	5,250.00
12	Electric	113.75	96.25	145.25	157.50	122.50	145.25	780.50
13								
14	Net Income	\$ 470.00	\$ 417.50	#N/A	\$ 356.25	\$ 303.75	\$ 316.00	#N/A
15								
16	40% Credit Union	\$ 188.00	\$ 167.00	#N/A	\$ 142.50	\$ 121.50	\$ 126.40	#N/A
17	60% Bank Account	\$ 282.00	\$ 250.50	#N/A	\$ 213.75	\$ 182.25	\$ 189.60	#N/A
18								

Figure 8-6 The #N/A Value at Work

Notice that every formula that depends somehow on that missing value is flagged. This will remind you that a value still needs to be provided for the worksheet to be complete.

USING ISERROR()

This function is used to locate errors in formulas. It returns a logical TRUE if any of the error values (#N/A, #VALUE, #REF, #DIV/0!, #NUM, #NAME?, or #NULL) appear in the cell.

You might need to include formulas in a worksheet that will require the sheet to be completed by a user before they will display a correct result. In this case, you could have error values throughout the spreadsheet until you get all the necessary input. The most common workaround to suppress #DIV/0! and other errors is to apply the ISERROR function.

EXERCISE 8T

Exercise

1. Open the spreadsheet named *IsError.xls*.

	A	F	G	H	I	J	K	L	M
1	Northern								
2									
3									
4		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
5									
6	Neon	336.66	202.00						
7	Plaid	222.25	745.25						
8	Polka Dot	434.79	691.32						
9	Solid	479.16	296.34						
10	Striped	450.58	745.26						
11									
12	TOTAL	1,923.64	2,680.17	-	-	-	-	-	-
13	AVERAGE	384.73	536.03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14									

Notice that the average calculations produce an error for data that has not yet been entered. A solution would be to suppress the error.

2. Enter the following formula into cell H13 (case does not matter):

=IF(IsError(Average(H6:H10)),"No Data",Average(H6:H10))

This would say if the average of cells H6:H13 causes an error, then make the value in the cell equal to “No Data.” Otherwise (ELSE), make it whatever the average of cells H6:H13 really should be.

3. If you prefer the cell to remain blank, place an empty string in place of the text using empty double quotes. That formula would be

=IF(IsError(Average(H6:H10)),"",Average(H6:H10))

4. Copy the formula across to remove the error message and make the result more “user friendly.”

POINTS TO REMEMBER

- **Excel** has the ability to calculate the value of a cell based on values in other cells. This is accomplished by *formulas*.
- All formulas begin with an *equals sign* (=).
- Cell reference tells **Excel** where to get the values on which the calculations will be made.
- A function is a built-in formula that performs a special calculation automatically.
- **Excel** categorizes functions into the following groups:
 - Financial
 - Date & Time
 - Math & Trigonometry
 - Statistical
 - Lookup & Reference
 - Database
 - Text
 - Logical
 - Information
 - Engineering
- The information you provide to a function is called an *argument*. Each function includes a predetermined set of arguments, always separated by commas.
- When the **AUTOSUM** button is clicked, the entire formula is inserted for you and **Excel** suggests a range to sum. You can use the **AUTOSUM** button on more than one cell at a time.
- When you copy formulas, the cell references adjust for you.
- In some cases, a value in a formula must remain constant when copied to other locations. This is referred to as *absolute* addressing. You use the dollar symbol (\$) in a formula to indicate an absolute reference.
- **Excel's** Function Wizard is an easy way to enter a built-in function.
- The **PMT()** function calculates the payment required to pay back a loan in a specified period of time. Its syntax is **=PMT(rate, number of periods, present value, future value, type)** The last two arguments are optional.

- The NOW() and TODAY() functions allow you to enter the current date and time into your worksheets.
- The DateValue() function will convert text dates into serial date values.
- You can add and subtract from dates to calculate such things as overdue and late payments
- The IF() function sets up a conditional statement to test data. The syntax for an IF() function is as follows: **=IF(condition, true instruction, false instruction)**
- You can use **Excel's** built-in statistical functions to analyze a group (or *population*) of measurements.
- The COUNTIF() function lets you count how many values in a range of cells match criteria you specify. The syntax for this function is **=COUNTIF(range, criteria)**
- The SUMIF() function can calculate a total for rows that meet a specific criterion. The syntax for this function is **=SUMIF(range, criteria, sum_range)**
- When you create a formula that refers to data in a worksheet, you can use column and row labels to name the ranges referred to
- The look-up and reference functions provided in **Excel** enable you to access cells on your worksheet by address, row, and column. You can use these functions to look up information that is in a table format.
- The syntax for a VLOOKUP() function is as follows.
=VLOOKUP(value to be looked up, range of lookup list, column number, look up closest value) The fourth argument is an optional one.
- Use the HLOOKUP() function when your data is spread horizontally instead of vertically. Its syntax is as follows: **=HLOOKUP(value to be looked up, range of lookup list, row number, look up closest value)** The fourth argument is an optional one.
- Just as you can perform calculations on two-dimensional ranges, you can create formulas that span worksheets.

- You can use the #N/A error value in a spreadsheet to flag the fact that “no value is yet available.” After you have entered #N/A into a cell, formulas and functions that refer to that data will return #N/A instead of trying to calculate results based on erroneous or incomplete data.
- Use the ISERROR() function to suppress the display of certain error messages.

Formatting the Spreadsheet

CHAPTER 9

Setting up a worksheet, entering the data, getting all the formulas to work, and structuring the worksheet in a useful way are usually only half the battle. Before you can use **Excel** to share information with others, you must be able to format the worksheet so you can communicate quickly and effectively.

Note



You can make many formatting changes with the Toolbars. This chapter will demonstrate features sometimes using the menus and sometimes using shortcuts. You will find that you develop your own preferences.

FORMATTING NUMBERS AND DATES

One of the best ways to improve the readability of your worksheets is to display your data in a format that is logical, consistent and straightforward. Formatting currency amounts with leading dollar signs, percentages with trailing percent signs, and large numbers with commas to separate thousands are a few of the ways you can improve your spreadsheet style.

Numeric Display

The quickest way to format your numbers is to specify the format in the formula bar. For example, if you begin a dollar amount with a dollar sign (\$), **Excel** automatically formats the number as currency. Similarly, if you type a percent sign (%) after a number, **Excel** automatically formats the number as a percentage.

When you create a worksheet, each cell uses this format, known as the **General** number format, by default. If you would like your numbers to appear differently, you can choose from among the other built-in numeric formats.

Formatting the Spreadsheet

Follow these steps to format the exercise you created in the previous chapter.

EXERCISE 9A

Exercise

1. Your spreadsheet should look something like this:

	A	B	C	D	E	F	G	H	I
1									
2	Employee Nam	Hourly Rate	Hours Worked	Overtime Hours	Regular Hours	Overtime Pay	Regular Pay	Total	
3									
4	Stevens	5.55	40	0	40	0	222	222	
5	Warren	12.25	45	5	40	61.25	490	551.25	
6	Walton	6.35	50	10	40	63.5	254	317.5	
7	Pfeffer	10.75	35	0	35	0	376.25	376.25	
8	Jones	8.85	42	2	40	17.7	354	371.7	
9	Jackson	9	20	0	20	0	180	180	
10									
11	TOTALS	52.75	232	17	215	142.45	1876.25	2018.7	
12	AVERAGE	8.7916667	38.66666667	2.833333333	35.83333333	23.74166667	312.7083333	336.45	
13	COUNT	6	6	6	6	6	6	6	
14	HIGHEST RATE	12.25	50	10	40	63.5	490	551.25	
15	LOWEST RATE	5.55	20	0	20	0	180	180	
16									
17									

2. Select the following non-adjacent cells.

	A	B	C	D	E	F	G	H	I
1									
2	Employee Nam	Hourly Rate	Hours Worked	Overtime Hours	Regular Hours	Overtime Pay	Regular Pay	Total	
3									
4	Stevens	5.55	40	0	40	0	222	222	
5	Warren	12.25	45	5	40	61.25	490	551.25	
6	Walton	6.35	50	10	40	63.5	254	317.5	
7	Pfeffer	10.75	35	0	35	0	376.25	376.25	
8	Jones	8.85	42	2	40	17.7	354	371.7	
9	Jackson	9	20	0	20	0	180	180	
10									
11	TOTALS	52.75	232	17	215	142.45	1876.25	2018.7	
12	AVERAGE	8.7916667	38.66666667	2.833333333	35.83333333	23.74166667	312.7083333	336.45	
13	COUNT	6	6	6	6	6	6	6	
14	HIGHEST RATE	12.25	50	10	40	63.5	490	551.25	
15	LOWEST RATE	5.55	20	0	20	0	180	180	
16									

**use the Control key
to select more than one range**

3. Select the **FORMAT > CELLS** option from the menu and click on the **NUMBER** tab. Select the **Number** option from the **Category** list.

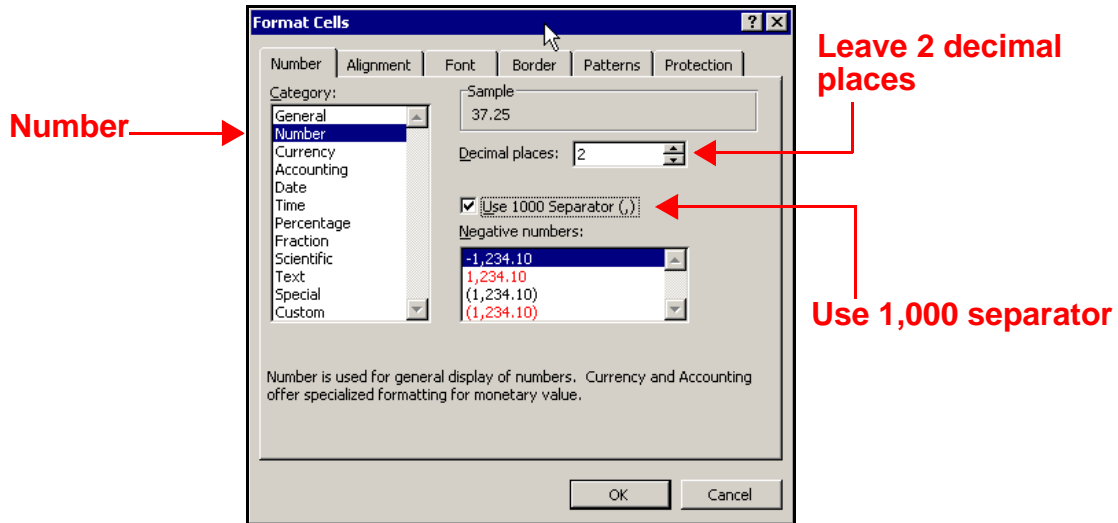


Figure 9-1 The Format Cell dialog — Number tab

4. When you click **OK** the number format will be applied.

	A	B	C	D	E	F	G	H
1								
2	Employee Nam	Hourly Rate	Hours Worked	Overtime Hours	Regular Hours	Overtime Pay	Regular Pay	Total
3								
4	Stevens	5.55	40	0	40	0.00	222.00	222.00
5	Warren	12.25	45	5	40	61.25	490.00	551.25
6	Walton	6.35	50	10	40	63.50	254.00	317.50
7	Pfeffer	10.75	35	0	35	0.00	376.25	376.25
8	Jones	8.85	42	2	40	17.70	354.00	371.70
9	Jackson	9.00	20	0	20	0.00	180.00	180.00
10								
11	TOTALS	52.75	232.00	17.00	215.00	142.45	1,876.25	2,018.70
12	AVERAGE	8.79	38.67	2.83	35.83	23.74	312.71	336.45
13	COUNT	6.00	6.00	6.00	6.00	6.00	6.00	6.00
14	HIGHEST RATE	12.25	50.00	10.00	40.00	63.50	490.00	551.25
15	LOWEST RATE	5.55	20.00	0.00	20.00	0.00	180.00	180.00
16								

Notice that the values in those ranges are now consistently formatted to 2 decimal places.

Date Formats

If you include dates or times in your worksheets, you need to make sure that they are presented in a readable format. For example, most people would interpret the date 8/5/99 as August 5, 1999. However, there are countries where this date would mean May 8, 1999. Similarly, if you use the time 2:45, do you mean AM or PM?

To avoid these kinds of problems, you can use the **Excel** built-in date and time formats.

EXERCISE 9B

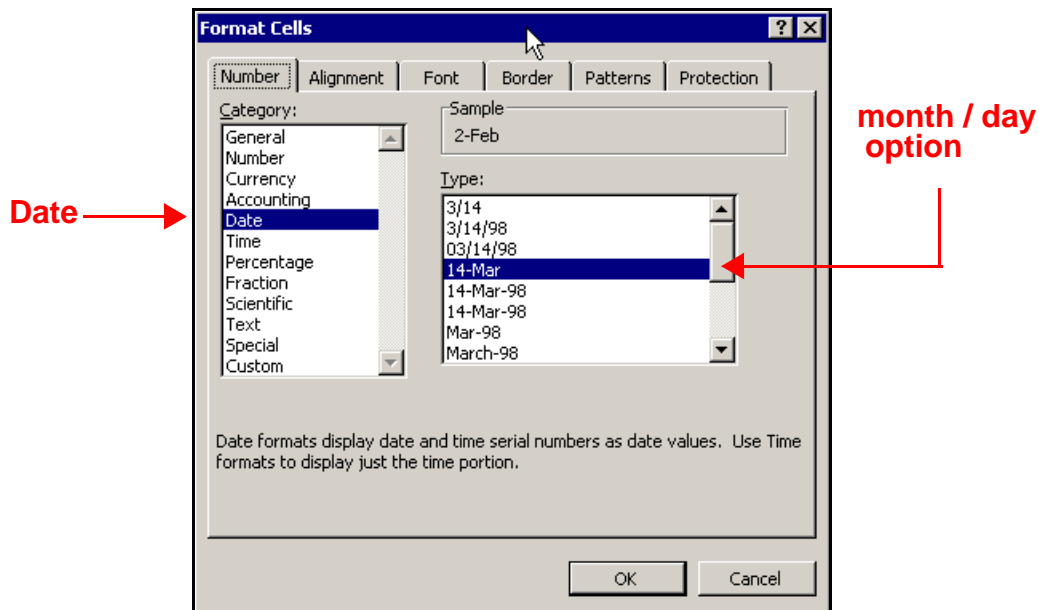
Exercise

Follow these steps to add and format a date.

1. Enter the text **Week Ending** in cell **A18**.
2. Enter **2/2/2001** in cell **B18**:

	A	B	C
1			
2	Employee Name	Hourly Rate	Hours Worked
3			
4	Stevens	5.55	
5	Warren	12.25	
6	Walton	6.35	
7	Pfeffer	10.75	
8	Jones	8.85	
9	Jackson	9.00	
10			
11	TOTALS	52.75	
12	AVERAGE	8.79	
13	COUNT	6.00	
14	HIGHEST RATE	12.25	
15	LOWEST RATE	5.55	
16			
17			
18	Week Ending	2/2/2001	
19			

3. Highlight cell **B18**, select the **FORMAT > CELLS** option, and the **NUMBER** tab. Make the following choices and click **OK**.



The spreadsheet should now look something like this:

	A	B	C
1			
2	Employee Nam	Hourly Rate	Hours Wor
3			
4	Stevens	5.55	
5	Warren	12.25	
6	Walton	6.35	
7	Pfeffer	10.75	
8	Jones	8.85	
9	Jackson	9.00	
10			
11	TOTALS	52.75	20
12	AVERAGE	8.79	3
13	COUNT	6.00	
14	HIGHEST RATE	12.25	8
15	LOWEST RATE	5.55	2
16			
17			
18	Week Ending	2-Feb	
19			

← Date format changed

TEXT FORMATTING

The characters that you enter into your **Excel** worksheets have a number of attributes:

- the typeface
- the type size
- the type style

Taken all together, these attributes define the character's *font*. You can set all the font attributes from the **Font** dialog box.

EXERCISE 9C

Exercise

Follow these steps to change the font formatting of your spreadsheet.

1. Open the spreadsheet called **formatting.xls**.

	A	B	C	D	E	F	G	H
1	Northern Region							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958	
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522	
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214	
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414	
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561	
11								
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669	
13								

2. Highlight the following non-adjacent ranges:

	A	B	C	D	E	F	G	H
1	Northern Region							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958	
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522	
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214	
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414	
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561	
11								
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669	
13								

3. Click on the **BOLD** button on the toolbar.

4. Now select cell **A1**, and select the **FORMAT > CELLS** command from the menu.

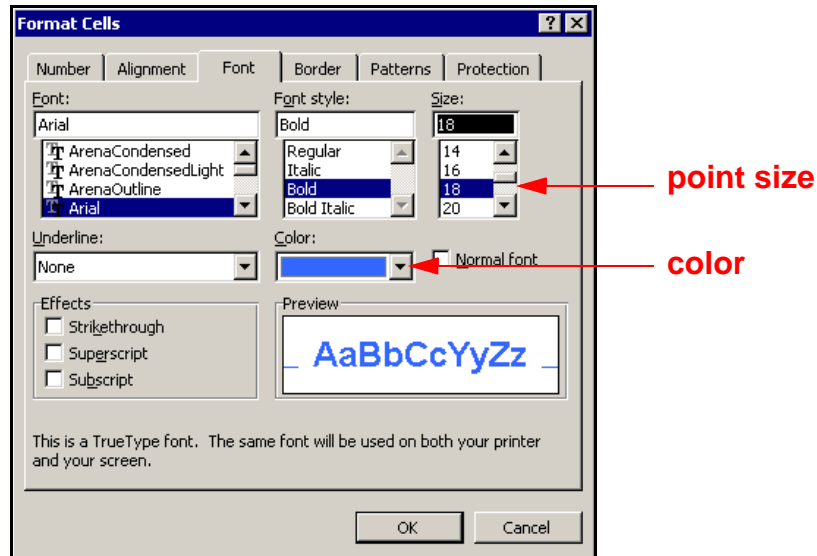


Figure 9-2 The Format Font Dialog Box

5. Change the size to 18 and the color to blue. Then click **OK**.

CELL ALIGNMENT

When you place data into an unformatted cell, **Excel** aligns text entries with the left edge of the cell, numbers and dates with the right edge of the cell, and error and logical values in the center of the cell.

This is the default General alignment scheme. Although this format is useful for distinguishing text entries from numerical ones, it tends to make a worksheet look messy and poorly organized. To remedy this, **Excel** allows you to apply a number of alignment options.

You set the alignment attributes using the **Alignment** dialog box.

Formatting the Spreadsheet

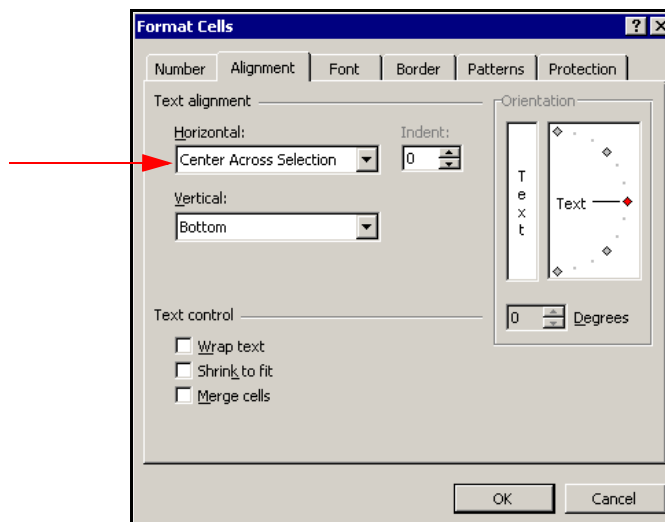
EXERCISE 9D

Exercise

1. Highlight the following range:

	A	B	C	D	E	F	G	H
1	Northern Region							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958	
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522	
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214	
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414	
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561	
11								
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669	
13								

2. Click on the **CENTER** button on the toolbar.
3. Select the range from cell **A1** through **G1** and click on the **FORMAT > CELLS** menu. Choose the **ALIGNMENT** tab.

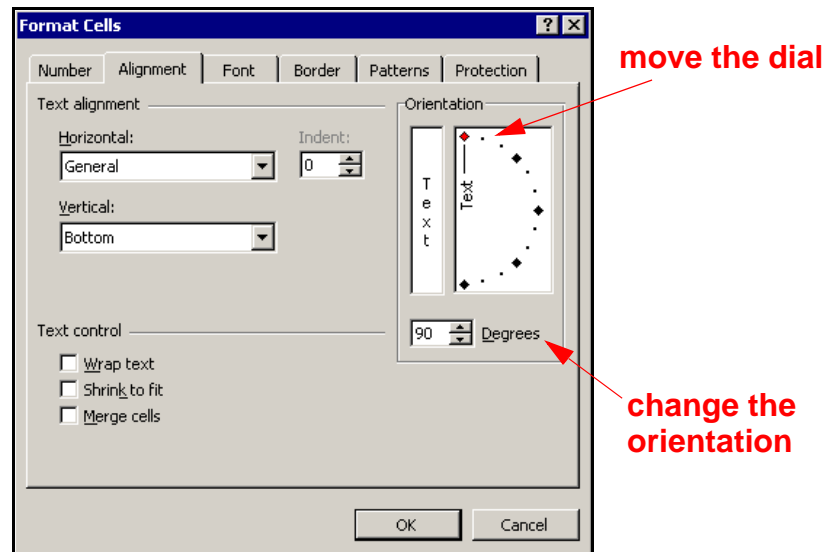


4. Choose the **CENTER ACROSS SELECTION** option and click **OK**.

	A	B	C	D	E	F	G	H
1	Northern Region							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958	
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522	
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214	
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414	
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561	
11								
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669	
13								

5. Notice that the heading is exactly centered across the columns.

For very thin columns, you can make the column headings vertical



Drag the dial until it is straight up, or set the **Degrees** to 90.

USING BORDERS

You can spice up your worksheets by using borders. By drawing lines around certain portions of your spreadsheets, you can make the worksheets more attractive, and separated into sections. Borders make your work easier for others to understand.

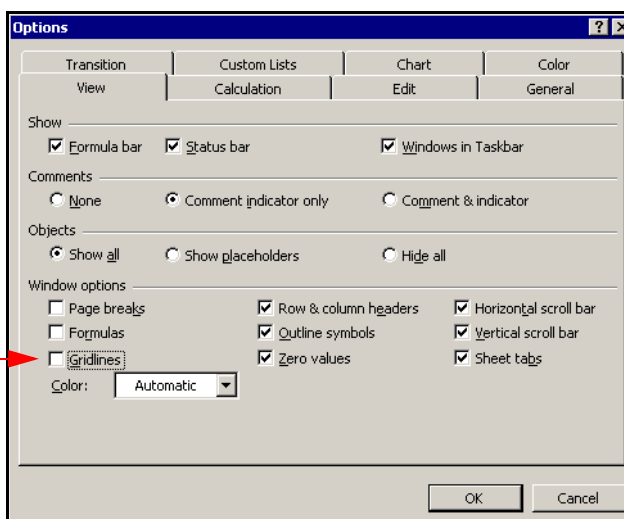
EXERCISE 9E

Exercise

When you use the Border option, it is helpful to turn off the display of gridlines.

1. Choose **TOOLS > OPTIONS** and click on the **VIEW** tab. Unselect the gridlines options.

unselect gridlines



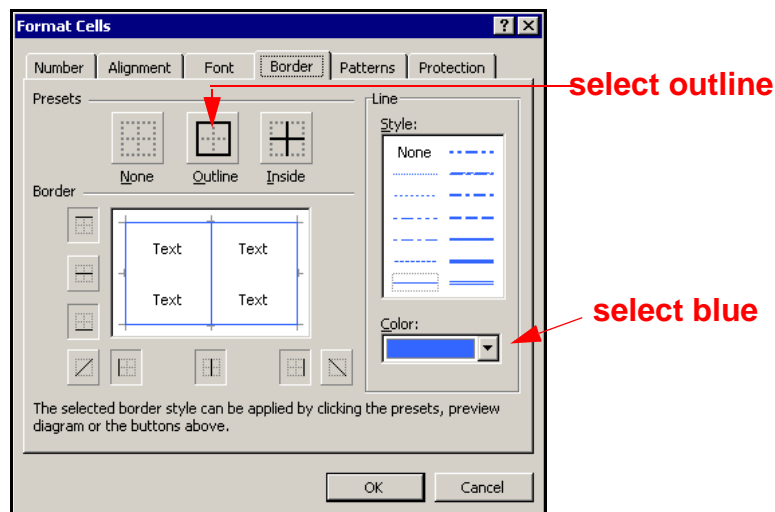
The spreadsheet should look like this figure:

	A	B	C	D	E	F	G	H
1	Northern Region							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958	
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522	
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214	
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414	
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561	
11								
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669	
13								

2. Highlight the range A4:G12.

	A	B	C	D	E	F	G	H
1	Northern Region							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958	
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522	
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214	
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414	
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561	
11								
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669	
13								

3. Select **FORMAT** ➤ **CELLS** from the menu and select the **BORDERS** tab.



4. First, select the color blue from the drop-down list.
5. Next, click on **OUTLINE**.
6. Click the middle of the example box so that there is a vertical line.
7. Click on **OK**. The spreadsheet should look like the following figure:

Formatting the Spreadsheet

	A	B	C	D	E	F	G	H
1	Northern Region							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958	
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522	
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214	
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414	
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561	
11								
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669	
13								

8. Select the following two ranges: (Remember to use the **CTRL** key to select the non adjacent ranges.)

	A	B	C	D	E	F	G	H
1	Northern Region							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958	
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522	
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214	
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414	
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561	
11								
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669	
13								

9. Select **FORMAT > CELLS** from the menu and select the **BORDERS** tab.

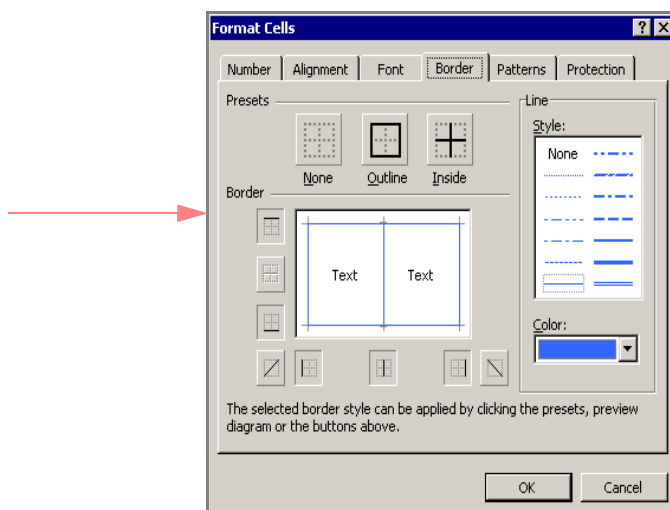


Figure 9-3 The Borders Tab

10. Make sure that there is a blue border at the top and at the bottom of the example box.
11. Click on the **PATTERNS** tab and pick a light color.

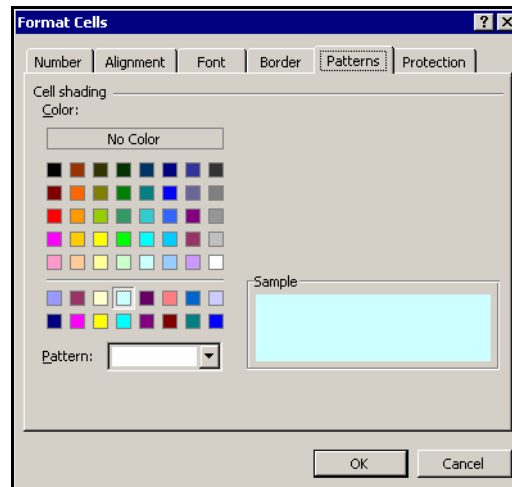


Figure 9-4 The Patterns Tab

12. Click **OK**.

	A	B	C	D	E	F	G	H
1	Northern Region							
2								
3								
4		January	February	March	April	May	June	
5								
6	Neon	2,019,958	4,491,492	6,511,450	6,763,911	3,368,619	2,019,958	
7	Plaid	7,452,522	2,963,399	10,415,921	18,208,067	2,222,549	7,452,522	
8	Polka Dot	6,913,214	5,797,138	12,710,352	6,867,099	4,347,853	6,913,214	
9	Solid	2,963,414	6,388,849	9,352,264	11,096,778	4,791,637	2,963,414	
10	Striped	7,452,561	6,007,703	13,460,264	11,978,551	4,505,777	7,452,561	
11								
12	TOTAL	26,801,669	25,648,581	52,450,249	54,914,406	19,236,435	26,801,669	
13								

THE REPEAT KEY (F4)

A handy shortcut is the Repeat shortcut. It allows you to repeat actions you have just taken. You perform an action on a cell or range of cells, select another cell or range of cells, and press the **F4** key.

To illustrate how it works, do the exercise in this section. You will find many of your own uses for the **F4** key once you see how it works.

EXERCISE 9F

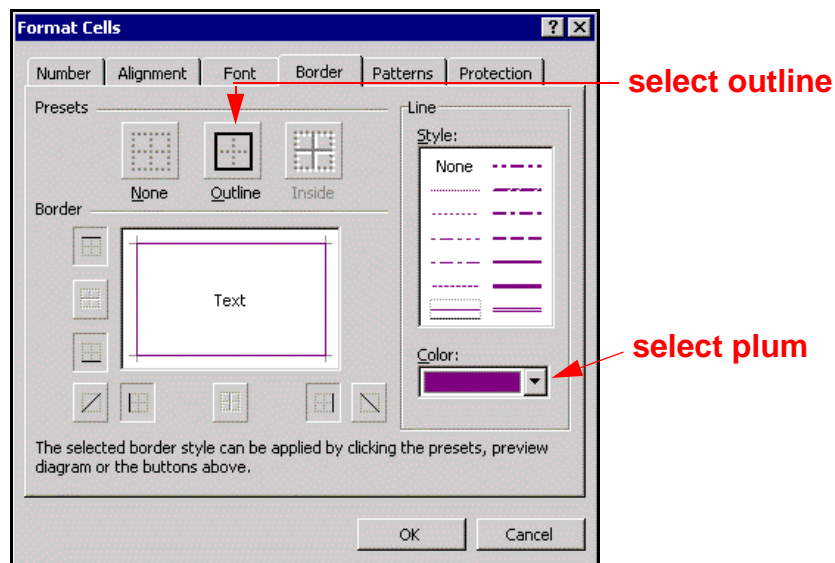
Exercise

In this exercise you will apply multiple formatting to one cell and then repeat that action on several other cells.

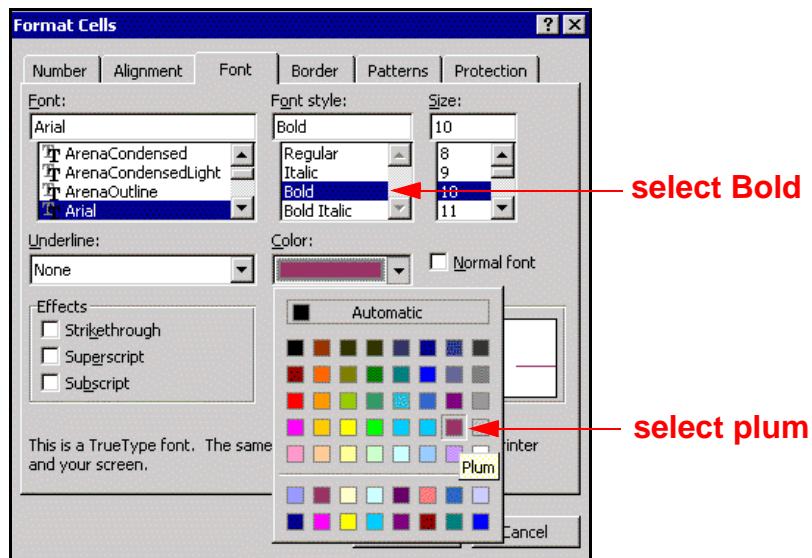
1. Open the spreadsheet called *repeat.xls*.

	A	B	C	D	E	F	G
1	FIRST UNION NATIONAL						
3	Date	Explanation	Deposits	Debits	Credits	Checks Issued	Balance
4	01/04/00	FROM CHASE NORTH AMERICA			81,130.40		81,130.40
5	12/21/99	TO CHASE		55,127.08			26,003.32
6	01/26/00	TO CHASE		576,198.84			(550,195.52)
7	02/03/00	TO CHASE		360,677.81			(910,873.33)
8	02/03/00	DEPOSIT	1,588,257.67				677,384.34
9	02/03/00	ARIZONA PAYROLL		171,117.29			506,267.05
10	02/03/00	TENNESSEE PAYROLL		32,977.38			473,289.67
11	02/03/00	ULSTER FEDERAL CREDIT UNION			13,063.92		486,353.59
12	02/03/00	PRUDENTIAL				12,104.16	474,249.43
13	02/03/00	TO NORWEST (MEDICAL)		10,915.26			463,334.17
14	02/03/00	FROM FIRST UNION NATIONAL			360,677.81		824,011.98
15	02/03/00	FROM CHASE NORTH AMERICA			662,009.06		1,486,021.04
16	02/03/00	FROM PITTSBURGH			59,005.01		1,545,026.05
17	02/03/00	TO CHASE PAYABLES		362,398.53			1,182,627.52
18	02/03/00	FLORIDA PAYROLL				230,632.32	951,995.20
19	02/03/00	NEW YORK PAYROLL		164,863.87			787,131.33
20	02/03/00	SMITH BARNEY	83,619.15				870,750.48
21	02/04/00	TO CHASE		647,155.58			223,594.90
22	02/04/00	DEPOSIT	266,706.89				490,301.79
23	02/06/00	TO CHASE		13,063.92			477,237.87
24	02/07/00	DEPOSIT	1,394,822.99				1,872,060.86
25	02/07/00	TO CHASE		1,164,089.04			707,971.82
26	02/08/00	DEPOSIT	59,027.06				766,998.88
27	02/08/00	TO CHASE		500,000.00			266,998.88
28							

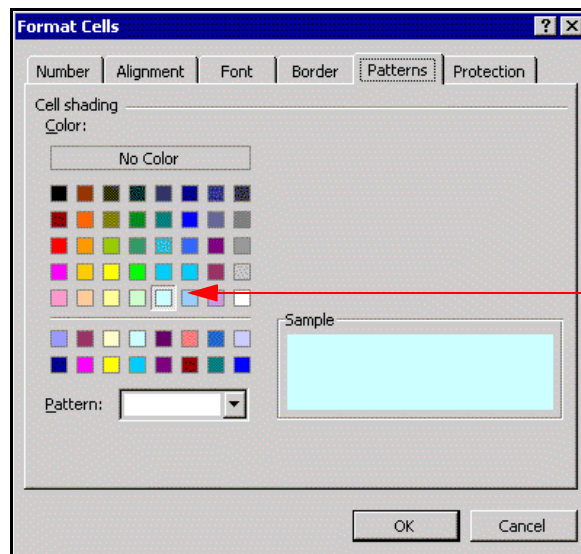
2. Highlight cell **C8**. It is the first value in the **Deposits** column.
3. Select **FORMAT > CELLS** from the menu and select the **BORDERS** tab. Choose **Plum** from the **Color** box, and then click **Outline**.



4. Select the **FONT** tab. Choose **Plum** for **Color**, and select **Bold** from Font Style.



5. Select the **PATTERNS** tab. Choose Light Turquoise.



select
Light Turquoise

6. Click **OK**.
7. The cell will look like this:

	A	B	C	D
1	FIRST UNION NATIONAL			
3	Date	Explanation	Deposits	Deb
4	01/04/00	FROM CHASE NORTH AMERICA		
5	12/21/99	TO CHASE		55,
6	01/26/00	TO CHASE		576,
7	02/03/00	TO CHASE		360,
8	02/03/00	DEPOSIT	1,588,257.67	
9	02/03/00	ARIZONA PAYROLL		171,
10	02/03/00	TENNESSEE PAYROLL		32,
11	02/03/00	ULSTER FEDERAL CREDIT UNION		
12	02/03/00	PRUDENTIAL		
13	02/03/00	TO NORWEST (MEDICAL)		10,
14	02/03/00	FROM FIRST UNION NATIONAL		

8. Now select each of the other cells with values in the **Deposits** and press the **F4** key. All of the actions you performed while in the **Format Cells** dialog will be repeated. If you perform some other action before you select all of the deposits, that action will be repeated instead.
9. The spreadsheet will look similar to the following figure:

	A	B	C	D	E	F	G
1	FIRST UNION NATIONAL						
3	Date	Explanation	Deposits	Debits	Credits	Checks Issued	Balance
4	01/04/00	FROM CHASE NORTH AMERICA			81,130.40		81,130.40
5	12/21/99	TO CHASE		55,127.08			26,003.32
6	01/26/00	TO CHASE		576,198.84			(550,195.52)
7	02/03/00	TO CHASE		360,677.81			(910,873.33)
8	02/03/00	DEPOSIT	1,588,257.67				677,384.34
9	02/03/00	ARIZONA PAYROLL		171,117.29			506,267.05
0	02/03/00	TENNESSEE PAYROLL		32,977.38			473,289.67
1	02/03/00	ULSTER FEDERAL CREDIT UNION			13,063.92		486,353.59
2	02/03/00	PRUDENTIAL				12,104.16	474,249.43
3	02/03/00	TO NORWEST (MEDICAL)		10,915.26			463,334.17
4	02/03/00	FROM FIRST UNION NATIONAL			360,677.81		824,011.98
5	02/03/00	FROM CHASE NORTH AMERICA			662,009.06		1,486,021.04
6	02/03/00	FROM PITTSBURGH			59,005.01		1,545,026.05
7	02/03/00	TO CHASE PAYABLES		362,398.53			1,182,627.52
8	02/03/00	FLORIDA PAYROLL				230,632.32	951,995.20
9	02/03/00	NEW YORK PAYROLL		164,863.87			787,131.33
0	02/03/00	SMITH BARNEY	83,619.15				870,750.48
1	02/04/00	TO CHASE		647,155.58			223,594.90
2	02/04/00	DEPOSIT	266,706.89				490,301.79
3	02/06/00	TO CHASE		13,063.92			477,237.87
4	02/07/00	DEPOSIT	1,394,822.99				1,872,060.86
5	02/07/00	TO CHASE		1,164,089.04			707,971.82
6	02/08/00	DEPOSIT	59,027.06				766,998.88
7	02/08/00	TO CHASE		500,000.00			266,998.88

Note



You could have used several other ways to duplicate the formatting. This example merely illustrates that the **F4** key can be used to duplicate actions.

ADJUSTING COLUMN WIDTHS

You can use column width adjustments to improve the appearance of your worksheet in a number of different ways.

- If you're faced with a truncated text entry, or a number that **Excel** shows as #####, you can enlarge the column so the entry will be displayed in full.
- If your worksheet contains many numbers, you can widen the columns to spread the numbers out and make the worksheet less cluttered.
- You can make your columns smaller to fit the entire worksheet onto your screen or onto a single printed page.

Excel measures column width in characters. When you create a new worksheet, each column uses a standard width of 8.43 characters. The actual width you see on your screen depends on the width of the default font.

You can change column width several ways:

- by using the **FORMAT > COLUMN WIDTH** menu and entering a specific width
- by dragging with the mouse
- by using the *Best Fit* method

Entering a Specific Column Width

With **Excel**, you can set column widths as small as 0 characters or as large as 255 characters.

- Select at least one cell in each column you want to adjust.
- Select **FORMAT > COLUMN WIDTH**. **Excel** displays the **Column Width** dialog box.



- Enter the desired width in the **Column Width** text box.
- Select **OK** or press **ENTER**.

EXERCISE 9G

Exercise

1. Click on the **ColumnWidth** tab of the spreadsheet in the previous example.
2. Select Column B.
3. Select **FORMAT > COLUMN WIDTH**.
4. Type **35** in the **Column Width** text box.
5. Select **OK** or press **ENTER**.

Using the Mouse

You can bypass the **Column Width** dialog box entirely by using your mouse to drag a column to the width you want. Here are the steps:

EXERCISE 9H

Exercise

1. Move the mouse pointer to Column C and position the pointer at the right edge. The mouse pointer changes to a crossbow shape.

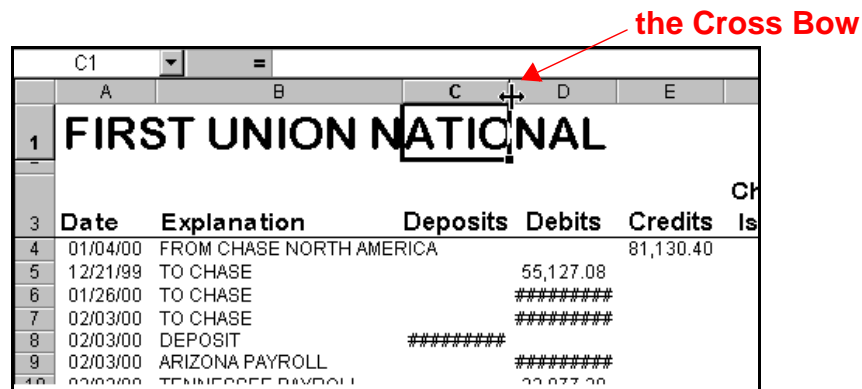
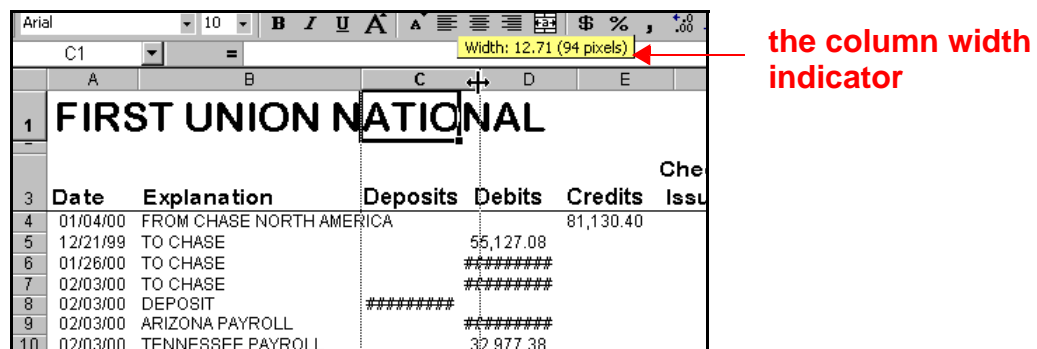


Figure 9-5 Change a Column Width by Dragging its Border

2. Press and hold down the left mouse button. As you drag, a little box displaying the current width appears next to the mouse pointer.



3. Release the mouse button. **Excel** adjusts the column width accordingly.

Hint



You can use this technique to set the width of several columns at once. For every column you want to adjust, select the entire column. The new width will be applied to each selected column,

Using the Best Fit Feature

If you have a long column of entries with varying widths, it may take a few tries to get the optimum column width. To avoid guesswork, you can have **Excel** set the width automatically using the **Best Fit** feature. When you use this feature, **Excel** examines the column's contents and sets the width slightly larger than the longest entry.

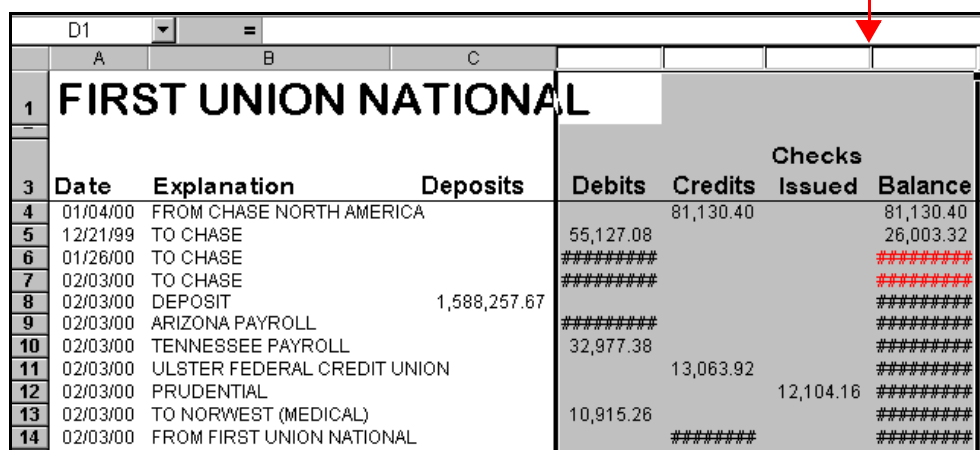
EXERCISE 9I

Follow these steps with your spreadsheet:

Exercise

1. Drag over each of the column borders D, E, F, and G.
2. Double-click at the right edge of any of those column headings.

Double-Click



	A	B	C				
1	FIRST UNION NATIONAL						
3	Date	Explanation	Deposits	Debits	Credits	Checks Issued	Balance
4	01/04/00	FROM CHASE NORTH AMERICA			81,130.40		81,130.40
5	12/21/99	TO CHASE		55,127.08			26,003.32
6	01/26/00	TO CHASE		#####			#####
7	02/03/00	TO CHASE		#####			#####
8	02/03/00	DEPOSIT	1,588,257.67				#####
9	02/03/00	ARIZONA PAYROLL		#####			#####
10	02/03/00	TENNESSEE PAYROLL		32,977.38			#####
11	02/03/00	ULSTER FEDERAL CREDIT UNION			13,063.92		#####
12	02/03/00	PRUDENTIAL				12,104.16	#####
13	02/03/00	TO NORWEST (MEDICAL)		10,915.26			#####
14	02/03/00	FROM FIRST UNION NATIONAL			#####		#####

3. All of the columns will be adjusted to fit their widest entries.

Hint



You could also have chosen **FORMAT > COLUMN > AUTOFIT SELECTION** from the menu.

FREEZING TITLES

With larger spreadsheets it is sometimes difficult to keep track of what column you're in as you scroll down. **Excel** provides a way to *freeze* the titles or column headings to keep them in view.

EXERCISE 9J

Exercise

1. Scroll down with either the mouse or the keyboard until the column headings disappear from the screen.
2. Press **CTRL+HOME** to quickly get to the top.
3. You will want to freeze rows one through three so that the column headings always stay visible. Click on cell A4.
4. Choose **WINDOW > FREEZE PANES**. Since A4 is the current cell, **Excel** will freeze the rows above A4.
5. Now try scrolling down the worksheet. Notice that the columns headings never scroll off the screen.

CONDITIONAL FORMATTING

With conditional formatting you can instruct Excel to change the formatting for a cell automatically if the cell's value changes based on criteria you establish for change. This can be helpful in error checking your entries and performing exception reporting for analysis.

To Highlight Cells that Meet Specific Conditions

Conditional formatting allows you to set rules for cell formatting. If the rules (conditions) are met, then the formatting is applied. You can have up to 3 rules in a cell.

For example, you can set conditional formatting so that a cell turns blue if it contains a value higher than 95, and turns red if it contains a value lower than 75.

1. Select the cells you want to highlight and select **FORMAT > CONDITIONAL FORMATTING..** from the menu. Do one of the following:
 - To use values in the selected cells as the formatting criteria, click **CELL VALUE IS**, select the comparison phrase, and then type a value in the appropriate box. You can enter a constant value or a formula. If you enter a formula, you must start it with an equal sign (=).
 - To use a formula as the formatting criteria (to evaluate data or a condition other than the values in selected cells), click **FORMULA IS** in the box on the left, and then enter the formula in the box on the right. The formula must evaluate to a logical value of TRUE or FALSE.
2. Click **FORMAT**.
3. Select the font style, font color, underlining, borders, shading, or patterns you want to apply.

Excel applies the selected formats only if the cell value meets the condition or if the formula returns a value of TRUE.
4. To add another condition, click **ADD**, and then repeat the steps.

You can specify up to three conditions. If none of the specified conditions are true, the cells keep their existing formats. You can use the existing formats to identify a fourth condition.

EXERCISE 9K

Exercise

In the exercise you will highlight cells for students with grades lower than 75.

1. Open the spreadsheet called *conditional.xls*:

	A	B	C	D	E	F	G	H	I
1	Test Scores								
2									
3		Marion	Martha	Laura	Joe	Moe	Larry	Curly	George
4	Math	97	89	79	78	51	76	87	85
5	English	98	85	85	90	47	87	91	98
6	Science	96	82	80	98	52	65	57	90
7	History	98	91	75	80	49	56	78	85
8	Geography	95	84	54	98	47	64	67	67
9	Art	95	95	70	70	39	89	64	85
10	Computer Studies	95	95	65	89	41	92	89	91
11	French	90	91	65	81	28	51	92	87
12									
13	Overall Average	96	89	72	85	44	73	78	86
14									

2. To apply the formatting select the range B4:I11.

To Highlight Cells that Meet Specific Conditions

3. To apply the formatting also to the **Overall Average** row, hold down the **CTRL** key and also select range B13:I13.
4. Select the **FORMAT > CONDITIONAL FORMATTING...** option from the menu. You will see the dialog box in Figure 9-6 .
5. In the **Condition 1** text box, click the drop-down arrow and select **Cell Value Is**.

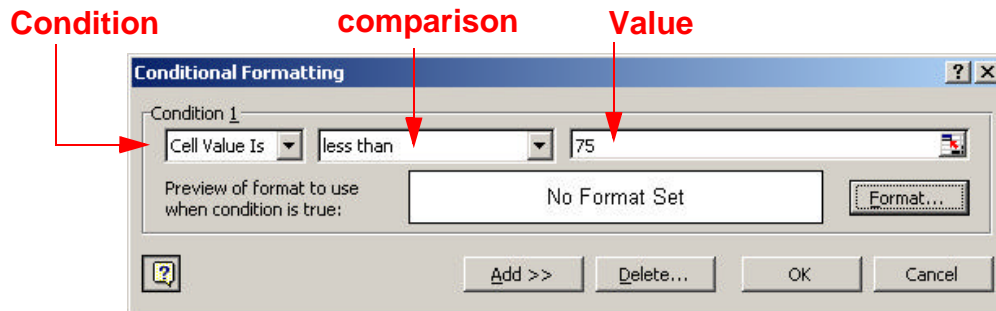
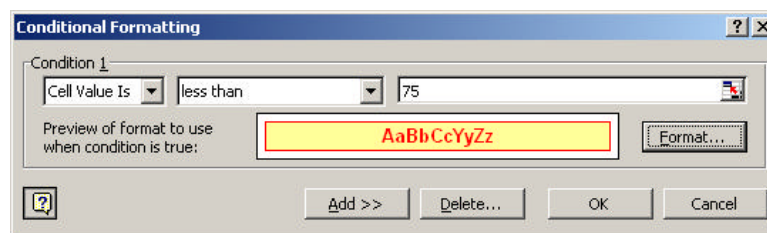


Figure 9-6 The Conditional Formatting Dialog Box

6. Click the drop-down arrow in the next box and select **less than**.
7. Enter **75** in the value box and click **FORMAT**.
8. In the **Font** tab, choose the following settings:
 - Red
 - Bold
9. In the **Border** dialog box, select the following settings:
 - Outline
 - Red
10. And since we want to make a real statement, in the **Patterns** dialog box select **yellow**. The dialog box will preview the formatting.



11. Click on **OK**. Your spreadsheet will look like this:

	A	B	C	D	E	F	G	H	I
1	Test Scores								
2									
3		Marion	Martha	Laura	Joe	Moe	Larry	Curly	George
4	Math	57	89	79	78	51	76	87	85
5	English	58	85	85	50	47	87	91	93
6	Science	56	82	80	58	52	65	57	90
7	History	58	91	75	80	49	56	78	88
8	Geography	55	84	54	98	47	64	67	67
9	Art	55	95	70	70	39	89	64	85
10	Computer Studies	55	95	65	83	41	92	80	91
11	French	50	91	65	81	28	51	92	87
12									
13	Overall Average	96	89	72	85	44	73	78	86
14									
15									

Copying formats to other cells

To copy specific formatting to other cells, select the cells that have the conditional formats you want to copy. On the toolbar, click **FORMAT PAINTER** and then select the cells you want to format.

To copy only the conditional formats, select the cells you want to format and include at least one cell in the selection that has the conditional formats you want to copy.

On the **FORMAT** menu, click **CONDITIONAL FORMATTING**, and then click **OK**.

Adding More than One Condition

You can have up to three conditions for conditional formatting. Suppose you also wanted to flag all test grades over 95.

EXERCISE 9L

Exercise

- Highlight the same ranges:
 - B4:I11
 - B13:I13
- Select the **FORMAT > CONDITIONAL FORMATTING...** option from the menu.

3. Click on the **ADD>>** button. The dialog box will expand to show another Condition.
4. In the **Condition 2** text box, click the drop-down arrow and select **Cell Value Is**.
5. Click the drop-down arrow in the next box and select **greater than**.
6. Enter **95** in the value box and click **FORMAT**.
7. In the **Font** tab, choose the following settings:
 - Blue
 - Bold
8. In the **Border** dialog box, select the following settings:
 - Outline
 - Blue
9. The dialog box will preview the formatting.

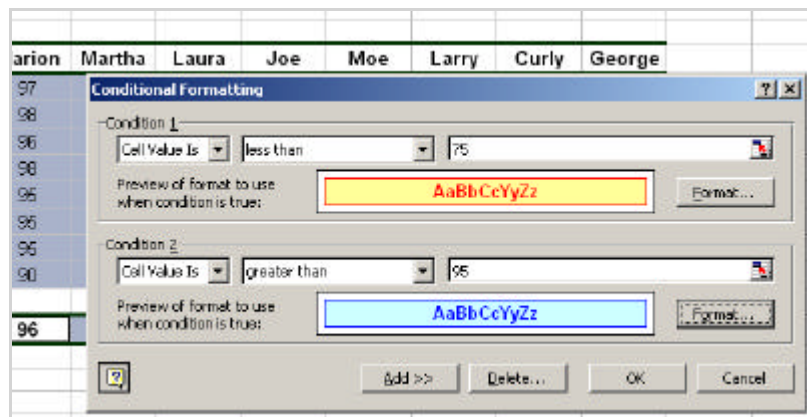


Figure 9-7 Applying More Than One Condition

Formatting the Spreadsheet

- Click on **OK**. Your spreadsheet will look like this:

	A	B	C	D	E	F	G	H	I
1	Test Scores								
2									
3		Marion	Martha	Laura	Joe	Moe	Larry	Curly	George
4	Math	97	89	79	78	51	78	87	85
5	English	98	85	86	90	47	87	91	98
6	Science	96	82	80	98	52	65	57	90
7	History	98	91	75	80	49	56	78	85
8	Geography	95	84	54	98	47	64	67	67
9	Art	96	95	70	70	39	88	64	85
10	Computer Studies	96	95	65	83	41	92	89	91
11	French	90	91	65	81	28	51	92	87
12									
13	Overall Average	96	89	72	85	44	73	78	86
14									

Conditional Formatting Based on Formulas

You can apply conditional formatting that calculates a formula, and applies formatting to other cells, based on the result.

EXERCISE 9M

Exercise

In this exercise you will flag all phone bills that are greater than 10% of the monthly income.

- Click on the Budget tab.

	A	B	C	D	E	F	G	H
1	Budget							
2								
3								
4		JAN	FEB	MAR	APR	MAY	JUN	Totals
5	Income	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$15,000.00
6								
7	Food	350.00	490.00	455.00	428.75	542.50	490.00	2,756.25
8	Car Loan	350.00	350.00	350.00	350.00	350.00	350.00	2,100.00
9	Insurance	210.00	210.00	210.00	210.00	210.00	210.00	1,260.00
10	Phone	200.00	300.00	120.00	280.00	200.00	113.75	1,213.75
11	Rent	875.00	875.00	875.00	875.00	875.00	875.00	5,250.00
12	Electric	113.75	96.25	145.25	157.50	122.50	145.25	780.50
13								
14	Net Income	\$ 401.25	\$ 178.75	\$ 344.75	\$ 198.75	\$ 200.00	\$ 316.00	\$ 1,639.50
15								
16	40% Credit Union	\$ 160.50	\$ 71.50	\$ 137.90	\$ 79.50	\$ 80.00	\$ 126.40	\$ 655.80
17	60% Bank Account	\$ 240.75	\$ 107.25	\$ 206.85	\$ 119.25	\$ 120.00	\$ 189.60	\$ 983.70
18								

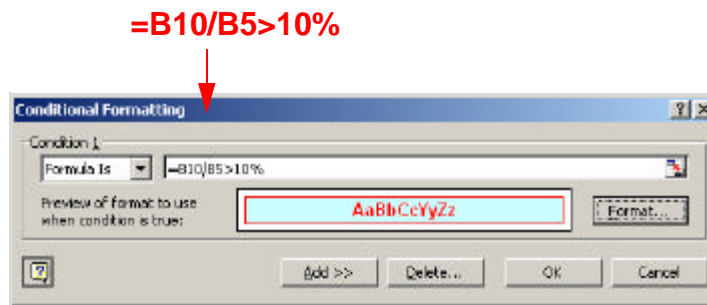
- The phone entries are in row 10. The income entries are in row 5. The formula to determine the percentage of income that is spent on the phone bill for January is:

=B10/B5

3. The formula to determine whether the phone bill is greater than 10% of the income is:

=B10/B5>10% (would evaluate as True or False)

4. Highlight the range B10:G10.
5. Select the **FORMAT > CONDITIONAL FORMATTING...** option from the menu.
6. Fill out the dialog box as follows:



7. Select a red bold font, a red outline, and a light blue pattern.
8. Click **OK**.
9. Your spreadsheet should look like this:

	A	B	C	D	E	F	G	H
1	Budget							
2								
3								
4		JAN	FEB	MAR	APR	MAY	JUN	Totals
5	Income	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$15,000.00
6								
7	Food	350.00	490.00	455.00	428.75	542.50	490.00	2,756.25
8	Car Loan	350.00	350.00	350.00	350.00	350.00	350.00	2,100.00
9	Insurance	210.00	210.00	210.00	210.00	210.00	210.00	1,260.00
10	Phone	200.00	300.00	120.00	290.00	200.00	113.75	1,213.75
11	Rent	875.00	875.00	875.00	875.00	875.00	875.00	5,250.00
12	Electric	113.75	96.25	145.25	157.50	122.50	145.25	780.50
13								
14	Net Income	\$ 401.25	\$ 170.75	\$ 344.75	\$ 198.75	\$ 200.00	\$ 316.00	\$ 1,639.50
15								
16	40% Credit Union	\$ 160.50	\$ 71.50	\$ 137.90	\$ 79.50	\$ 80.00	\$ 126.40	\$ 655.80
17	60% Bank Account	\$ 240.75	\$ 107.25	\$ 206.85	\$ 119.25	\$ 120.00	\$ 189.60	\$ 983.70

Delete Conditional Formatting

To remove one or more conditions, click **DELETE**, and then select the check box for the conditions you want to delete.

EXERCISE 9N

Exercise

In this exercise you will delete the formatting you just applied.

1. Highlight the range B10:G10.
2. Select the **FORMAT > CONDITIONAL FORMATTING...** option from the menu.

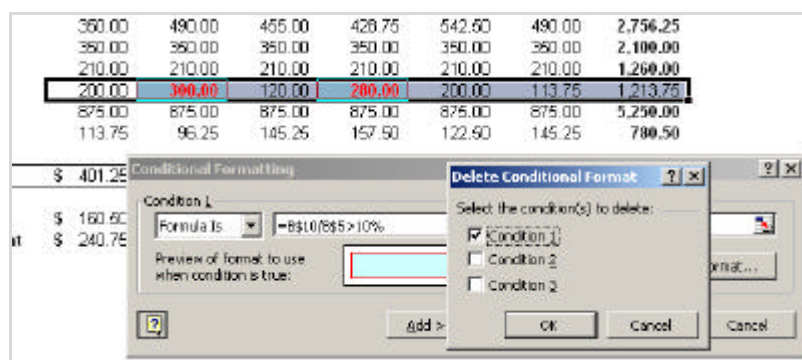


Figure 9-8 Delete Conditional Formatting

3. Click on **DELETE** and then select **Condition 1** (you only had one condition),
4. Click **OK**.

Conditional Formatting Based on Other Cells

You can apply conditional formatting that checks the value in one cell, and applies formatting to other cells, based on that value. For example, apply the formatting so that it checks whether the phone bill is over a set percentage amount in a particular cell.

EXERCISE 9O

Exercise

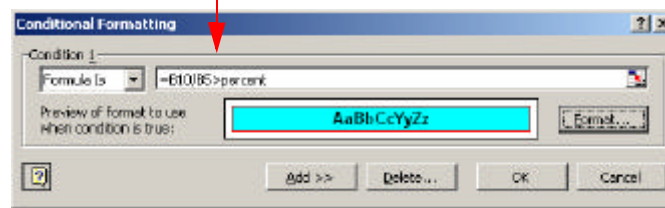
In this exercise you will set a percentage amount in a cell and have Excel calculate the formula based on that cell.

1. Enter 8% in cell J5.

Apply Conditional Formatting to Hide Errors

2. Cell J5 has been given the name **Percent**.
3. Highlight the range B10:G10.
4. Select the **FORMAT > CONDITIONAL FORMATTING...** option from the menu.
5. Fill out the dialog box as follows:

=B10/B5>Percent (or J5)



6. Select a red bold font, a red outline, and a light blue pattern.
7. Click **OK**.
8. Your spreadsheet should look like this:

	A	B	C	D	E	F	G	H	I	J
1	Budget									
2										
3		JAN	FEB	MAR	APR	MAY	JUN	Totals		Percentage
4										
5	Income	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$15,000.00		8%
6										
7	Food	350.00	450.00	455.00	428.75	542.50	490.00	2,756.25		
8	Car Loan	350.00	350.00	350.00	350.00	350.00	350.00	2,100.00		
9	Insurance	210.00	210.00	210.00	210.00	210.00	210.00	1,260.00		
10	Phone	250.00	300.00	120.00	280.00	200.00	113.75	1,303.75		
11	Rent	875.00	875.00	875.00	875.00	875.00	875.00	5,250.00		
12	Electric	113.75	96.25	145.25	157.50	122.50	145.25	780.50		
13										
14	Net Income	\$ 311.25	\$ 178.75	\$ 344.75	\$ 198.75	\$ 200.00	\$ 316.00	\$ 1,549.50		
15										
16	40% Credit Union	\$ 124.50	\$ 71.50	\$ 137.90	\$ 79.50	\$ 80.00	\$ 126.40	\$ 619.80		
17	60% Bank Account	\$ 186.75	\$ 107.25	\$ 206.85	\$ 119.25	\$ 120.00	\$ 189.60	\$ 929.70		
18										

9. Try changing the value in cell J5 and watch the values change.

Apply Conditional Formatting to Hide Errors

You can use conditional formatting to check for errors, and change the font color to match the cell color.

EXERCISE 9P

Exercise

In this example, if row 12 contains a zero or is blank, the #DIV/0! error is displayed in row 13.

	A	G	H	I	J	K	L	M
1	Northern Region							
2								
3								
4		JUN	JUL	AUG	SEP	OCT	NOV	DEC
5								
6	Neon	202.00						
7	Plaid	745.25						
8	Polka Dot	691.32						
9	Solid	296.34						
10	Striped	745.26						
11								
12	TOTAL	2,680.17	-	-	-	-	-	-
13	AVERAGE	536.03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

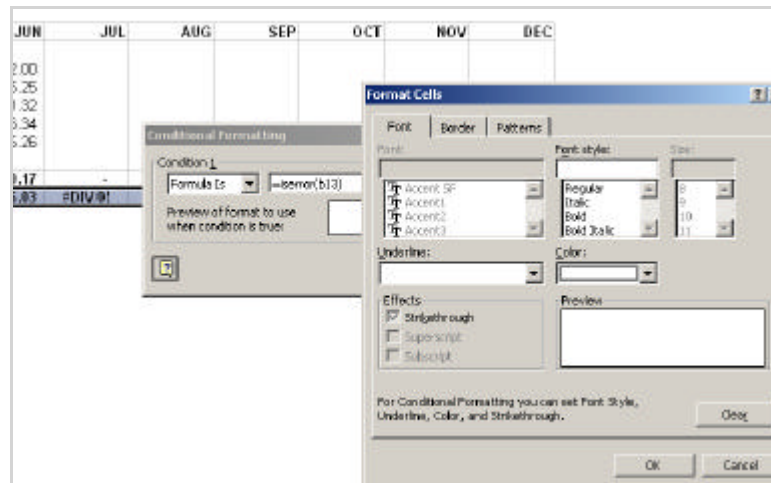
1. Click on the **Errors** tab.
2. Select cells B13:J13
3. Select the **FORMAT > CONDITIONAL FORMATTING...** option from the menu.
4. From the first dropdown, choose **Formula Is**
5. For the formula, enter a formula that refers to the active cell in the selection:

=ISERROR(B13)

6. Click the **FORMAT** button.

Apply Conditional Formatting to Hide Duplicates

7. Select a font color of White.



8. Click **OK** to close the **Format Cells** dialog.
9. Click **OK** to close the **Conditional Formatting** dialog.
10. Your spreadsheet will look like this.

	A	D	E	F	G	H	I	J
1	Northern Region							
2								
3								
4		JUN	JUL	AUG	SEP	OCT	NOV	DEC
5								
6	Neon	202.00						
7	Plaid	745.25						
8	Polka Dot	691.32						
9	Solid	296.34						
10	Striped	745.26						
11								
12	TOTAL	2,680.17	-	-	-	-	-	-
13	AVERAGE	536.03						
14								
15								

Apply Conditional Formatting to Hide Duplicates

In a table, each row should have all data entered, to enable sorting and filtering. However, you can hide the duplicate values to make the list easier to read. In this example, when the table is sorted by State and Category, the second (and subsequent) occurrences of each State and Category name will have white font color.

EXERCISE 9Q

Exercise

1. Click on the Duplicates tab.

	A	B	C	D	E
1	State	Category	Units	Net	
2	CT	Art	370.0	956.92	
3	CT	Art	15.0	62.50	
4	CT	Environment	115.0	258.75	
5	CT	Environment	160.0	360.00	
6	CT	Humorous	40.0	90.00	
7	CT	Humorous	20.0	36.00	
8	CT	Humorous	20.0	36.00	
9	CT	Humorous	30.0	67.50	
10	CT	Museum	895.0	1,841.63	
11	CT	Museum	575.0	1,220.68	
12	CT	Museum	275.0	466.66	
13	CT	Museum	425.0	722.69	
14	CT	Sports	20.0	55.00	
15	CT	Sports	10.0	17.50	
16	CT	Sports	35.0	78.75	
17	CT	Sports	30.0	67.50	
18	MA	Art	165.0	371.25	
19	MA	Art	180.0	405.00	
20	MA	Art	30.0	62.50	
21	MA	Art	195.0	426.44	
22	MA	Art	30.0	62.50	
23	MA	Art	30.0	62.50	
24	MA	Environment	105.0	183.75	
25	MA	Environment	210.0	367.50	
26	MA	Environment	195.0	426.61	
27	MA	Museum	255.0	657.15	
28	MA	Museum	165.0	371.25	

2. Select cells A2:B37.
3. Select the **FORMAT** ➤ **CONDITIONAL FORMATTING...** option from the menu.
4. From the first dropdown, choose Formula Is
5. For the formula, enter a formula that refers to the active cell in the selection:

=A2=A3

6. Click the **FORMAT** button.
7. Select a font color of White.
8. Click **OK** to close the **Format Cells** dialog.
9. Click **OK** to close the **Conditional Formatting** dialog.

Apply Conditional Formatting to Hide Duplicates

10. Your spreadsheet will look like this.

	A	B	C	D
1	State	Category	Units	Net
2			370.0	956.92
3		Art	15.0	62.50
4			115.0	259.75
5		Environment	160.0	360.00
6			20.0	36.00
7		Humorous	30.0	67.50
8			835.0	1,841.83
9			575.0	1,220.68
10	CT	Museum	275.0	466.86
11			165.0	371.25
12			160.0	406.00
13			30.0	62.50
14		Art	30.0	62.50
15		Environment	105.0	183.75
16			195.0	425.74
17			105.0	183.75
18		Museum	210.0	367.50
19			60.0	136.00
20			36.0	96.25
21			45.0	78.75
22			40.0	70.00
23			55.0	123.75
24			30.0	62.50
25	MA	Sports	60.0	136.00
26			156.0	609.83
27			210.0	853.71
28			57.0	313.50
29			60.0	165.00
30		Art	105.0	259.75
31			65.0	146.25
32		Environment	96.0	213.75
33			63.0	220.50

POINTS TO REMEMBER

- The quickest way to format your numbers is to specify the format in the formula bar.
- Choose the **FORMAT > CELLS** option from the menu and click on the tabs for other types of cell formatting
- The characters that you enter into your **Excel** worksheets have a number of attributes which define the characters' *font*:
 - the typeface
 - the type size
 - the type style
- You can set all the font attributes from the **Font** dialog box.
- You set the alignment attributes using the **Alignment** dialog box.
- Borders make your work easier for others to understand. Use the **Borders** dialog box.
- To turn off the display of gridlines choose **TOOLS > OPTIONS** and click on the **VIEW** tab. Unselect the gridlines options.
- The Repeat shortcut allows you to repeat actions you have just taken. You perform an action on a cell or range of cells, select another cell or range of cells, and press the **F4** key.
- You can change column width several ways:
 - by using the **FORMAT > COLUMN WIDTH** menu and entering a specific width
 - by dragging with the mouse
 - by using the *Best Fit* method
- The **WINDOW > FREEZE PANES** command allows you to freeze column headings so that they remain visible on the screen..
- Conditional formatting allows you to set rules for cell formatting. If the rules (conditions) are met, then the formatting is applied. You can have up to 3 rules in a cell.

- To use values in the selected cells as the formatting criteria, click **CELL VALUE IS**, select the comparison phrase, and then type a value in the appropriate box. You can enter a constant value or a formula. If you enter a formula, you must start it with an equal sign (=).
- To use a formula as the formatting criteria (to evaluate data or a condition other than the values in selected cells), click **FORMULA IS** in the box on the left, and then enter the formula in the box on the right. The formula must evaluate to a logical value of TRUE or FALSE.
- To copy specific formatting to other cells, select the cells that have the conditional formats you want to copy. On the toolbar, click **FORMAT PAINTER** and then select the cells you want to format.
- To remove one or more conditions, click **DELETE**, and then select the check box for the conditions you want to delete.
- You can apply conditional formatting that checks the value in one cell, and applies formatting to other cells, based on that value.
- You can use conditional formatting to check for errors, and change the font color to match the cell color, white for example.
- You can apply conditional formatting to hide duplicates

Creating Charts

CHAPTER 10

Charts are visually appealing and make it easy for users to see comparisons, patterns, and trends in data. For instance, rather than having to analyze several columns of worksheet numbers, you can see at a glance whether sales are falling or rising over quarterly periods, or how the actual sales compare to the projected sales.

A chart is linked to the worksheet data it's created from and is updated automatically when you change the worksheet data.

A good chart lets the reader instantly see the point that you want to make. Different charts draw readers to different conclusions. If you're selling something — an idea, result, plan, or opportunity — charts let you get across your thoughts with clarity and power.

CREATING A CHART

You can create a chart on its own sheet or as an embedded object on a worksheet. You can also publish a chart on a Web page. Either way, the chart is linked to the source data on the worksheet, which means the chart is updated when you update the worksheet data.

Chart Types

To create a chart, you must first enter the data for the chart on the worksheet. Then select that data and use the Chart Wizard to step through the process of choosing the chart type and the various chart options.

- **Column Charts** compare individual or sets of values. The height of each bar is proportional to its corresponding value in the worksheet.

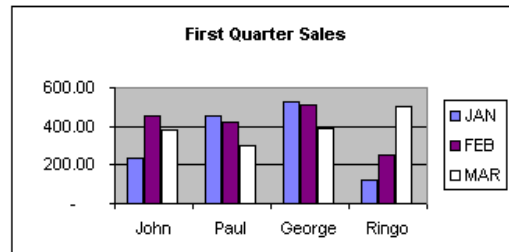


Figure 10-1 A Column Chart

- **Stacked Column Charts** show how different values contribute to a total across different categories or time.

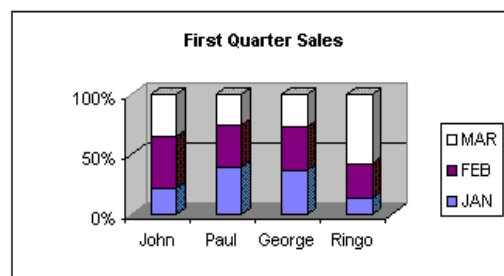


Figure 10-2 A Stacked Column Chart

- **Line Charts** are another way of presenting data graphically. Line charts are especially useful when you plot trends, since lines connect points of data and show changes over time effectively.

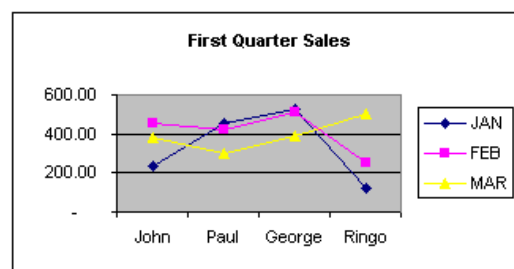


Figure 10-3 A Line Chart

- **Pie Charts** are circular graphs used to show the relationship of each value in a data range to the entire data range. The size of each wedge represents the percentage each value contributes to the total.
 - Only one numerical data range may be used in a pie chart. This data will be represented as pie slices.
 - Pie charts may be formatted to indicate the percentage each piece of the pie represents of the whole.

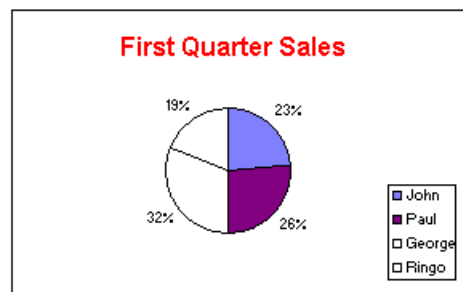


Figure 10-4 A Column Chart

Embedded charts

An embedded chart is considered a graphic object and is saved as part of the worksheet on which it is created. Use embedded charts when you want to display or print one or more charts with your worksheet data

Chart sheets

A chart sheet is a separate sheet within your workbook that has its own sheet name. Use a chart sheet when you want to view or edit large or complex charts separately from the worksheet data or when you want to preserve screen space as you work on the worksheet.

AXIS VALUES

Excel creates the axis values from the worksheet data. Unless you specify differently, **Excel** uses the format of the upper-left cell in the value range as the number format for the axis.

CATEGORY NAMES

Excel uses column or row headings in the worksheet data for category axis names. You can change whether **Excel** uses column or row headings for category axis names or create different names.

CHART DATA SERIES NAMES

Excel also uses column or row headings in the worksheet data for series names. Series names appear in the chart legend. You can change whether **Excel** uses column or row headings for series names or create different names.

DATA MARKERS

Data markers with the same pattern represent one data series. Each data marker represents one number from the worksheet.

CREATING A BAR CHART

Follow these steps to create a sample chart as an object in a spreadsheet.


EXERCISE 10A

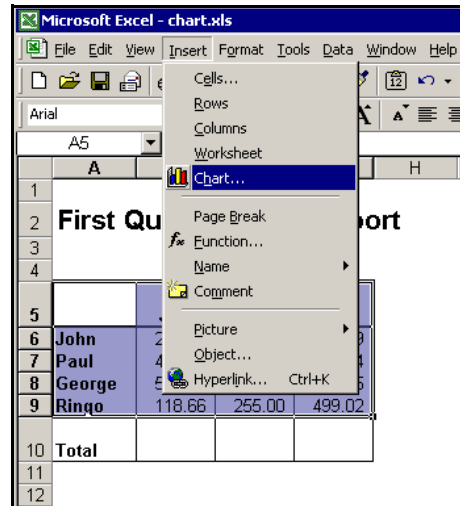
Exercise

1. Open the file called *chart.xls*.
2. Highlight the range **A5:D9**.

	A	B	C	D	H
1					
2					
3					
4					
5		JAN	FEB	MAR	
6	John	234.34	453.88	377.99	
7	Paul	456.56	422.19	298.14	
8	George	523.77	511.12	386.55	
9	Ringo	118.66	255.00	499.02	
10	Total				
11					

Figure 10-5 Highlighting the Range for a Chart

3. Select **INSERT** > **CHART** from the menu or click on the **Chart** button on the toolbar ().



4. The Chart Wizard will appear. You will be asked to select a chart type. Leave the default bar selected.

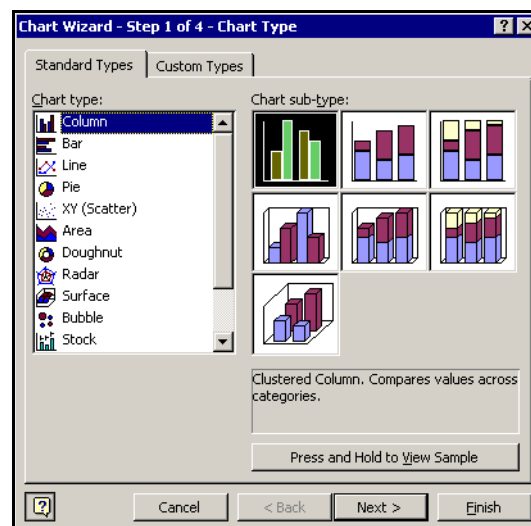
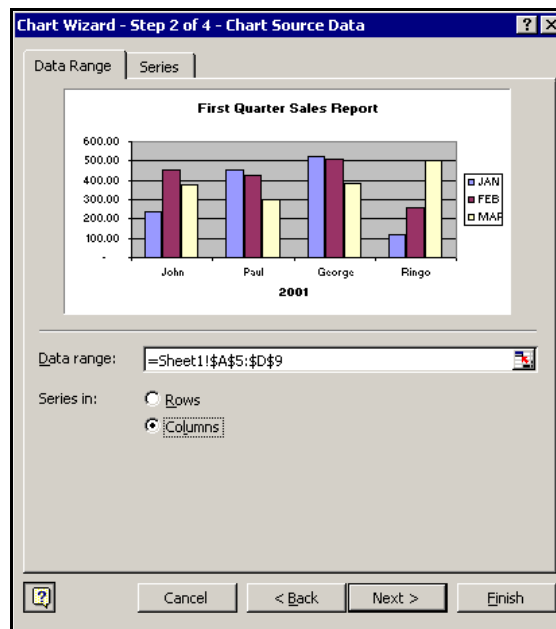
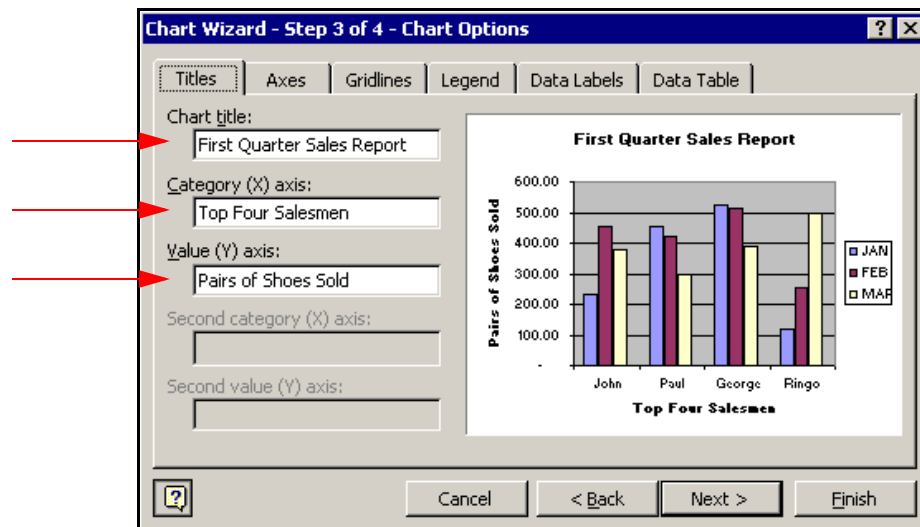


Figure 10-6 The Chart Wizard

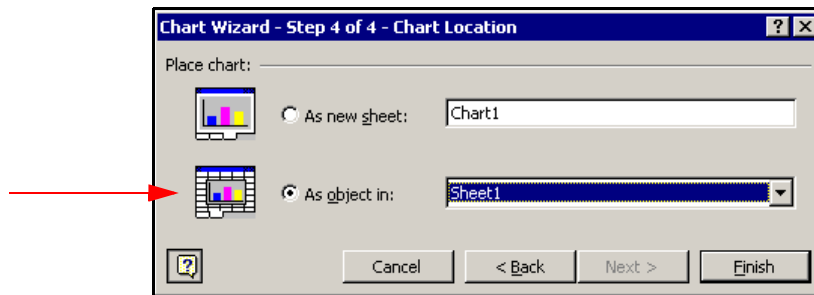
5. Click on the **NEXT** button. You will be asked whether you want the bars to represent months (JAN, FEB, or MAR) or salesmen (John, Paul, George, or Ringo). Select the **COLUMNS** option, which compares the salesmen to each other.



- Click on the **Next** button.



- Enter the labels entered above as the chart titles and click on the **NEXT** button.



8. Select the Place chart **AS OBJECT IN Sheet 1** (the current sheet) option. Click on the **FINISH** button.
9. The chart will be placed as an object in the spreadsheet. You can drag it to a new location and size it if you want.

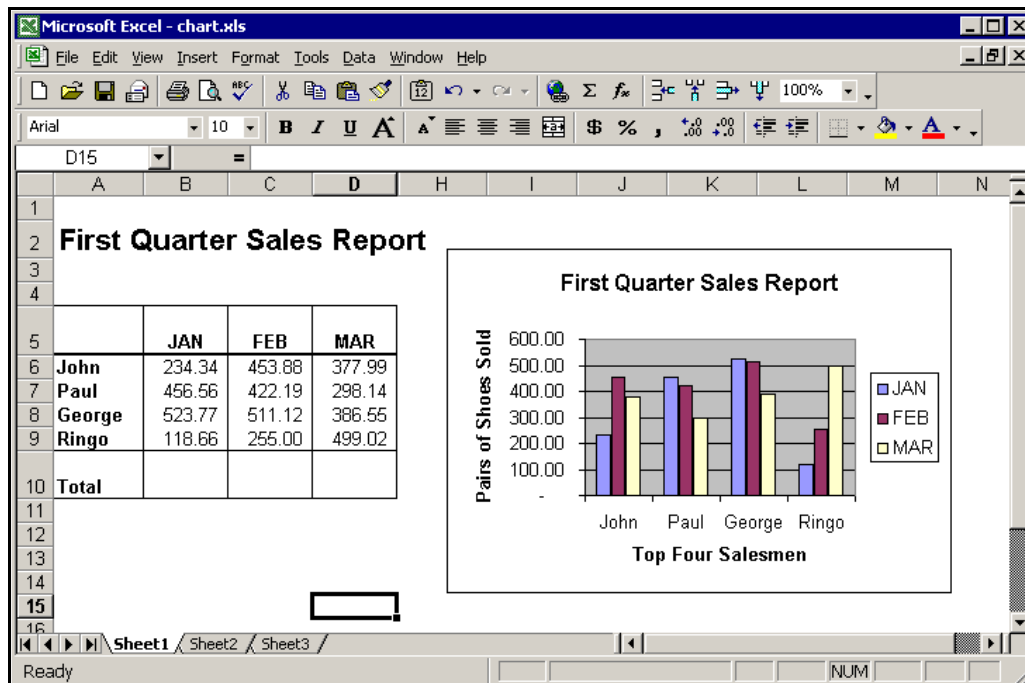


Figure 10-7 The Chart as an Object in the Spreadsheet

10. Try changing some of the values in the original plot range and see how the graph is affected.
11. Double-clicking on various parts of the chart will open up dialog boxes to allow formatting changes.

CREATING A LINE CHART


Line charts are especially useful when you plot trends, since lines connect points of data and show changes over time effectively.

EXERCISE 10B

Exercise

1. Click on the **LineChart** tab.
2. Highlight the range **A6:D9**.

	A	B	C	D	E
1	Chelsea Toy Company				
2	Production Summary				
3	Eastern Division				
4					
5					
6		Toys	Games	Stuffed Toys	
7	Fishkill	123	89	54	
8	Beacon	143	95	64	
9	Hopewell Junction	45	135	53	
10					

3. Select **INSERT > CHART** from the menu or click on the **Chart** button on the toolbar ().
4. When the Chart Wizard appears, select **Line Chart**, then click **NEXT**.
5. In Step 2 of the Chart Wizard, change the Series to the **Columns** option. This will plot the graph differently, comparing the manufacturing plants against one another rather than comparing the items.

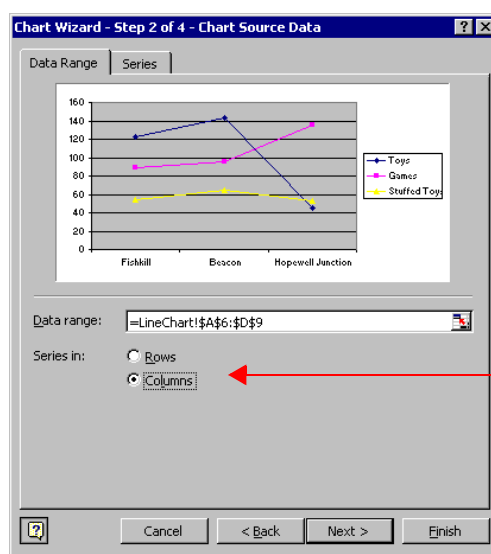


Figure 10-8 Changing the Plot Direction

6. In Step 3 of the Wizard use the **Titles** tab to enter **Chelsea Toy Company** as the chart title and click **NEXT**.
7. Click **FINISH** to insert the chart onto the spreadsheet. You can drag it to a new location and size it if you want.
8. Change some of the values to see the chart update.

CREATING A PIE CHART


Pie Charts are used to show the relationship of each value in a data range to the entire data range. The size of each wedge represents the percentage each value contributes to the total.

EXERCISE 10C

Exercise

1. Click on the **PieChart** tab.
2. Select the two ranges shown below. Remember to use the **CTRL** key to select the non-contiguous ranges.

	A	B	C	D
1	Chelsea Toy Company			
2	Production Summary			
3				
4				
5				
6		Toys	Games	Stuffed Toys
7	Fishkill	123	89	54
8	Beacon	143	95	64
9	Hopewell Junction	45	135	53
10				
11	Total	311	319	171
12				

3. Select **INSERT > CHART** from the menu or click on the **Chart** button on the toolbar (.
4. When the Chart Wizard appears, select **Pie**, with subtype 2, which is the 3-D visual effect chart.

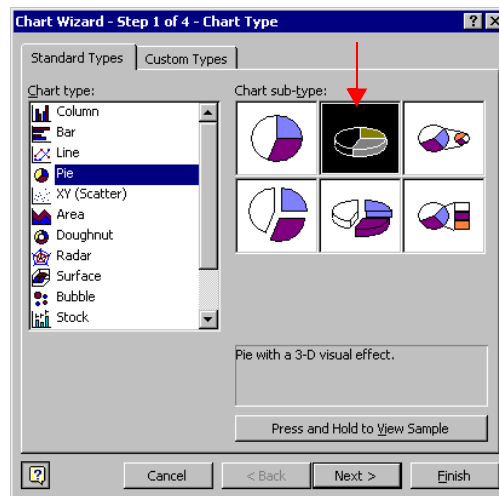
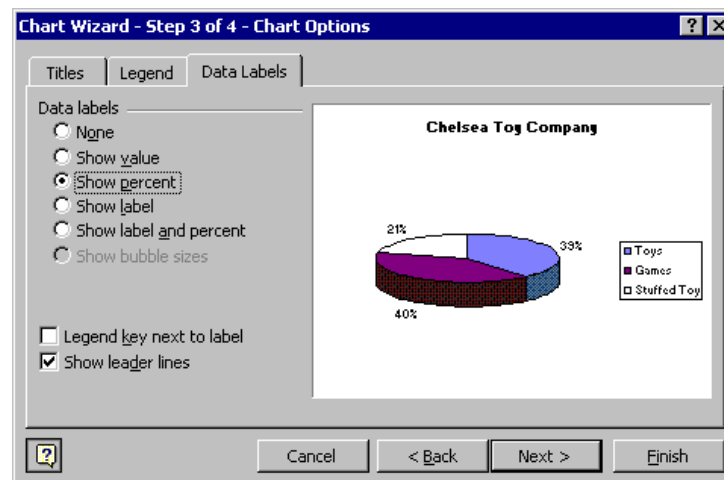


Figure 10-9 3D Visual Effect Pie Chart Type

5. Click on the **NEXT** button twice so that you get to **Step 3** of the Wizard.
6. On the **Titles** tab enter Chelsea Toy Company as the chart title.
7. On the **Data Labels** tab choose the **Show Percent** option. This will label each pie segment with the percentage of the whole.



8. Click on the **NEXT** button for Step 4 and then the **FINISH** button to place the chart. Move and size it if you want.

POINTS TO REMEMBER

- A chart is linked to the worksheet data it's created from and is updated automatically when you change the worksheet data.
- **Excel** creates the axis values from the worksheet data. Unless you specify differently, **Excel** uses the format of the upper-left cell in the value range as the number format for the axis.
- **Excel** uses column or row headings in the worksheet data for category axis names. You can change whether **Excel** uses column or row headings for category axis names or create different names.
- **Excel** also uses column or row headings in the worksheet data for series names. Series names appear in the chart legend. You can change whether **Excel** uses column or row headings for series names or create different names.

What-If Analysis

CHAPTER 11

Many users of Excel create What-If worksheets manually and modify the input cells directly. Analyzing data doesn't have to be a headache-inducing endeavor. Excel Data Tables offer you a way to look at many outcomes without having to enter each set of the equation manually.

A data table is a range of cells that shows how changing certain values in your formulas affects the results of the formulas. Data tables provide a shortcut for calculating multiple versions in one operation and a way to view and compare the results of all of the different variations together on your worksheet.

This chapter discusses one- and two-variable **Data Tables**. It also covers the **Goal Seek** command which allows you to *back in* to a desired result.

MANUAL WHAT-IF CALCULATIONS

The following figure shows a simple table for calculating monthly payments on the basis of specific information. It uses the `=PMT()` function.

	A	B	C	D
1	Monthly Mortgage Payment			
2				
3	Interest Rate	12.50%		
4	Years to Pay	10		
5	Loan Amount	18,000		
6				
7	Monthly Payment	\$263.48		
8				
9				

=PMT(interest rate, number of periods, loan amount)

By simply entering different values for the loan amount, interest rate, and number of years to pay, the monthly payment would calculate each time.

In this way you could make decisions based on changing the variables. But you would need some way to manually keep track of the results. This is where a data table could make things easier.

ONE-VARIABLE DATA TABLE

You can use a one-variable data table, for example, if you want to shop around for the best interest rates. The data table will display several solutions on-screen so you can see how the variables affect each other when you adjust them.

Setting Up a One-Variable Data Table

You need to design one-variable data tables so that input values are listed either down a column (column-oriented) or across a row (row-oriented). Formulas used in a one-variable data table must refer to an input cell.

1. Type the list of values you want to substitute in the input cell either down one column or across one row. This would correspond to the Yellow Range below.
2. If the input values are listed down a column, type the formula in the row above the first value and one cell to the right of the column of values. This would correspond to the Green Range below. Type any additional formulas to the right of the first formula.



If the input values are listed across a row, type the formula in the column to the left of the first value and one cell below the row of values. Type any additional formulas below the first formula.

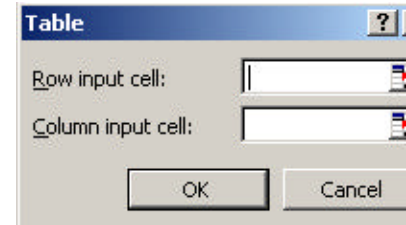
3. Select the range of cells that contains the formulas and values you want to substitute. This corresponds to the Blue Rectangle below.

	A	B	C	D
1				
2				
3			Formula Entered Here	
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Figure 11-1 One Variable Data Table Structure

4. Select **DATA > TABLE** from the menu.

5. If the data table is row-oriented, type the cell reference for the input cell in the **Row input cell** box.
6. If the data table is column-oriented, type the cell reference for the input cell in the **Column input cell** box.



EXERCISE 11A

Exercise

1. Open up the file called *DataTable.xls*.

	A	B	C	D	E
1	Data Table (What If Analysis)				
2					
3	Interest Rate	12.50%			
4	Years to Pay	10			
5	Loan Amount	18,000			
6					
7	Monthly Payment	\$ 263.48			
8					
9		\$ 263.48			
10	8.00%				
11	8.25%				
12	8.50%				
13	8.75%				
14	9.00%				
15	9.25%				
16	9.50%				
17	9.75%				
18	10.00%				
19	10.25%				
20	10.50%				

Annotations in the image:

- Red arrow pointing to cell B3: **Column Input Cell (represents interest rates)**
- Red arrow pointing to cell B9: **Formula**
- Red arrow pointing to the range A10:A20: **Range of possible interest rates**

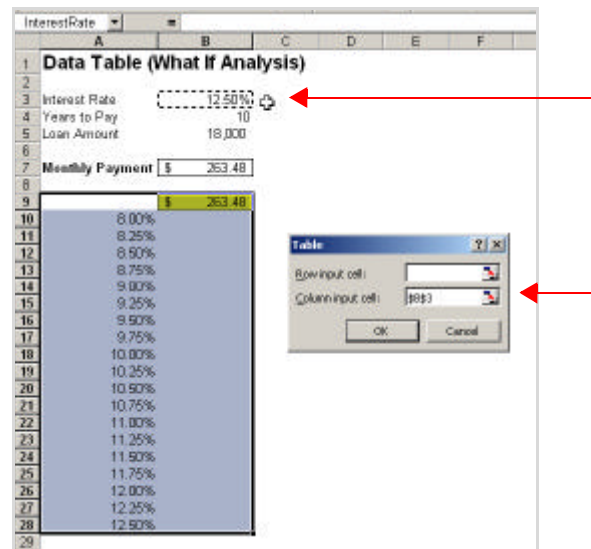
2. Try entering different values in the **Interest Rate** cell in **B3** to see how the monthly payment is affected.

In this example, possible interest rate values are listed in column A. The AutoFill method was used to populate this range. 8.0% was entered into the first cell, and 8.25% was entered into the second cell. With both cells selected, the fill handle was dragged down to row 28.

The formula has also been repeated and placed directly to the right of the interest cell range and one cell above.

3. Select the range A9:B28. This range includes the column of interest rates, the column to its right, and the formula in the row one column to the right of the interest rates and one row above.

4. Select **DATA > TABLE** from the menu.



5. Since the interest rate variables appear in a column, you need to tell Excel to replace the variable B3 in the PMT() function with the values in the first column of the data table. In other words, the Column Input Cell.
6. When you click on **OK**, the table will be completed.
7. Now you can change the values that represent term and loan amount and the results in the table will automatically recalculate.

Setting Up a One-Way Data Table with Two Formulas

Suppose you wanted to see not only what the monthly payment would be but also what the yearly payment would be for each scenario. In this case, all that is needed is another formula to the right of the first one.

EXERCISE 11B

Exercise

1. Switch to the TwoFormulas tab in the file *DataTable.xls*

Notice that a formula to the right of the previous one has been added to the spreadsheet.

Setting Up a One-Way Data Table with Two Formulas

	Monthly Payment	Yearly Payment
8.00%	\$ 616.26	\$ 7,395.13
8.25%		
8.50%		
8.75%		
9.00%		
9.25%		
9.50%		
9.75%		
10.00%		
10.25%		
10.50%		

- This time select the range A11:C30. This range includes the second formula in the column to the right of the first formula and the range of substitute interest rates.
- Select **DATA > TABLE** from the menu.

	Monthly Payment	Yearly Payment
8.00%	\$ 616.26	\$ 7,395.13
8.25%		
8.50%		
8.75%		
9.00%		
9.25%		
9.50%		
9.75%		
10.00%		
10.25%		
10.50%		

- As before select cell B8 as the column input cell and press **OK**.

TWO-VARIABLE DATA TABLE

So far you had to make changes manually to the interest rate *and* the term to see how the monthly payment would be affected. A two-variable data table could do the work for you.

Setting Up a Two-Variable Data Table

Two-variable data tables use only one formula with two lists of input values. The formula must refer to two different input cells.

1. In a cell on the worksheet, enter the formula that refers to the two input cells. This would correspond to the Green Range below.
2. Type one list of input values in the same column, below the formula. This would correspond to the Yellow Range below.
3. Type the second list in the same row, to the right of the formula. This would correspond to the Blue Range below.
4. Select the range of cells that contains the formula and both the row and column of values. This corresponds to the Blue Rectangle below.

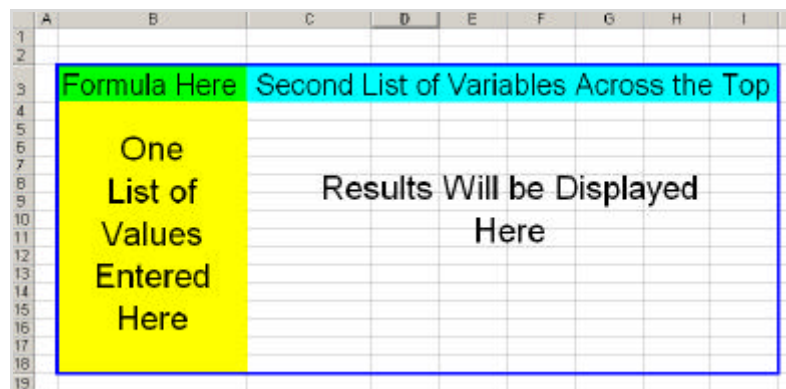


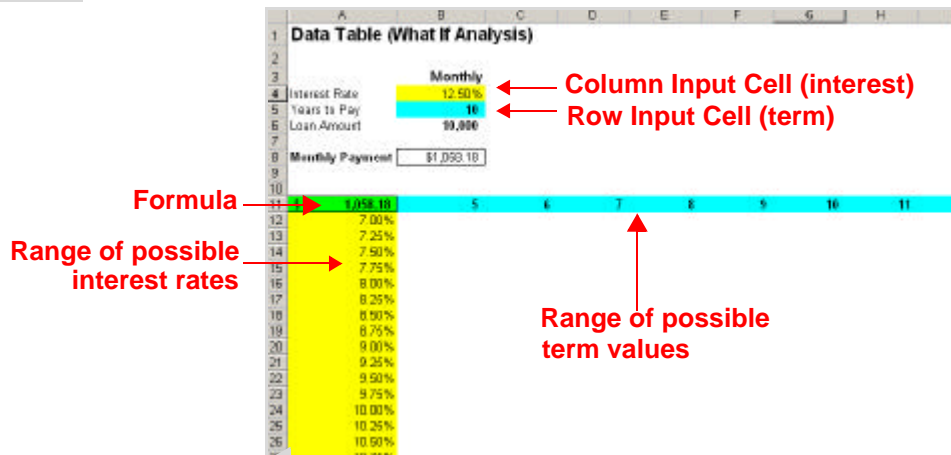
Figure 11-2 Two Variable Data Table Structure

5. Select **DATA > TABLE** from the menu.
6. In the **Row input cell** box, enter the reference for the input cell for the input values in the row.
7. In the **Column input cell** box, enter the reference for the input cell for the input values in the column.

EXERCISE 11C

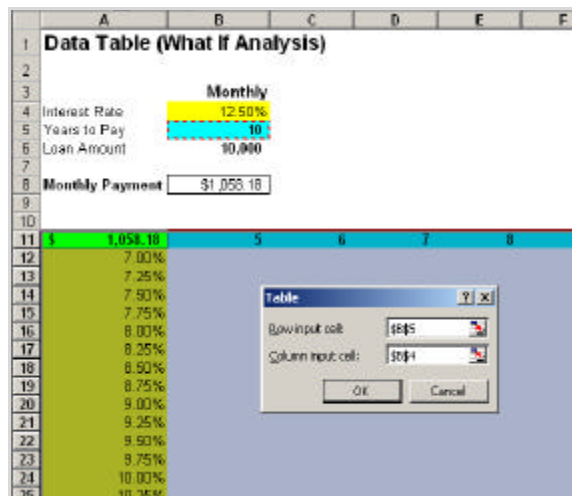
Exercise

1. Switch to the 2-Way Table tab in the file *DataTable.xls*.



In this example, possible interest rate values are listed in column A. The formula is placed directly *above* the interest cell range. Possible term values are entered to the right of the formula across the top.

2. Select the range A11:N40. This range includes the column of interest rates, the formula, and the row of possible term values across the top.
3. Select **DATA > TABLE** from the menu.



4. Select cell B5 as the row input cell. Select B6 as the column input cell and press **OK**.

Editing Data Tables

Excel considers all calculated data in a data table (those values not in the top row or left column) to be an array. You cannot delete a portion of an array. However, you can format or change the values in the first column and the top row.

If you try to delete a portion of the table, you will get an error message. To clear all the calculated cells in a data table, highlight the *entire* array and press **DELETE**.

USING GOAL SEEK

The Goal Seek command on the Tools menu is another method of answering a what-if question. It will adjust a value in a cell (the changing cell) until a cell containing a formula (the set cell) reaches the value you specify.

The Goal Seek command lets you work backward through a worksheet scenario. It's like What-If in reverse.

For example, using the same PMT() function, if you know what the largest payment you can afford is, Excel can determine the maximum amount you can purchase given a particular interest rate and loan term.

How It Works

To use Goal Seek successfully, you supply three items of information:

- A worksheet cell (the **Set cell**) with the target formula for the operation.
- The projected value (the **To value**) that you want this formula to yield.
- The cell with the input value (the **By changing cell**) that Excel will adjust in order to achieve the specified result from the target formula.

Goal Seek works by estimating a high number in the changing cell and looking at the answer in the **Set cell**. It evaluates how closely the answer matches the answer required in the **To value** text box. It then estimates a low number and evaluates it. Alternating between high and low numbers, it seeks to provide an answer.

In some cases, Goal Seek can't find an answer. The input may be incorrect or a realistic answer may not exist. Then you receive an error message. By default, Goal Seek makes up to 100 attempts to find an answer. It quits when the answer is exact or within .001.

EXERCISE 11D

Exercise

1. Switch to the Goal Seek tab in the file *DataTable.xls*.
2. Let's assume that the maximum value you want for your monthly payments is \$350. You can have Excel calculate the maximum loan amount that you can afford
3. Select **TOOLS > GOAL SEEK** from the menu.

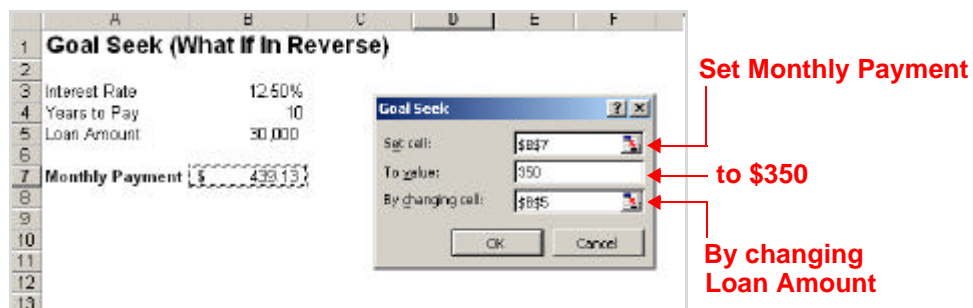


Figure 11-3 Goal Seek Dialog Box

4. Fill in these values

Set cell	\$B\$7
To value	350
By changing cell	\$B\$5
5. Click **OK**. You will see the optimum loan value appear.

POINTS TO REMEMBER

- You can create a **data table** (what-if table) to evaluate a series of possible answers for values you supply in the first row and left-most column of the table. These values are called **substitution** values.
- The **column and row input values** that the formula will refer to must be outside the table
- When you use a one way data table, Excel uses the formula at the top of the second column to calculate the substitution values.
- With a one-way data table you can use more than one formula to be calculated. Place each additional formula to the right of the first one.
- With a two-way data table the formula must be in the top-left cell of the table range and must refer to the column and row input values. The substitution values must be arranged in the first row and first column of the table.
- When you know the desired result of a single formula but not the input value the formula needs to determine the result, you can use the Goal Seek feature. When goal seeking, Microsoft Excel varies the value in one specific cell until a formula that's dependent on that cell returns the result you want.

Summarizing Data With Subtotals

CHAPTER 12

In its simplest form, a database is an organized list. The more complex your database, the more information you list will contain. The row and column structure of Excel lends itself well to creating lists of information. It presents you with the opportunity for organizing your data in meaningful and easily retrievable order.

This chapter discusses one of Excel's methods of working with large lists.

SUBTOTALING DATA

Excel has the ability to insert or remove dozens of subtotals with just a single click. Consider a worksheet containing 10 columns and 100 rows of data. You could spend 5 minutes or more inserting blank rows, writing formulas, copying formulas, and formatting the data to generate totals, subtotals, and grand totals.

Excel's Data Subtotals command will do all of these steps in less than 5 seconds. The Subtotals command can be used not only for sums but for counts, averages, minimums and maximums. When you apply this command, Excel performs three things:

- It automatically inserts a new row for the Subtotal for each group of data in the list.
- Builds a formula in the new row(s) for the column to be subtotaled.
- Inserts a Grand Total line at the bottom of the list.

Inserting Subtotals Into a List

Sort the list by the column for which you want to calculate subtotals. For example, to summarize the units sold by each salesperson in a list of salespeople, sales amounts, and the number of units sold, sort the list by the salesperson column.

1. Click a cell in the list.
2. Select **DATA > SUBTOTALS** from the menu.

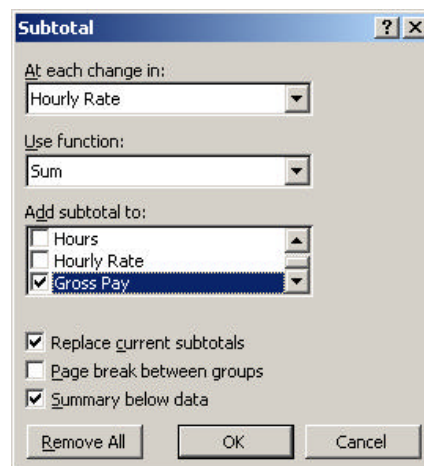
3. In the **At each change in** box, click the column that contains the groups for which you want subtotals. This should be the same column by which you sorted your list in step 1.
4. In the **Use function** box, click the function you want to use to calculate the subtotals. For information about the summary functions, see the table below.
5. In the **Add subtotal to** box, select the check boxes for the columns that contain the values for which you want subtotals.

Excel automatically applies Outline buttons for you to display or hide the detailed rows of each subtotal group.

- If you click on number 1 (first level), only the Grand Total shows. The data in the list is hidden.
- If you click on the number 2 (second level), only the subtotals and grand totals show.
- If you click on the number 3 (third level), the entire list is displayed.

You can also use the plus (+) and the minus (-) signs to show different details of your list.

6. To remove the subtotals, make sure your active cell is within the list, select **DATA > SUBTOTALS** and check **REMOVE ALL**.



Use This	To Summarize
Sum	The sum of the values in a list. This is the default function for numeric data.
Count	The number of items in a list. This is the default function for nonnumeric data.
Average	The average of the values in a list.
Max	The largest value in a list.
Min	The smallest value in a list.
Product	The result of multiplying all the values in a list.
Count Nums	The number of records or rows in a list that contain numeric data.

Table 12-1 Summary Functions for Subtotaled Lists

Use This	To Summarize
StdDev	An estimate of the standard deviation of a population, where the list is the sample.
StdDevp	The standard deviation of a population, where the list is the entire population.
Var	An estimate of the variance of a population, where the list is the sample.
Varp	The variance of a population, where the list is the entire population.

Table 12-1 Summary Functions for Subtotaled Lists

EXERCISE 12A

Exercise

In this exercise you will create subtotals in a spreadsheet that lists Unit and Net amounts for items sold in five states. The first level totals will be by State, and the second level totals will be by Category.

1. Open up the file called *Subtotals.xls*.

	A	B	C	D
1	State	Category	Units	Net
2	CT	Kids	25.0	43.75
3	CT	Kids	35.0	78.75
4	NH	Museum	130.0	227.50
5	NH	Museum	205.0	448.25
6	MA	Art	30.0	82.50
7	MA	Art	165.0	371.25
8	MA	Museum	105.0	193.75
9	MA	Museum	165.0	371.25
10	VT	Art	85.0	148.75
11	RI	Kids	1,075.0	1,857.50
12	RI	Kids	230.0	490.21
13	NH	Museum	195.0	436.25
14	NH	Museum	145.0	253.75
15	NH	Museum	340.0	523.85
16	MA	Art	30.0	82.50
17	MA	Art	165.0	371.25
18	MA	Environment	195.0	425.61
19	MA	Kids	450.0	955.15
20	MA	Museum	50.0	157.50
21	MA	Museum	195.0	425.74
22	VT	Art	325.0	542.50
23	VT	Art	95.0	123.75
24	VT	Environment	85.0	148.75
25	VT	Environment	95.0	123.75
26	VT	Hamocks	50.0	112.50
27	VT	Kids	145.0	253.75
28	VT	Kids	45.0	101.25
29	VT	Museum	85.0	113.75
30	VT	Museum	85.0	180.00
31	RI	Kids	1,045.0	1,954.54
32	RI	Kids	335.0	643.90

2. The first thing that needs to be done is a sort of the rows by **State** and then by **Category**. Make sure that you select any cell within the list and select **DATA > SORT** from the menu.
3. Once the list is sorted, select **DATA > SUBTOTALS** from the menu. Again, make sure a cell within the list is selected before you choose the command.

Summarizing Data With Subtotals

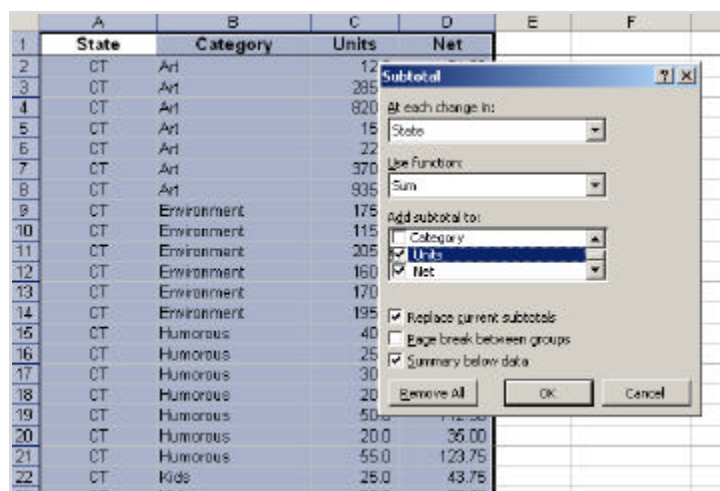


Figure 12-1 Data Subtotals Dialog Box

4. Make the following selections in the dialog box:

At each change in:	State
Use function:	Sum
Add subtotal to:	Units Net
check Replace current subtotals	
check Summary below data	

5. Click the **OK** button.

Notice that Excel adds the Outline buttons for you to display or hide the detailed rows of each subtotal group. Scroll down to the end of the CT group to see the subtotal that was added.

Outline Symbols →

	A	B	C	D
	State	Category	Units	Net
43	CT	Sports	930.0	2,180.15
44	CT	Sports	30.0	65.00
45	CT	Sports	470.0	798.57
46	CT	Sports	10.0	17.50
47	CT	Sports	95.0	123.75
48	CT	Sports	35.0	78.75
	CT Total		9,994.6	19,849.16
50	MA	Art	30.0	82.50
51	MA	Art	185.0	371.25
52	MA	Art	30.0	82.50
53	MA	Art	185.0	371.25
54	MA	Art	30.0	82.50
55	MA	Art	195.0	426.44
56	MA	Art	30.0	82.50

← **Subtotal**

Create “Nested” or Multiple-Level Subtotals

You can insert subtotals for smaller groups within existing subtotal groups. For example, you can insert subtotals for each category in a list that already has subtotals for each state. Before inserting nested subtotals, be sure to sort by all the columns for which you want subtotal values so that the rows you want subtotaled are grouped together.

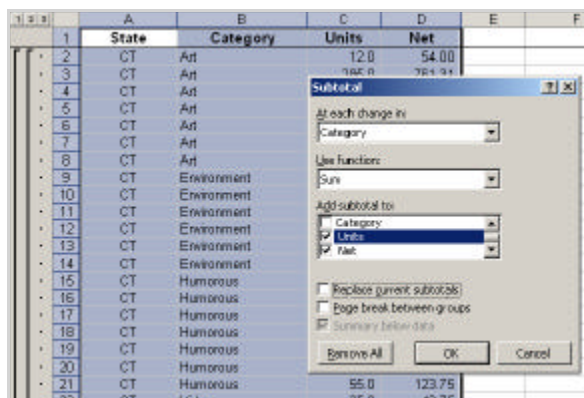
1. After you have displayed automatic subtotals for the first column, repeat the process for the next column.
2. Click a cell in the list.
3. Select **DATA > SUBTOTALS**.
4. In the **At each change in** box, select the next column you want to subtotal.
5. Clear the **Replace current subtotals** check box, and then click **OK**.
6. Repeat steps 2 through 5 for each column for which you want to calculate subtotals.

EXERCISE 12B

Exercise

In this exercise you will create subtotals within each State list by Category.

1. Make sure a cell within the list is selected and choose **DATA > SUBTOTALS** from the menu.



2. Make the following selections in the dialog box:

At each change in:	Category
Use function:	Sum
Add subtotal to:	Units
	Net
Remove the check for Replace current subtotals	

Summarizing Data With Subtotals

3. Click the **OK** button.

Notice that Excel adds another outline level..

Additional Outline Symbols

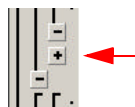
Subtotals by Category

	A	B	C	D
	State	Category	Units	Net
41	CT	Museum	525.0	1,112.85
42	CT	Museum	435.0	738.72
43	CT	Museum	665.0	1,406.10
44		Museum Total	4,040.0	7,929.45
45	CT	Sports	20.0	35.00
46	CT	Sports	40.0	90.00
47	CT	Sports	30.0	67.50
48	CT	Sports	920.0	2,180.15
49	CT	Sports	20.0	55.00
50	CT	Sports	470.0	798.57
51	CT	Sports	10.0	17.50
52	CT	Sports	65.0	123.75
53	CT	Sports	35.0	78.75
54		Sports Total	1,600.0	3,426.22
55	CT Total		9,594.0	19,849.40
56	MA	Art	30.0	82.50
57	MA	Art	165.0	371.25
58	MA	Art	30.0	82.50
59	MA	Art	165.0	371.25
60	MA	Art	30.0	82.50

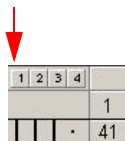
Show or Hide Detail Data in the Subtotal Outline

The advantage to having an outline is that you can quickly display only the rows that provide summaries for sections of your worksheet.

- Click on the plus and minus signs in the outline to expand and collapse specific levels.



- Click on the level number to collapse a whole level.



EXERCISE 12C

Exercise

1. Click on the number 3 at the top corner of the outline. You will have a summary of each state by category.

Level 3

	A	B	C	D
1	State	Category	Units	Net
9		Art Total	2,469.0	5,500.45
16		Environment Total	1,030.0	2,007.02
24		Humorous Total	340.0	507.50
36		Kids Total	235.0	478.75
44		Museums Total	4,040.0	7,929.45
54		Sports Total	1,600.0	3,426.22
55	CT Total		9,594.0	19,849.40
66		Art Total	1,035.0	2,398.94
74		Environment Total	1,215.0	2,471.67
81		Humorous Total	2,115.0	3,989.63
88		Kids Total	1,895.0	3,747.45
100		Museums Total	1,740.0	3,431.42
110		Sports Total	400.0	882.50
111	MA Total		8,400.0	16,972.01
122		Art Total	999.0	3,407.54
129		Environment Total	343.0	667.00
138		Humorous Total	427.0	1,133.00
145		Kids Total	461.0	1,269.60
156		Museums Total	1,895.0	3,841.98
168		Sports Total	520.0	1,481.25
169	NH Total		4,645.0	12,000.27
176		Art Total	4,055.0	9,522.39
181		Environment Total	990.0	1,924.16

2. Click on the number 2 at the top corner of the outline. You will have a summary of each state.

Level 2

	A	B	C	D
1	State	Category	Units	Net
55	CT Total		9,594.0	19,849.40
111	MA Total		8,400.0	16,972.01
169	NH Total		4,645.0	12,000.27
216	NJ Total		12,050.0	24,277.82
268	NY Total		13,559.0	27,911.68
301	RI Total		1,860.0	7,470.47
356	VT Total		3,620.0	8,553.41
357		Grand Total	53,928.0	117,035.06
358	Grand Total		53,928.0	117,035.06
359				

Figure 12-2 Creating a Summary of Data with a Collapsed Outline

Removing Subtotals from Your List

When you remove subtotals from a list, Excel also removes the outline and all page breaks that were inserted into the list when you inserted the subtotals.

1. Click a cell in the list that contains subtotals.
2. Select **DATA > SUBTOTALS** and click the **REMOVE ALL** button.

POINTS TO REMEMBER

- Excel can automatically summarize data by calculating subtotal and grand total values in a list. To use automatic subtotals, your list must contain labeled columns and the list must be sorted on the columns for which you want subtotals.
- The Subtotals command can be used not only for sums but for counts, averages, minimums and maximums.
- When you apply the Subtotals command, Excel adds Outline buttons for you to display or hide the detailed rows of each subtotal group.
- You can insert subtotals for smaller groups within existing subtotal groups. Before inserting nested subtotals, be sure to sort by all the columns for which you want subtotal values so that the rows you want subtotaled are grouped together.
- An advantage to having an outline is that you can quickly display only the rows that provide summaries for sections of your worksheet.
- When you remove subtotals from a list, Excel also removes the outline and all page breaks that were inserted into the list when you inserted the subtotals.

Intro to Pivot Tables

CHAPTER 13

A PivotTable report is an interactive table that you can use to quickly summarize large amounts of data. You can rotate its rows and columns to see different summaries of the source data, filter the data by displaying different pages, or display the details for areas of interest.

You can easily rearrange the information in the pivot table by dragging the buttons to a new position.

Before you can create a Pivot Table or Pivot Chart, organize your data in a table that Excel can understand.

- The first row must have headings. Use a different heading for each column.
- Keep all the data together — don't include any blank rows or columns in the table.
- Leave at least one blank row and one blank column between the data table and any other information on the worksheet.

	A	B	C	D	E	F	G
1	DATE	STATE	CHANNEL	PRICE	CATEGORY	UNITS	NET
2	03/01/06	WA	Wholesale	High	Fitness	560	1,423.72
3	11/01/06	AZ	Wholesale	High	Art	90	247.60
4	04/30/05	OR	Wholesale	Mid	Fitness	65	146.25
5	06/01/06	AZ	Wholesale	Mid	Environment	50	112.50
6	03/31/05	WA	Wholesale	Low	Kids	15	26.25
7	10/01/07	ID	Retail	Mid	Art	80	360.00
8	06/01/07	UT	Wholesale	Mid	Kids	40	90.00
9	04/01/07	NV	Retail	Mid	Sports	68	306.00
10	10/31/05	WA	Wholesale	Mid	Health	180	405.00
11	12/01/06	WA	Wholesale	Mid	Kids	35	78.75
12	07/01/06	CA	Retail	Mid	Sports	150	596.53
13	12/01/06	AZ	Retail	Mid	Art	98	441.00
14	01/01/07	AZ	Wholesale	High	Art	135	371.25
15	07/31/05	OR	Retail	Low	Kids	23	80.50
16	11/30/05	OR	Wholesale	Mid	Fitness	65	146.25

Use a Pivot Table when....

- you want to compare related totals, especially when you have a long list of figures to summarize and you want to compare several facts about each figure.
- you want Excel to do the sorting, subtotaling, and totaling for you. Because a PivotTable report is interactive, you can change the view of the data to see more details or calculate different summaries.

SOURCE DATA FOR A PIVOTTABLE REPORT

You can create a PivotTable report from an Excel spreadsheet, an external database, multiple Excel spreadsheets, or another PivotTable report.

Source data from Excel lists and most databases is organized in rows and columns. Your source data must have similar facts in the same column. In the example, the State always in column B, the Category is in column D, the Units in column F, and so on.

	A	B	C	D	E	F	G
1	DATE	STATE	CHANNEL	PRICE	CATEGORY	UNITS	NET
2	03/01/05	WA	Wholesale	High	Fitness	550	1,423.72
3	11/01/05	AZ	Wholesale	High	Art	90	247.50
4	04/03/05	OR	Wholesale	Mid	Fitness	65	146.25
5	05/01/05	AZ	Wholesale	Mid	Environment	50	112.50
6	03/01/05	WA	Wholesale	Low	Kids	16	26.25
7	10/01/07	ID	Retail	Mid	Art	80	360.00
8	05/01/07	UT	Wholesale	Mid	Kids	40	90.00
9	04/01/07	NY	Retail	Mid	Sports	68	306.00
10	10/01/05	WA	Wholesale	Mid	Health	180	405.00
11	12/01/05	WA	Wholesale	Mid	Kids	35	78.75
12	07/01/05	CA	Retail	Mid	Sports	150	596.53
13	12/01/05	AZ	Retail	Mid	Art	90	441.00
14	01/01/07	AZ	Wholesale	High	Art	135	371.25
15	07/01/05	OR	Retail	Low	Kids	23	80.50
16	11/03/05	CO	Wholesale	Mid	Fitness	65	146.25

Source Data

A PivotTable report contains fields, each of which corresponds to a column in the source data and summarizes multiple rows of information from the source data. Fields in a PivotTable report list items of data across rows or down columns. The cells where the rows and columns intersect show summarized data for the items at the top of the column and the left side of the row.

	A	B	C	D
1	STATE	CA		
2				
3	Sum of UNITS	CHANNEL		
4	CATEGORY	Retail	Wholesale	Grand Total
5	Art	7847	20940	28787
6	Environment	3840	10845	14685
7	Health	4360	12195	16555
8	Humorous	2155	4816	6970
9	Kids	868	36865	37733
10	Sports	2705	4890	7595
11	Grand Total	21795	90590	112385
12				

Pivot Table

A **data field**, such as **Sum of Units**, provides the values that are summarized in the PivotTable report.

To summarize the data field values, PivotTable reports use **summary functions**, such as Sum, Count, or Average. These functions also provide subtotals and grand totals automatically, where you choose to show them.

In most PivotTable reports, you can view the detail rows from the source data that make up the summary value in a particular data cell. By dragging a field button to another part of the PivotTable report, you can view your data in various ways and calculate different summarized values. For example, you can view the names of categories across the columns instead of down the rows.

ELEMENTS OF A PIVOTTABLE REPORT

The following diagram illustrates a sample pivot table report. It represents a pivot table created from the example used in this chapter. The example is an orders table. There are 3,300 rows of data, and the following fields for each record:

- DATE
- STATE
- CHANNEL
- PRICE
- CATEGORY
- UNITS
- NET

The Pivot breaks down the data, showing total units summarized by Category, Channel (Wholesale or Retail) and Price Range (Low, Medium, or High). The data can be viewed overall, or by state.

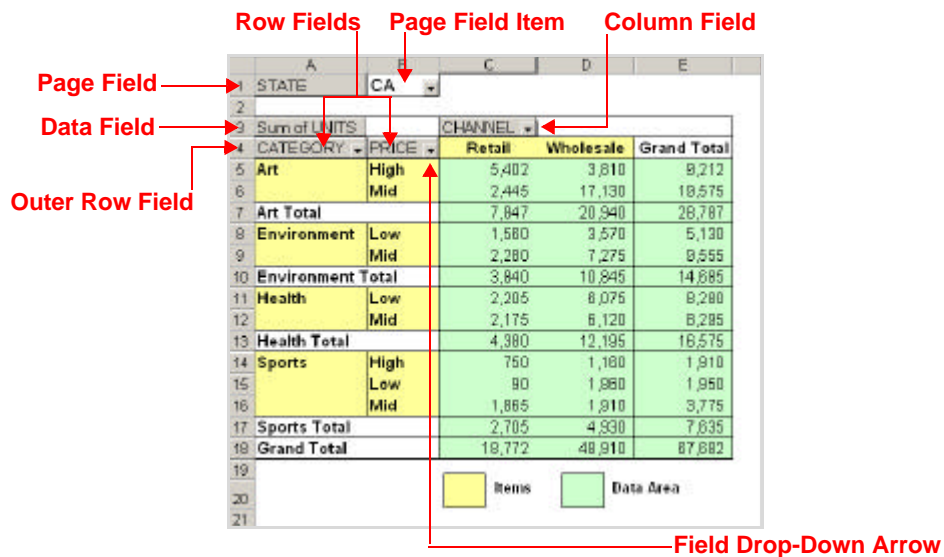


Figure 13-1 Pivot Table Elements

Element	Description
Row fields	Fields from the underlying source data that are assigned a row orientation in a PivotTable report. In the example, Category and Price are row fields. A PivotTable report that has more than one row field has one inner row field (Price, in the example), the one closest to the data area. Any other row fields are referred to as outer row fields. Inner and outer row fields have different attributes. Items in the outermost field are displayed only once, but items in the rest of the fields are repeated as needed.
Column field	A field that's assigned a column orientation in a PivotTable report. In the preceding example, Channel is a column field with two items, Wholesale and Retail. A PivotTable report can have multiple column fields just as it can have multiple row fields. Most indented format PivotTable reports do not have column fields.
Item	A subcategory, or member, of a PivotTable field. In the preceding example, Art and Environment are items in the Category field. Items represent unique entries in the same field, or column, in the source data. Items appear as row or column labels or in the drop-down lists for page fields.
Page field	A field that's assigned to a page, or filter, orientation. In the example, State is a page field that you can use to filter the report by region. With the State field, you can display summarized data for only AZ, for only the CA, or for other states. When you click a different item in a page field, the entire PivotTable report changes to display only the summarized data associated with that item.
Page field item	Each unique entry or value from the field, or column, in the source list or table becomes an item in the page field list. In the example, CA is the currently selected item for the State page field, and the PivotTable report displays the summarized data for only CA.
Data field	<p>A field from a source list or database that contains data to be summarized. In the example, Sum of Units is a data field that summarizes the entries from the Units field, or column, in the source data.</p> <p>A data field usually summarizes numeric data, such as statistics or sales figures, but the underlying data can also be text. By default, Excel summarizes text data in PivotTable reports by using the Count summary function and summarizes numeric data by using Sum.</p>

Table 13-1 PivotTable Elements

Element	Description
Data area	The part of a PivotTable report that contains summary data. The cells of the data area show summarized data for the items in the row and column fields. Each value in the data area represents a summary of data from the source records, or rows.
Field drop-down arrow	The arrow at the right side of each field. Click this arrow to select the items that you want to show.

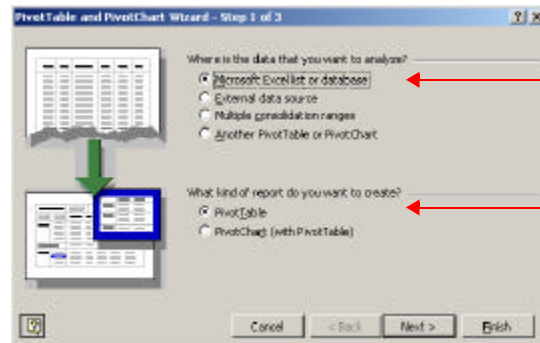
Table 13-1 PivotTable Elements

EXERCISE 13A

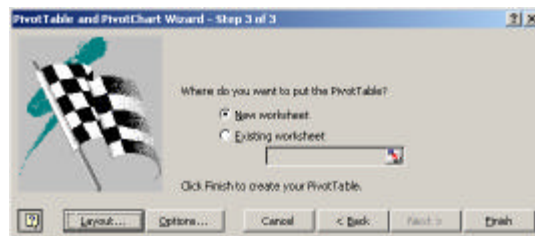
Exercise

In this exercise you will create a simple Pivot table. By the end of the chapter you will have built the Pivot Table illustrated in Figure 13-1.

1. Open the file called *PivotTable.xls*.
2. Click anywhere within the list and select **DATA > PIVOTTABLE AND PIVOTCHART REPORT...** from the menu.
3. The Pivot Table Wizard will appear.



4. Accept the default selections and click on the **NEXT** button.
5. Step 2 of the Wizard will ask you to confirm the list that has been highlighted. Click the **NEXT** button.



- Step 3 of the Wizard appears. Before you click the **FINISH** button, you will need to decide the layout. Click the **LAYOUT** button. The following dialog box will appear:

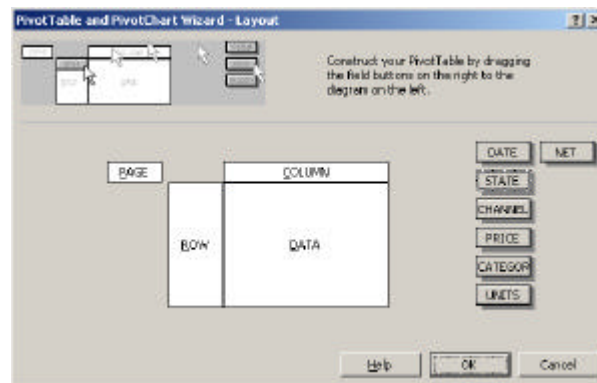
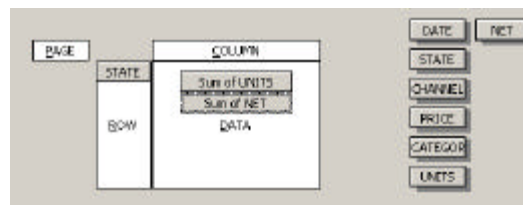


Figure 13-2 Pivot Table Layout Dialog Box

- In this step you drag the field names from the right side of the dialog box into the different PivotTable areas.
- Drag the STATE field to the Row section.
- Drag the UNITS and NET fields to the Data area.



- When you have done this, click the **OK** button.
- The last step of the Wizard will ask where you want the table. Keep the default selection, on a **New worksheet**. Click the **FINISH** button.
- The table will appear on a new sheet.
- Rename the sheet tab as **State Summary**.

MODIFYING PIVOTTABLES

Once you have created a PivotTable, changing it to suit your preferences is simple. You might decide to add new fields or modify existing fields, or modify field names. You can even add your own calculations.

STATE	Data	Total
AZ	Sum of UNITS	25341
	Sum of NET	69650.48
CA	Sum of UNITS	112385
	Sum of NET	269549.49
ID	Sum of UNITS	1660
	Sum of NET	7470.47
IN	Sum of UNITS	51634
	Sum of NET	137105.31
OR	Sum of UNITS	179516
	Sum of NET	432953.01
UT	Sum of UNITS	40068
	Sum of NET	87945.43
WA	Sum of UNITS	154017
	Sum of NET	362997.77
Total	Sum of UNITS	564821
Total	Sum of NET	1367081.96

Rearrange Data Fields

By changing the layout of the PivotTable, you can see a radically different scenario.

If you place two fields in the Data area of a Pivot Table, they appear vertically arranged. To make the data easier to read, you can rearrange the table.

USING THE PIVOTTABLE WIZARD

You can also use the PivotTable Wizard to change the arrangement of the fields. To access the PivotTable Wizard, first click one of the PivotTable fields, and then click the PivotTable Wizard button on the PivotTable toolbar.

You can also select **DATA > PIVOTTABLE AND PIVOTCHART REPORT...** from the menu. The Layout dialog box will instantly appear.

BY DRAGGING

The easiest way to change PivotTables is to simply drag and drop field headings into new areas on the PivotTable. There are three places to which you can drag the field headings:

- row fields
- column fields
- page fields

EXERCISE 13B

Exercise

1. Point to the grey button for the Data field.

2. Hold the left mouse button, and drag the **Data** button onto the cell which contains the word **Total**.

	A	B	C
1		Drop Page Fields Here	
2			
3	STATE	Data	Total
4	AZ	Sum of UNITS	25341
5		Sum of NET	69660.48
6	CA	Sum of UNITS	112385
7		Sum of NET	269549.49
8	ID	Sum of UNITS	1860
9		Sum of NET	7470.47
10	NV	Sum of UNITS	51634

3. Release the mouse button. The **Data** fields will now be arranged horizontally.

	A	B	C
1			
2			
3		Data	
4	STATE	Sum of UNITS	Sum of NET
5	AZ	25341	69660.48
6	CA	112385	269549.49
7	ID	1860	7470.47
8	NV	51634	137105.31
9	OR	179516	432353.01
10	UT	40068	87945.43
11	WA	154017	362997.77
12	Grand Total	564821	1367081.96
13			

Adding and Removing Data Fields

To remove a field the easiest way is to drag it outside the PivotTable area. The icon becomes a rectangle with an X through it, as illustrated here.



To add a field select the field name from the Field List select the field name from the list. From the **ADD TO** drop-down list select the area to add the field. Click the **ADD TO** button.

To add a field using the Layout Wizard, click on the PivotTable Wizard button on the PivotTable toolbar. Excel displays the PivotTable Wizard. Click the **LAYOUT** button for the layout dialog box. Drag the field you want to add into the appropriate layout area of your table, and then click on **FINISH**.



EXERCISE 13C

Exercise

The Pivot Table currently summarizes Units and Net by State. Suppose you wanted to break down Units and Net by category.

1. Select Category from the Field List.
2. Select Row Area from the **ADD TO** section.
3. Click on the **ADD TO** button.
4. Your table should look like the following illustration:

	A	B	C	D
1				
2				
3				
4	STATE	CATEGORY	Sum of UNITS	Sum of NET
5	AZ	Art	5252	17051.69
6		Environment	2056	6092
7		Health	5192	21169.6
8		Humorous	1657	5099
9		Kids	3020	7941.25
10		Sports	1604	11447.35
11	AZ Total		20541	29650.49
12	CA	Art	20787	70849.7
13		Environment	14885	37164.61
14		Health	18575	49417.89
15		Humorous	6970	17374.26
16		Kids	37702	73911.49
17		Sports	7626	22931.55
18	CA Total		112385	289549.49
19	ID	Art	256	1467.5
20		Environment	170	716
21		Health	260	676
22		Humorous	280	1176
23		Kids	226	596
24		Sports	629	2222.97
25	ID Total		1860	7470.47
26	NV	Art	14275	37167.90
27		Environment	5870	16013.90
28		Health	6169	38773.24

You can concentrate on one State at a time by moving the State field to the Page area.

5. Select State from the Field list.
6. Select Page area from the **ADD TO** drop down list.
7. Click on the **ADD TO** button.

	A	B	C
1	STATE	(All)	
2			
3			
4	CATEGORY	Sum of UNITS	Sum of NET
5	Art	134177	352081.85
6	Environment	87091	199518.38
7	Fitness	70270	154736.68
8	Health	75324	192423.66
9	Humorous	27690	70125.26
10	Kids	123226	271907
11	Sports	47083	126289.13
12	Grand Total	654821	1367081.96
13			
14			

Click on this arrow

to select a State



8. Currently the table lists All by Category. Click on the drop-down list in the figure above, select a state and click **OK**.

To understand the difference between adding fields to the Row or the Column area let's add one of the fields both ways. Suppose you also wanted to break down your report by Channel (showing Wholesale and Retail).

9. Select **Channel** from the field list. We'll add it first to the **Row** area. Select **Row** area from the **ADD TO** drop down list and click on the **ADD TO** button

“Channel” as a row field

	A	B	C	D
1	STATE	CA		
2				
3			Data	
4	CATEGORY	CHANNEL	Sum of UNITS	Sum of REVENUE
5	Art	Retail	7847	33601.27
6		Wholesale	20640	46048.43
7	Art Total		28487	79649.7
8	Environment	Retail	3840	15133.66
9		Wholesale	10645	22030.96
10	Environment Total		14485	37164.61
11	Health	Retail	4380	16511.45
12		Wholesale	12195	23906.44
13	Health Total		16575	40417.89
14	Humorous	Retail	2155	6153.66
15		Wholesale	4815	9220.38
16	Humorous Total		6970	15374.06
17	Kids	Retail	868	3492
18		Wholesale	36665	69319.48
19	Kids Total		37533	72811.48
20	Sports	Retail	2705	12213.94
21		Wholesale	4930	10717.61
22	Sports Total		7635	22931.55
23	Grand Total		112385	269549.49

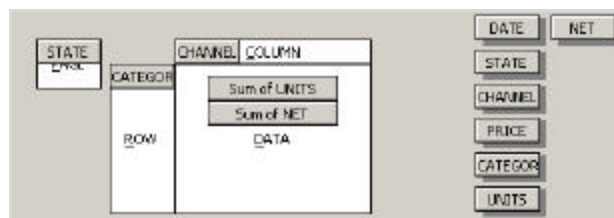
10. Select **Channel** from the field list again select **column area** from the **ADD TO** drop down list and click on the **ADD TO** button. This time the table looks like this:

“Channel” as a column field

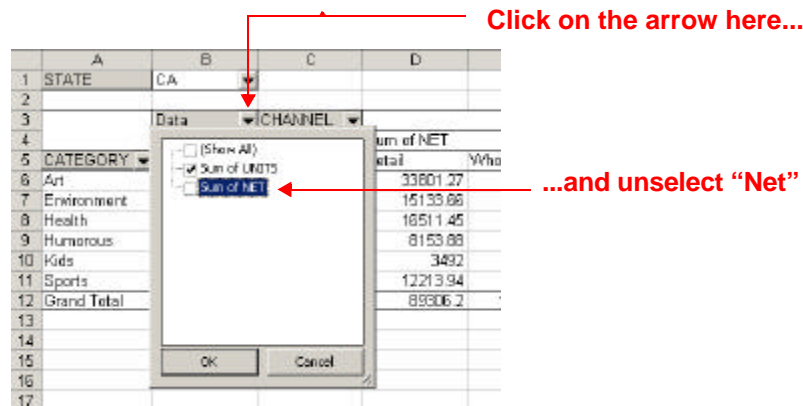
The screenshot shows an Excel PivotTable with the following data:

	A	B	C	D	E	F	G
1	STATE	CA					
2							
3		Data	CHANNEL				
4		Sum of UNITS		Sum of NET		Total Sum of UNITS	Total Sum of NET
5	CATEGORY	Retail	Wholesale	Retail	Wholesale		
6	Art	7847	20940	33801.27	46048.43	28787	78849.7
7	Environment	3840	10845	15133.66	22030.95	14685	37164.61
8	Health	4380	12195	16511.45	23806.44	16575	40417.89
9	Humorous	2155	4815	8153.88	9220.38	6970	17374.26
10	Kids	868	36865	3492	69319.48	37733	72811.48
11	Sports	2705	4930	12213.94	10717.61	7635	22931.55
12	Grand Total	21795	90590	89306.2	180243.29	112385	289549.49

11. If you were to look at the Layout for this configuration, it would look like the following illustration:



12. Now suppose that you no longer want to show Net in your report. Remove it by clicking on the drop-down arrow to the right of the Data button directly on your table.



The table is immediately updated.

13. To further break down the report on Units, add the Price field to the Row area. This is what the table should look like:

1	A	B	C	D	E
1	STATE	[All]			
2					
3	Sum of UNITS		CHANNEL		
4	CATEGORY	PRICE	Retail	Wholesale	Grand Total
5	Art	High	18151	40715	58866
6		Mid	12456	52855	75311
7	Art Total		30607	103570	134177
8	Environment	Low	11135	35470	46605
9		Mid	17951	22505	40456
10	Environment Total		29116	57975	87091
11	Fitness	High	3942	22585	26527
12		Low	1809	37560	39369
13		Mid	1614	2770	4384
14	Fitness Total		7365	62905	70270
15	Health	Low	14624	22245	36869
16		Mid	11220	27235	38455
17	Health Total		25844	49480	75324
18	Humorous	Low	3366	7540	11026
19		Mid	7709	8915	16624
20	Humorous Total		11095	16455	27550
21	Kids	Low	17844	49270	67114
22		Mid	21730	34380	56112
23	Kids Total		39576	83650	123226
24	Sports	High	8511	6235	14746
25		Low	4734	10105	14839
26		Mid	7003	10495	17498
27	Sports Total		20248	26635	47083
28	Grand Total		163951	400370	564321



Since State is the Page field, this table will either show calculations for one State or calculations for all States.

Click on **SHOW PAGES** at the bottom of the Pivot Table menu to create a sheet with the current PivotTable configuration for each state.

Adding Your Own Calculations

Data fields use summary functions to combine values from the underlying source data. You can also use custom calculations to compare data values, or add your own formulas that use elements of the report or other worksheet data.

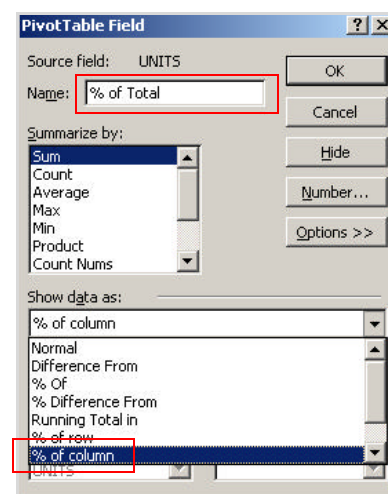
For example, you can show each State's total as a percentage of the grand total. You would use Excel's % of Column feature.

In this example, the pivot table has **Category** in the Row area, and **Units** in the Data area. A custom calculation will be added, to show the percentage for each region's total **Units**, compared to the grand total.

EXERCISE 13D

Exercise

1. From the Pivot Table field list, drag another copy of the **Units** field to the Data area.
2. Right-click the heading cell for the new column, and select **FIELD SETTINGS...**
3. In the Field Settings dialog box, type a name for the field, e.g. % of Total
4. Click the **OPTIONS** button, to expand the dialog box
5. From the Show data as dropdown list, select **% OF COLUMN** and click on the **OK** button.



GROUPING DATA

Your data isn't always grouped into neat packages that are the way you want to view them in your PivotTable. For example, the following figure shows a table that is virtually unusable because its data spans so many columns. In cases like this, you can group the data in different ways, depending on the type of data contained in the field.

EXERCISE 13E

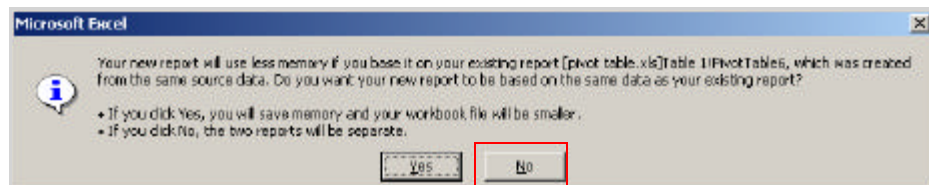
Exercise

In this exercise you will create a different PivotTable with the orders data and group it by year.

1. Switch to the Orders tab.
2. Click anywhere within the list and select **DATA > PIVOTTABLE AND PIVOTCHART REPORT...** from the menu.

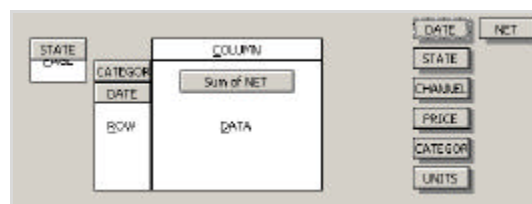
	A	B	C	D	E	F	G	H
1	STATE	(All)						
2								
3								
4			CHANNEL	Data				
5	CATEGORY	PRICE	Sum of UNITS	% of Total	Sum of UNITS	% of Total	Total Sum of UNITS	Total % of Total
6	Art	High	18151	11.08%	40715	10.15%	58866	10.42%
7		Mid	12456	7.69%	62865	15.68%	75311	13.33%
8	Art Total		30607	18.68%	103570	25.83%	134177	23.76%
9	Environment	Low	11135	6.90%	35470	8.85%	46605	8.25%
10		Mid	17981	10.97%	23505	5.61%	30486	5.17%
11	Environment Total		29116	17.77%	57975	14.46%	87091	15.42%
12	Fitness	High	3842	2.41%	22585	5.63%	26427	4.70%
13		Low	1809	1.10%	37580	9.36%	39389	6.97%
14		Mid	1614	0.99%	2770	0.69%	4384	0.78%
15	Fitness Total		7265	4.49%	62905	15.69%	70170	12.44%
16	Health	Low	14624	8.93%	22245	5.55%	36869	6.53%
17		Mid	11220	6.85%	27235	6.79%	38455	6.81%
18	Health Total		25844	15.77%	49480	12.34%	75324	13.34%
19	Humorous	Low	3366	2.07%	7640	1.91%	11006	1.95%
20		Mid	7709	4.70%	8915	2.22%	16624	2.94%
21	Humorous Total		11075	6.77%	16555	4.13%	27630	4.90%
22	Kids	Low	17844	10.89%	48270	12.29%	66114	11.88%
23		Mid	21732	13.26%	34380	8.57%	56112	9.93%
24	Kids Total		39576	24.15%	82650	20.86%	122226	21.82%
25	Sports	High	8511	5.19%	6235	1.55%	14746	2.61%
26		Low	4734	2.89%	10105	2.52%	14839	2.63%
27		Mid	7003	4.27%	10495	2.62%	17498	3.10%
28	Sports Total		20248	12.36%	26835	6.69%	47083	8.34%
29	Grand Total		163851	100.00%	403970	100.00%	564821	100.00%
30								

- Accept the default selections in Step 1 of the Wizard and click on the **NEXT** button.
- Step 2 of the Wizard will ask you to confirm the list that has been highlighted. Click the **NEXT** button.
- Once you click on the **NEXT** button you will see the following dialog box. This is because you already have a PivotTable associated with this data.



Click **YES**.

- Click the **LAYOUT** button and use the following figure as a guide to create the table.



7. Click **OK** and then **FINISH**.

1	STATE	(All)	
2			
3	Sum of NET		
4	CATEGORY	DATE	Total
5	Art	10/31/04	242.75
6		11/30/04	310.25
7		12/31/04	4983.64
8		01/31/05	6472.32
9		02/28/05	4775.13
10		03/31/05	7805.35
11		04/30/05	7760.75
12		05/31/05	5578.91
13		06/30/05	6688.92
14		07/31/05	7006.02
15		08/31/05	9696.2
16		09/30/05	10232.54
17		10/31/05	12459.27
18		11/30/05	12047.17
19		12/31/05	13153.95
20		01/31/06	10245.81
21		03/01/06	9918.04
22		04/01/06	10168.17
23		05/01/06	8179.35
24		06/01/06	8629.61
25		07/01/06	7015.95
26		08/01/06	8014.65

8. Notice that every record been listed. To group the data according to years, right-click on the **Date** field heading, select **Group and Outline** and then **Group...** as illustrated here:

The **Grouping** dialog box will appear.

Grouping

Auto

☒ Starting at: 10/31/2004

☒ Ending at: 10/2/2007

By

Minutes
Hours
Days
Months
Quarters
Years

Number of days: 1

OK Cancel

9. Select the **Years** option. You may have to *unselect* Months. Click on **OK**.
10. The data will be grouped by years.

	A	B	C
1	STATE	(All)	
2			
3	Sum of NET		
4	CATEGORY	DATE	Total
5	Art	2004	5536.64
6		2005	103675.59
7		2006	103333.81
8		2007	139535.81
9	Art Total		352081.85
10	Environment	2004	1786.25
11		2005	45117.18
12		2006	70206.3
13		2007	82429.66
14	Environment Total		199519.38
15	Fitness	2004	1607.75
16		2005	37572.24

11. Rename the sheet tab to Year Summary.

FORMATTING A PIVOT TABLE REPORT

You can change cell formats in a PivotTable report, such as font, background color, and alignment, as you do for other worksheet cells. You can set number formats for individual cells or for all cells of a data field.

Most formatting is retained when you refresh a report or change its layout, provided the **PRESERVE FORMATTING** check box in the PivotTable Options dialog box is selected. Cell border changes, however, aren't retained.

The following figure shows the PivotTable Options dialog box:

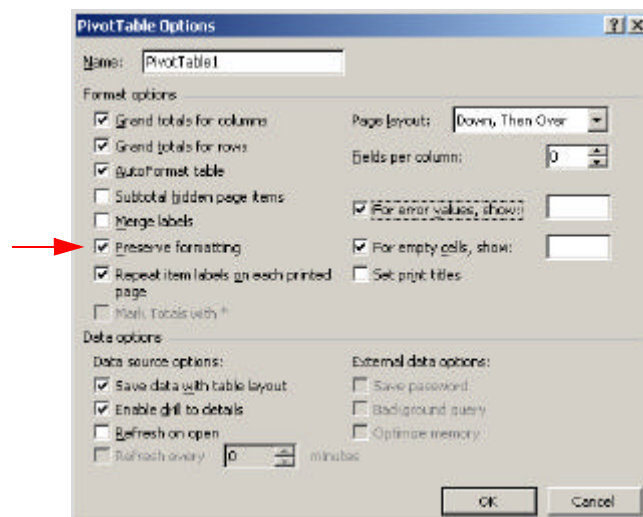


Figure 13-3 Pivot Table Options Dialog Box

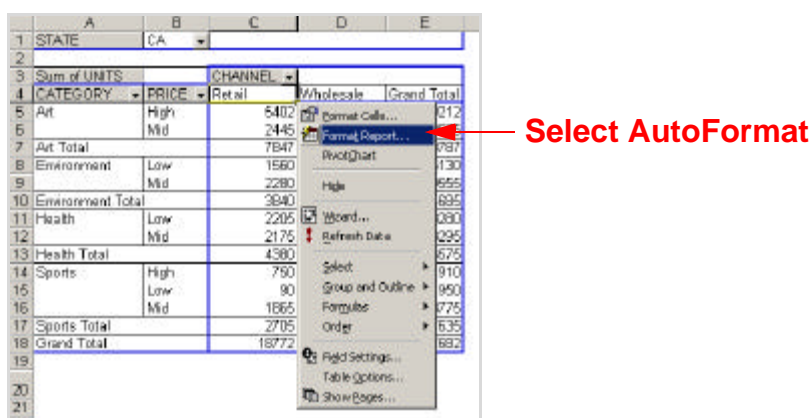
Using AutoFormat on a PivotTable

To change the layout and formatting, click **Format Report** on the PivotTable toolbar. This command provides a list of autoformats that are designed for PivotTable reports. The autoformats available for other worksheet areas (Format menu, AutoFormat command) are not available for PivotTable reports.

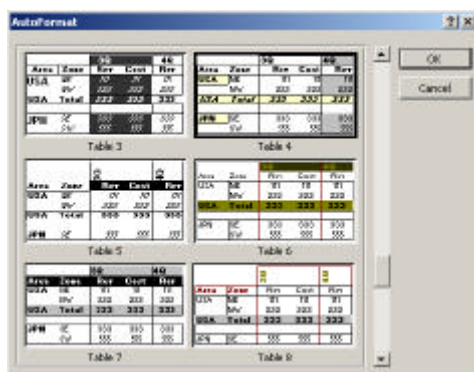
EXERCISE 13F

Exercise

1. Right-click on a PivotTable and select **Format Report**.



2. The AutoFormat dialog box will appear. Choose a format you like and click **OK**.



3. In the following figure, the Table 4 option was selected.

1	STATE	ALL			
2					
3	UNITS	CHANNEL			
4	CATEGORY	PRICE	Retail	Wholesale	Grand Total
5	Art	High	19151	40715	59866
6		Mid	12456	83055	25311
7	Art Total		30607	70370	734177
8					
9	Environment	Low	11135	35470	46605
10		Mid	17081	22605	40486
11	Environment Total		29116	57975	87491
12					
13	Fitness	High	3942	22485	26527
14		Low	1803	30550	38353
15		Mid	1614	2770	4384
16	Fitness Total		7359	62805	70164
17					
18	Health	Low	14624	22245	36869
19		Mid	11220	27235	38455
20	Health Total		25844	49480	75324
21					
22	Sports	High	8511	6235	14746
23		Low	4734	10100	14834
24		Mid	7003	10095	17098
25	Sports Total		20248	26430	47474
26					
27	Grand Total		113100	306765	419865

USE PIVOTTABLE DATA IN A FORMULA OUTSIDE THE PIVOTTABLE REPORT

To work with data from a PivotTable report in a formula elsewhere in the workbook, use the GETPIVOTDATA worksheet function in the formula.

The syntax for the GETPIVOTDATA function is

=GETPIVOTDATA(pivot_table,name)

Pivot_table is a reference to a cell in the PivotTable report that contains the data you want to retrieve. Pivot_table can be a cell or range of cells in the report, a name for the range that contains the PivotTable report, or a label stored in a cell above the PivotTable report.

Name is a text string enclosed in double quotation marks that describes the cell in the PivotTable report that contains the value you want to retrieve.

In the figure below the PivotTable has been named "Table1"

EXERCISE 13G

Exercise

1. Make sure that Year Summary is the active sheet.
2. Select the PivotTable and name it Table2.
3. Enter the following formula into a blank cell:

=GETPIVOTDATA(Table2,"Art 2007")

	A	B	C	D	E
1	STATE	(All)			
2					
3	UNITS	CHANNEL			
4	CATEGORY	PRICE	Retail	Wholesale	Grand Total
5	Art	High	18151	40715	58866
6		Mid	12495	62655	75311
7	Art Total		30647	103370	134177
8					
9	Environment	Low	11135	35470	46605
10		Mid	17981	22505	40486
11	Environment Total		29116	57975	87091
12					
13	Fitness	High	3842	22585	26527
14		Low	1609	37560	38369
15		Mid	1514	2770	4384
16	Fitness Total		7365	62915	70280
17					
18	Health	Low	14524	22245	36769
19		Mid	11230	27235	38465
20	Health Total		25754	49480	75324
21					
22	Sports	High	8511	6235	14746
23		Low	4734	10105	14839
24		Mid	7003	10495	17498
25	Sports Total		20248	26835	47083
26					
27	Grand Total		113188	300765	413945

Formula	Result
=GETPIVOTDATA(Table1,"Health")	75,324
=GETPIVOTDATA(Table1,"Wholesale Sports")	26,835
=GETPIVOTDATA(Table1,"Wholesale Sports Low")	10,105

REFRESHING PIVOT DATA

When PivotTable or PivotChart reports that are based on Excel source data are refreshed, Excel retrieves any new fields in the source range or named range that you specified when you created the PivotTable or PivotChart report.

When reports that are based on external source data are refreshed, Excel retrieves new rows or records in the external file or database that match the criteria specified in your query.

You can have Excel refresh a PivotTable or PivotChart report whenever you open the workbook and/or at timed intervals.

1. Click PivotTable (or PivotChart) on the PivotTable toolbar, and then click **TABLE OPTIONS** (or Options).
2. Under Data options, select the Refresh on open check box to refresh whenever you open the workbook.
3. To refresh a report from the external source data periodically, select the Refresh every check box, and then enter the interval you want in the minutes box. This check box is unavailable for reports that are based on Excel source data.

THE PIVOT CACHE

When you create a PivotTable, Excel places a copy of the data in a separate cache (a temporary part of memory). Every time you rearrange the table, Excel uses the cache data to create a new PivotTable. The cache data remains unchanged.

To update it, choose **DATA > REFRESH DATA** or click on the exclamation point in the PivotTable toolbar.

Because their worksheets contain copies of their data in memory, workbooks that contain PivotTables tend to be large. When the file is closed, the information used to retrieve the cache data is stored on the worksheet. It is automatically read into the cache when the workbook is opened again.

PIVOTCHART REPORTS

With regular charts, you must create one chart for each view of the data summary that you want to see. With PivotChart reports, you can create a single chart and view the summaries several ways.

If you are familiar with regular charts, you will find that most operations — such as formatting, choosing a chart type, displaying category or axis labels and titles, and so on — are performed the same way in PivotChart reports as they are in charts.

A PivotChart report always has an associated PivotTable report. Both reports have fields that correspond to each other. When you change the position of a field in one report, the corresponding field in the other report also moves.



PivotChart Elements

Besides containing the elements of a regular Excel chart, a PivotChart report contains series fields, category fields, data fields, and optional page fields. Items are contained within fields.

Element	Description
Page field	A field that you use to filter data by specific items.
Data field	A field from the source list or table that contains data.
Series field	A field that you assign to a series orientation in a PivotChart report.
Field drop-down arrow	The arrow at the right side of each field. Click this arrow to select the items to show and hide.

Table 13-2 PivotChart Elements

Creating a PivotChart

To create a PivotChart report, the method you use depends on the source data.

- You can use the Chart Wizard if you're creating a PivotChart report that will reflect the view of an existing PivotTable report in the same workbook.
- To create a PivotChart report not based on the view of an existing PivotTable report, you use the PivotTable and PivotChart Wizard. When you do this, Excel automatically creates an associated PivotTable report.

STARTING WITH A PIVOTTABLE REPORT

Make sure your PivotTable report has at least one row field, to become the category field in the PivotChart report, and a column field to become the series field. If your PivotTable report is in indented format, move at least one field to the column area before you create the chart.

EXERCISE 13H

Exercise

1. Open the file named *PivotCharts.xls*.
2. Select the Data tab.

3. Click anywhere in the PivotTable.
4. Click the **CHART** button on the PivotTable toolbar.

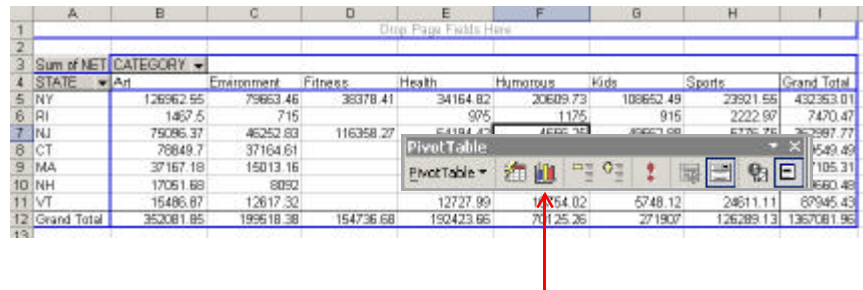
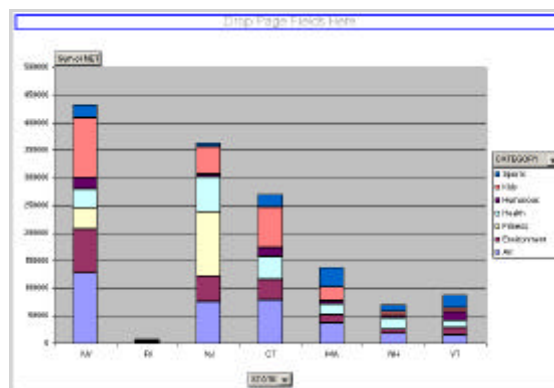


Figure 13-4 Chart Wizard Button on Toolbar

5. A chart based on the layout of the PivotTable will be created in a new sheet,



STARTING WITH A PIVOTTABLE AND PIVOTCHART WIZARD

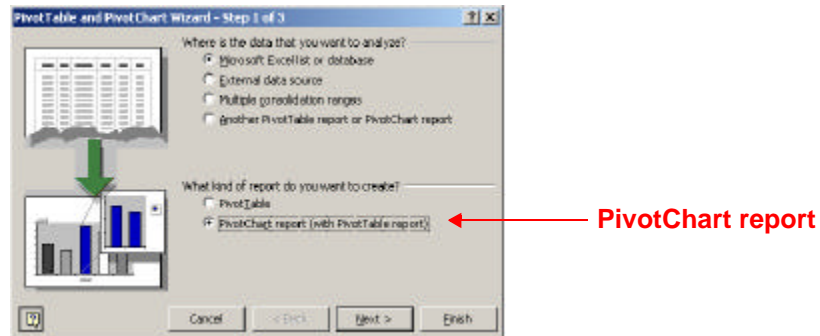
In the PivotTable and PivotChart Wizard, you specify the type of source data you want to use, and set options for how the data is used. You then lay out the PivotChart report in a manner similar to a PivotTable report. If your workbook doesn't contain a PivotTable report, Excel creates one when you create the PivotChart report. When you change the PivotChart report, its associated PivotTable report changes, and vice versa.

EXERCISE 13I

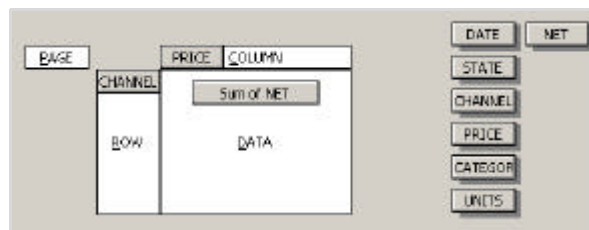
Exercise

1. Click on the Data tab.
2. Click anywhere within the list and select **DATA > PIVOTTABLE AND PIVOTCHART REPORT...** from the menu.

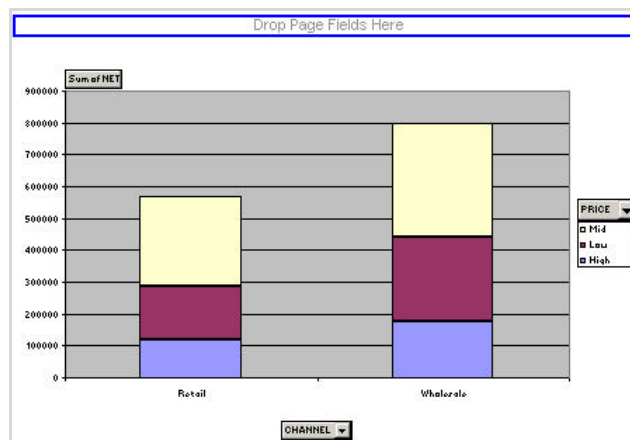
3. The Pivot Table Wizard will appear.



4. This time select PivotChart report and click on the **NEXT** button.
5. In step 3 of the Wizard click the **LAYOUT** button and use the following pattern to design the chart:



6. Click **OK** and then **FINISH**. Two new sheets will be added: a sheet displaying a PivotTable based on the layout you described and a Chart sheet with a chart of the same data.



USING PAGE FIELDS

Using page fields is a convenient way to summarize and quickly focus on a subset of data without having to modify your series and category information.

For instance, if you're giving a presentation, you can click (All) in the State page field to show sales for all states, and then focus on specific states by clicking one at a time. Each page of your chart has the same category and series layout for different states, so the data for each state can be easily compared.

Also, by allowing you to retrieve one page at a time from a large set of data, page fields can conserve memory when your chart uses external source data.

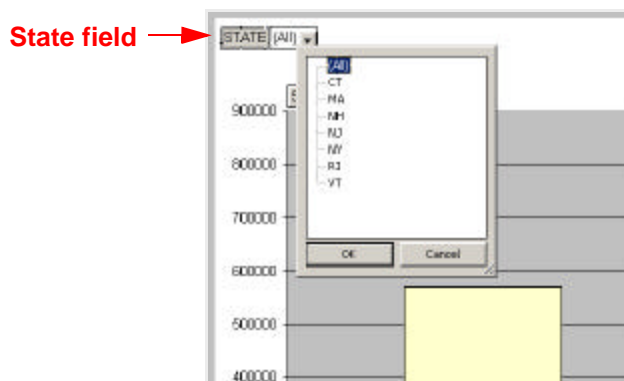
EXERCISE 13J

Exercise

1. On the **Chart** tab, drag the **State** field from the **Field List** and drop it onto the **Page Area** at the top of the chart.



2. A **State** tile will appear at the top left corner of the chart.



3. You can now change the focus of the data by selecting a state from the list and clicking **OK**.

CHANGES TO THE PIVOT CHART AFFECT THE PIVOT TABLE

If you rearrange the fields in a PivotChart, the same changes are made to the related PivotTable. You can make changes, print the PivotChart, and undo the changes, or close the file without saving the changes.

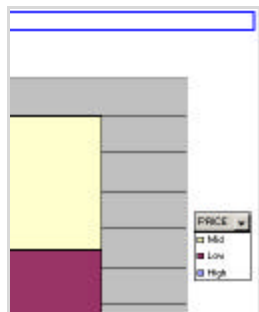
EXERCISE 13K

Exercise

- Click on the Sheet tab which contains the PivotTable report generated when you created the last PivotChart. It should look like this:.

	A	B	C	D	E
1					
2					
3	Sum of NET	PRICE			
4	CHANNEL	High	Low	Mid	Grand Total
5	Retail	117048.83	163646.7	282978.08	569673.61
6	Wholesale	176838.69	266885.29	364584.47	797408.35
7	Grand Total	293887.42	436531.99	637562.55	1367081.96
8					
9					

- Switch back to the chart sheet (Chart2).
- Drag the Price tile off of the chart. It now represents the legend.



Drag Price off the chart

- Now drag Category from the **Field List** and drop it in the **Legend** area where Price was.



Replace it with Category

5. The Chart is updated. If you switch back to the data table you previously looked at, this same change is reflected.

	A	B	C	D	E	F	G	H	I
1									
2									
3	Sum of NET	CATEGORY							
4	CHANNEL	Art	Environment	Fitness	Health	Humorous	Kids	Sports	Grand Total
5	Retail	121567.93	90963.23	32932.66	95011.46	37649.36	122326.06	69622.91	569673.61
6	Wholesale	230513.92	109155.15	121604.02	59412.2	32275.9	149680.94	56689.22	797408.35
7	Grand Total	352081.85	199618.38	154736.68	192423.66	70125.26	271907	126289.13	1367081.96

POINTS TO REMEMBER

- A PivotTable report is an interactive table that you can use to quickly summarize large amounts of data. You can create a PivotTable report from an Excel spreadsheet, an external database, multiple Excel spreadsheets, or another PivotTable report.
- Before you can create a Pivot Table or Pivot Chart, organize your data in a table that Excel can understand.
- You can add or remove data fields. You can also use custom calculations to compare data values, or add your own formulas that use elements of the report or other worksheet data.
- You can group the data in different ways, depending on the type of data contained in the field.
- You can change cell formats in a PivotTable report, such as font, background color, and alignment, as you do for other worksheet cells. You can set number formats for individual cells or for all cells of a data field.
- Most formatting is retained when you refresh a report or change its layout, provided the **PRESERVE FORMATTING** check box in the PivotTable.
- To work with data from a PivotTable report in a formula elsewhere in the workbook, use the GETPIVOTDATA worksheet function in the formula.
- You can have Excel refresh a PivotTable or PivotChart report whenever you open the workbook and/or at timed intervals.
- With PivotChart reports, you can create a single chart and view the summaries several ways.
- You can use the Chart Wizard if you're creating a PivotChart report that will reflect the view of an existing PivotTable report in the same workbook.
- To create a PivotChart report not based on the view of an existing PivotTable report, you use the PivotTable and PivotChart Wizard. When you do this, Excel automatically creates an associated PivotTable report.
- If you rearrange the fields in a Pivot Chart, the same changes are made to the related Pivot Table.

Validating User Input

CHAPTER 14

Data validation lets you define what type of data you want entered in a cell. For example, you can allow entry of a date no later than a certain date. You can set up data validation to prevent users from entering data that isn't valid, or allow invalid data but check for it after the user is finished. You can also provide messages to define what input you expect for the cell, and instructions to help users correct any errors.

When data is entered that doesn't meet your requirements, Excel displays a message with instructions you provide

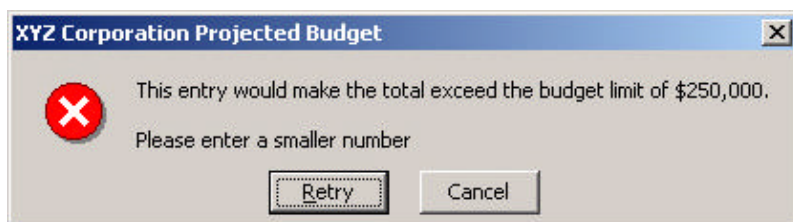
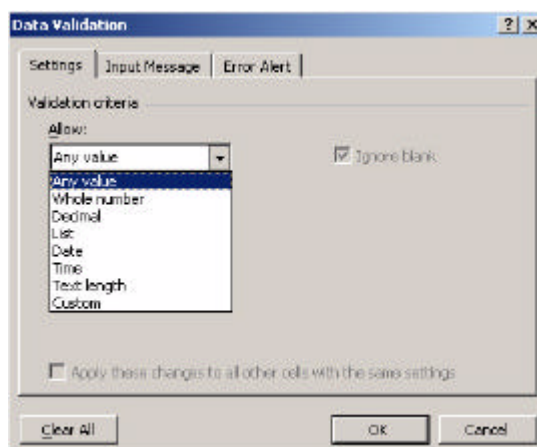


Figure 14-1 An Invalid Entry Message

TYPES OF DATA YOU CAN VALIDATE

Excel lets you designate the following types of valid data for a cell:

Numbers Specify that the entry in a cell must be a whole number or a decimal number. You can set a minimum or maximum, exclude a certain number or range, or use a formula to calculate whether a number is valid.



Dates and times Set a minimum or maximum, exclude certain dates or times, or use a formula to calculate whether a date or time is valid.

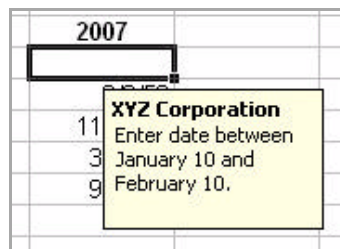
Length Limit how many characters can be typed in a cell, or require a minimum number of characters.

List of values Make a list of the choices for a cell — such as small, medium, large — and allow only those values in the cell. You can display a dropdown arrow when a user clicks the cell to make it easy to pick from your list.

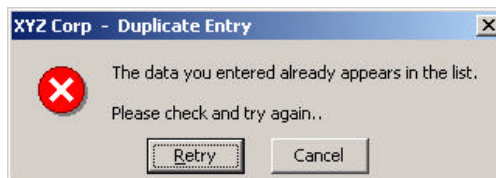
TYPES OF MESSAGES YOU CAN DISPLAY

For each cell you validate, you can display two different messages:

- One that appears before the user enters data.



- One that appears after the user tries to enter data that doesn't meet your requirements.



If users have the Office Assistant turned on, the Assistant displays the messages.

INPUT MESSAGE

This type of message appears as soon as a user clicks the validated cell. You can use it to provide instructions about the type of data you want entered in the cell.

ERROR MESSAGE

This type of message appears only when the user types data that isn't valid and presses **ENTER**. You can choose from three types of error messages:

Information message This message does not prevent entry of invalid data. In addition to the text you provide, it has an information icon, an OK button, which enters the invalid data in the cell, and a Cancel button, which restores the previous value to the cell.

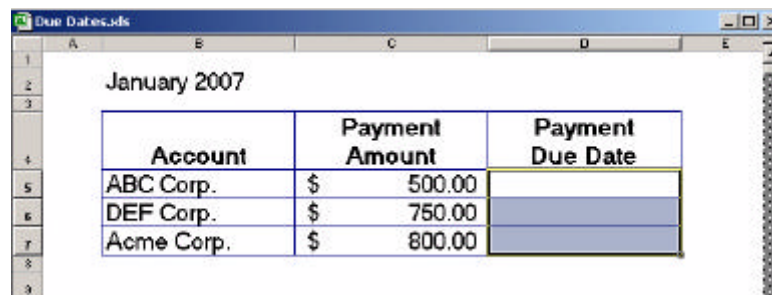
Warning message This message does not prevent entry of invalid data. It has the text you provide, a warning icon, and three buttons: Yes enters the invalid data in the cell, No returns to the cell for further editing, and Cancel restores the previous value to the cell.

Stop message This message won't allow invalid data to be entered. It has text you provide, a stop icon, and two buttons: Retry returns to the cell for further editing, and Cancel restores the previous value to the cell. Note that this message isn't intended as a security measure: although users can't enter invalid data by typing and pressing ENTER, they can circumvent the validation by copying and pasting or filling data in the cell.

EXERCISE 14A**Exercise**

The first exercise will help you to enter a validation criteria for a range of valid dates.

1. Open the file named *DueDates.xls*.
2. Highlight the range D5:D7



January 2007		
Account	Payment Amount	Payment Due Date
ABC Corp.	\$ 500.00	
DEF Corp.	\$ 750.00	
Acme Corp.	\$ 800.00	

3. Select **DATA > VALIDATION** from the menu and select the **SETTINGS** tab.

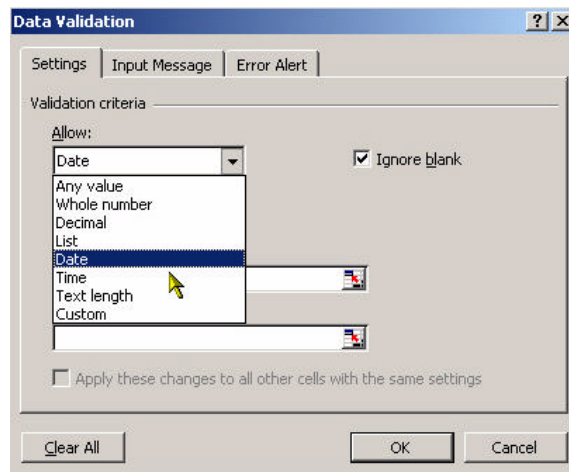
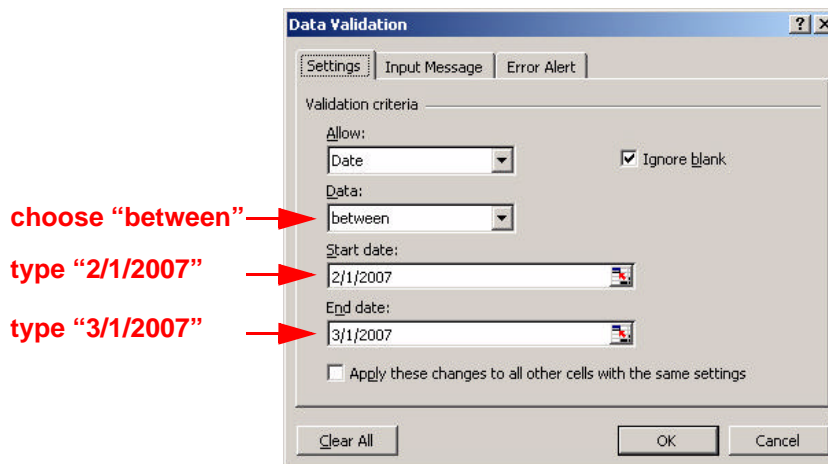


Figure 14-2 Data Validation Settings Tab

4. Enter the following information into the dialog box.



5. Select the **ERROR ALERT** tab and enter the following information:
 - Title: Payment Due Date.
 - Error Message: Value must be between February 1 and March 1.

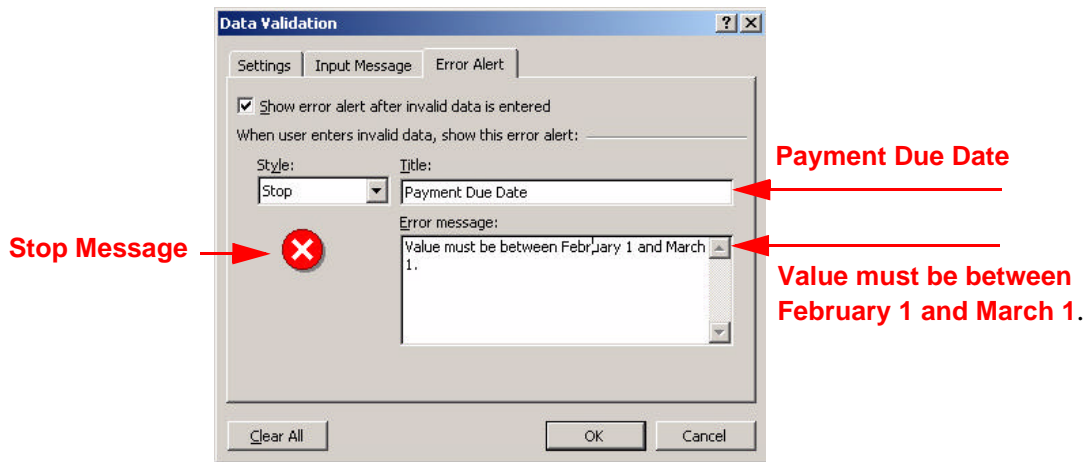
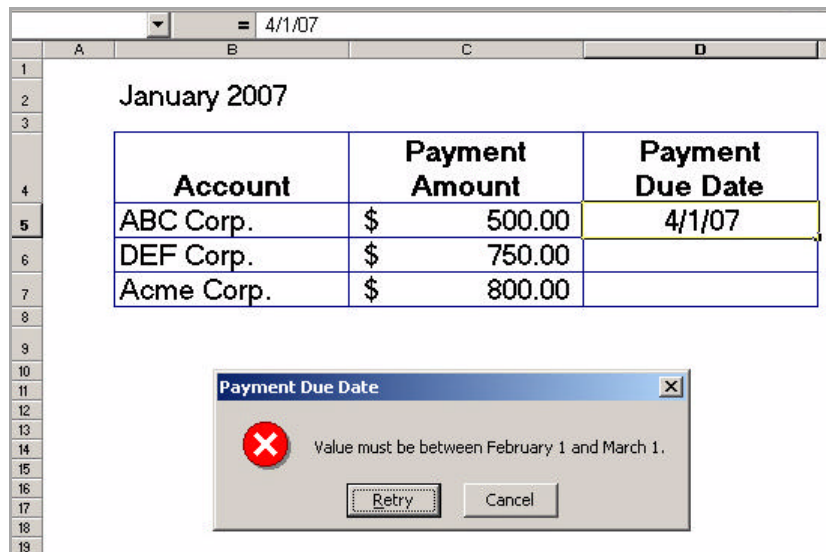


Figure 14-3 Data Validation Error Alert Tab

6. Click on **OK** to apply the settings and close the dialog box.
7. Enter the date 4/1/07 into cell D5.

The following error message will appear.

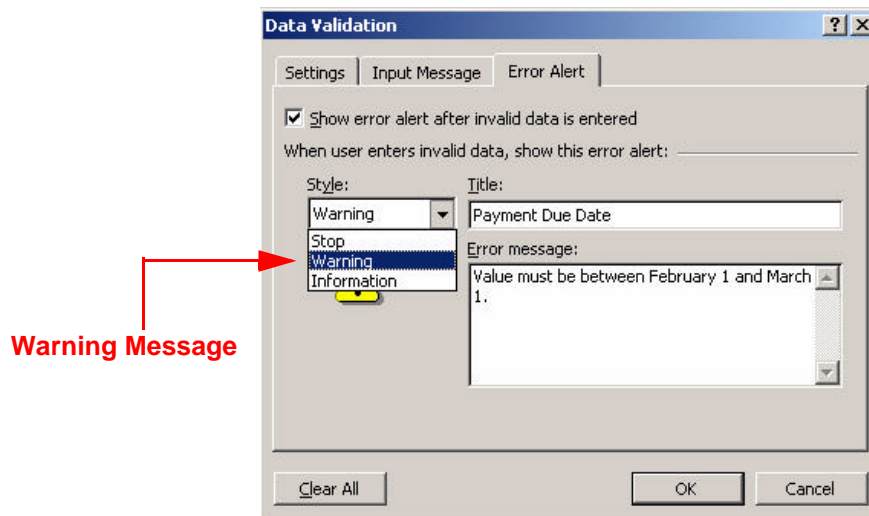


- If you select **RETRY**, the cell stays highlighted until you enter a valid entry.
- If you select **CANCEL**, the cell value clears altogether.

Validating User Input

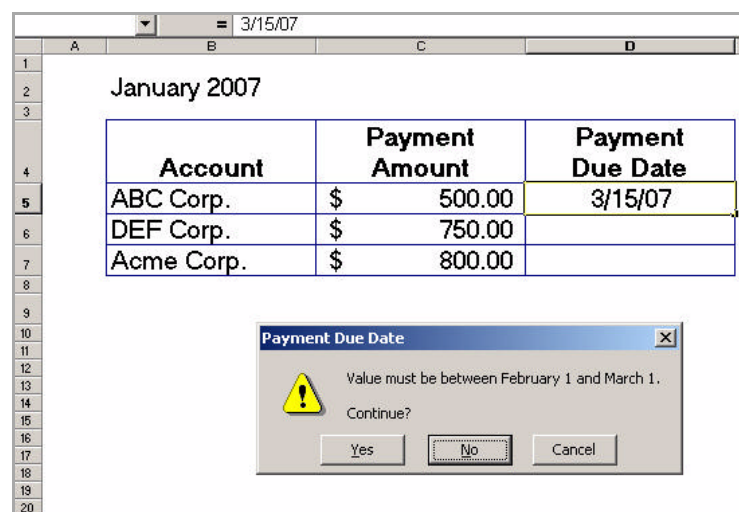
Because the error message was a **Stop** message, the **STOP** icon appeared in the dialog box and entry of the data was not allowed.

8. Highlight the same range of cells (D5:D7) select **DATA > VALIDATION** from the menu and select the **ERROR ALERT** tab.
9. Select **WARNING** from the Style section and click on **OK** to apply the change and close the dialog box.



10. Enter an invalid date, such as 3/15/07 into cell D5.

This time a Warning message is displayed. This means that the entry can be accepted, but the viewer is warned.



POINTS TO REMEMBER

- Data validation lets you define what type of data you want entered in a cell. When data is entered that doesn't meet your requirements, Excel displays a message with instructions you provide
- Excel lets you designate the following types of valid data for a cell
 - ***Numbers***
 - ***Dates and times***
 - ***Length***
 - ***List of Values***
- For each cell you validate, you can display two different messages:
 - One that appears before the user enters data.
 - One that appears after the user tries to enter data that doesn't meet your requirements.
- You can choose from three types of error messages:
 - **Information message**
 - **Warning message**
 - **Stop message**

Introduction to Excel Macros

CHAPTER 15

MACROS

If you perform a task repeatedly in Excel, you can automate the task by using a macro. A macro is a series of Excel commands and instructions that you group together as a single command to accomplish a task automatically. Instead of manually performing a series of time-consuming, repetitive actions in Excel, you can create and run a single macro, in effect, a custom command, that accomplishes the task for you.

You can easily record and play back macros, assigning the macro to be run when you press a convenient key combination, or when you click on a toolbar button or a graphic object on a worksheet. The macros that you record are created automatically in the Visual Basic for Applications programming language, also known as VBA. You don't need to do any programming to work with recorded macros.

Recording a macro creates VBA code, as if you had typed the code in yourself. Many capabilities of VBA, such as custom forms and dialog boxes, using variables, and other advanced programming logic, can only be entered into your VBA macros by typing the code yourself.



See the book [EXCEL VBA BASIC TRAINING](#) for help on creating custom forms, dialog boxes, and advanced programming logic.

Planning a Macro

The simplest way to plan your macro before recording it, is to perform all the actions that the macro needs to carry out, one step at a time. Everything you do once the recorder is on will be recorded exactly.

Naming Macros

If you don't enter your own name for the macro that you record, Excel assigns a default name, like Macro1, Macro2, and so on. Excel lets you use more descriptive names, subject to the following rules:

- Macro names must begin with a letter.
- Names can contain letters, numbers, and the underscore character.
- Spaces are not allowed, but you can use the underscore character to separate words.
- Generally, you shouldn't use any names that are the same as the functions, statements, and methods in Visual Basic.

Where Do New Macros Go?

The first time you record a macro, Excel creates a new module. Each time you record an additional macro, Excel adds it to the end of the same module. When you close and reopen the workbook, the macro recorder will start recording macros into a new module.

When you use the macro dialog box to select and edit a macro, it will automatically take you to the appropriate module.

EXERCISE 15A

Exercise

The first exercise will be a simple one: formatting a cell with number formatting.

1. Open the *rollup.xls* file.
2. Select cells **B12 through G12** (the Totals row) and start recording.
3. Name the macro **CurrencyFormat**.
4. Choose **FORMAT > CELLS...** from the menu and select the **NUMBER** tab. Select **Currency** from the **Category** list. Set the number of decimal places to **zero** and select the **\$** symbol. Click **OK**. Click the **Stop Recording** button.
5. To look at the macro you just recorded, press **ALT-F11**. This will open up the VBA Editor window.

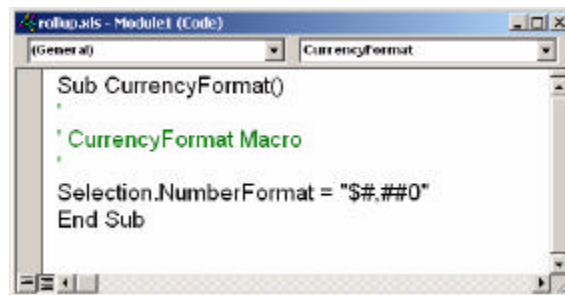


Figure 15-1 The VBA Code Window



You don't really need to understand the code right now. You don't even have to look at it or know that it's there for the macro to run.

But if you're interested, the lines that start with apostrophes at the beginning of the macro are *comments*. In any line, anything that follows an apostrophe is a comment. You can add comments, change them, or delete them without changing how the macro runs. Comments are green to help you distinguish them from statements that do something.

MODIFYING RECORDED MACROS

When you record a macro you almost always need to make some adjustments or enter some code manually.

EXERCISE 15B

Exercise

The next exercise shows how to record a macro that simply changes the page setup to *Landscape* orientation.

1. Activate any worksheet.
2. Start recording a macro.
3. Click **OK** to accept the defaults. The macro will start recording.
4. Select the **FILE > PAGE SETUP** command.
5. Select the **Landscape** option, and click **OK** to close the dialog box.
6. Click the **STOP RECORDING** button.
7. Switch to the Visual Basic window and look at the macro you just created

Don't be intimidated
by all the code.
You don't need to
understand it!

```
Sub Macro1()  
    With ActiveSheet.PageSetup  
        .PrintTitleRows = ""  
        .PrintTitleColumns = ""  
    End With  
    ActiveSheet.PageSetup.PrintArea = ""  
    With ActiveSheet.PageSetup  
        .LeftHeader = ""  
        .CenterHeader = ""  
        .RightHeader = ""  
        .LeftFooter = ""  
        .CenterFooter = ""  
        .RightFooter = ""  
        .LeftMargin =  
Application.InchesToPoints(0.75)  
        .RightMargin =  
Application.InchesToPoints(0.75)  
        .TopMargin =  
Application.InchesToPoints(1)  
        .BottomMargin =  
Application.InchesToPoints(1)  
        .HeaderMargin =  
Application.InchesToPoints(0.5)  
        .FooterMargin =  
Application.InchesToPoints(0.5)  
        .PrintHeadings = False  
        .PrintGridlines = False  
        .PrintComments = xlPrintNoComments  
        .PrintQuality = -3  
        .CenterHorizontally = False  
        .CenterVertically = False  
        .Orientation = xlLandscape
```

You might be surprised by the amount of code generated by this simple command. Although you changed only one simple setting in the **Page Setup** dialog box, Excel generated code that reproduced all the settings in the dialog box. Delete all the code but the following.

```
Sub Macro1()  
    .Orientation = xlLandscape  
  
End Sub
```

This is all the code you need for this macro to function correctly.

Relative vs. Absolute Recording

When recording your actions, Excel normally records absolute references to cells. Sometimes this is exactly what you want. But sometimes it's not.

Every position on an Excel spreadsheet has a similar position in another spreadsheet. The cell B10 exists on all spreadsheets. So if you somehow find that you need to format the text in cell B10 in all your documents the same way, you can write a macro for that. However, if you want to write a macro that is more flexible and doesn't rely on all your documents looking the same, Excel allows you to toggle the Relative References button when you record.

The Relative References option allows you to change data based upon what cell is initially selected. When you go to record, Excel will figure out what cells you're changing based upon how far they are away from the initial cell you had selected. This is great for performing the same action many times around similarly structured data within your spreadsheet.

EXERCISE 15C

Exercise

The next exercise will show you how to modify cell references in macros.

1. Activate a worksheet, and start the macro recorder.
2. Activate cell **B1**.
3. Enter **Jan** into cell **B1**.
4. Move to cell **C1**, and enter **Feb**.
5. Continue this process until you have entered six months of the year in the range **B1:G1**.
6. Click cell **B1** to activate it again.
7. Stop the macro recorder.

Excel generated the following code.

```
Sub Macro4()  
    Range("B1").Select  
    ActiveCell.FormulaR1C1 = "Jan"  
    Range("C1").Select  
    ActiveCell.FormulaR1C1 = "Feb"  
    Range("D1").Select  
    ActiveCell.FormulaR1C1 = "Mar"  
    Range("E1").Select  
    ActiveCell.FormulaR1C1 = "Apr"  
    Range("F1").Select  
    ActiveCell.FormulaR1C1 = "May"  
    Range("G1").Select  
    ActiveCell.FormulaR1C1 = "Jun"  
    Range("B1").Select
```

8. Execute this macro on another worksheet. The macro re-creates the actions exactly regardless of which cell is active when you begin.

However, what if you wanted the macro to execute these actions starting with the current cell. You can change the manner in which Excel records your actions by clicking the **RELATIVE REFERENCE** button on the **Stop Recording** toolbar.

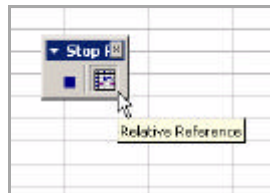


Figure 15-2 The Relative Reference Button

9. Select cell B1 and then record the macro again. This time click the **RELATIVE REFERENCE** button before any other steps.
10. After you have entered the six months and selected cell B1, stop recording.

This time Excel generated the following code.

Remember..
Don't let the code
scare you. You don't
need to understand
it.

```
Sub Macro5()  
    ActiveCell.FormulaR1C1 = "Jan"  
    ActiveCell.Offset(0,  
1).Range("A1").Select  
    ActiveCell.FormulaR1C1 = "Feb"  
    ActiveCell.Offset(0,  
1).Range("A1").Select  
    ActiveCell.FormulaR1C1 = "Mar"  
    ActiveCell.Offset(0,  
1).Range("A1").Select  
    ActiveCell.FormulaR1C1 = "Apr"  
    ActiveCell.Offset(0,  
1).Range("A1").Select
```

11. Execute this macro on another sheet. Select cell B6 before you start recording.

THE OFFSET PROPERTY

The first statement of this macro simply enters *Jan* into the active cell. It uses the active cell because it's not preceded by a statement that selects a cell.

The next statement uses the **Offset** property to move the selection one cell to the right. The next statements inserts more text, and so on. Finally the original cell is selected by calculating a relative offset rather than an absolute cell. This macro always start entering text in the active cell.

You'll notice that this macro generates code that references cell A1—which may seem strange because cell A1 was not involved in the macro. The offset arguments correspond to the upper-left cell of the specified Range object, as if the upper range was A1. You can delete all references to Range("A1") and the macro still works perfectly.

The following display shows a simpler and faster way to perform the same operation. It illustrates that VBA doesn't have to select a cell before it puts something into it.

```
Sub Macro5()  
    ActiveCell.Offset(0, 0) = "Jan"  
    ActiveCell.Offset(0, 1) = "Feb"  
    ActiveCell.Offset(0, 2) = "Mar"  
    ActiveCell.Offset(0, 3) = "Apr"  
    ActiveCell.Offset(0, 4) = "May"  
    ActiveCell.Offset(0, 5) = "Jun"  
  
End Sub
```

The **Offset** property takes two arguments that correspond to the relative position from the upper-left cell of the specified Range object. The arguments can be positive (down or right), negative (up or left), or zero. The syntax is:

Offset(RowOffset, ColumnOffset)

The example that follows enters a value of 12 into the cell directly below the active cell:

ActiveCell.Offset(1,0).Value = 12

The next example enters a value of 15 into the cell directly above the active cell:

ActiveCell.Offset(-1,0).Value = 15

The **Offset** property is very useful, especially when you use variables within looping procedures.

Simplifying Select... Selection Pairs

When you carry out actions in Excel, you first select something—like a cell—and then you do something to it—like enter a value. The macro recorder always records both the “selecting” and the “doing” of all your actions.

EXERCISE 15D

Exercise

The next exercise will show you another way to decrease code, making your macro run faster.

1. Insert a blank worksheet and start recording a macro names LabelMonths.

2. Use Absolute referencing by deselecting the **RELATIVE REFERENCE** button on the **Stop Recording** toolbar.
3. Type the labels **January**, **February**, and **March** in the cells **B1**, **C1**, and **D1**. Turn off the recorder, and then edit the macro.

The macro should look like this:

```
Sub LabelMonths()  
    Range("B1").Select  
    ActiveCell.FormulaR1C1 = "January"  
    Range("C1").Select  
    ActiveCell.FormulaR1C1 = "February"  
    Range("D1").Select  
    ActiveCell.FormulaR1C1 = "March"
```

Each time you see *Select* at the end of one line followed by either *Selection* or *ActiveCell* at the beginning of the next, you can delete them both, leaving only a single period. If a *Select* statement is the last one in a macro, you can delete it entirely.

4. Modify your macro until it looks like this:

```
Sub LabelMonths()  
    Range("B1").Formula = "January"  
    Range("C1").Formula = "February"  
    Range("D1").Formula = "March"  
End Sub
```

Getting rid of *Select... Selection* pairs makes the macro run faster since it doesn't keep changing the current selection.



You can even shorten the expression like this: **[B1]="January"**

DELETING A MACRO

If you decide that you don't need a macro any longer, you can delete it. Follow these steps:

1. Open the workbook that contains the macro you want to delete.
2. Select **TOOLS > MACRO** and then click **MACROS...**
3. In the **Macros in** list, click **THIS WORKBOOK**.

4. In the **Macro** name box, click the name of the macro that you want to delete.
5. Click **DELETE**.

ASSIGNING A MACRO TO A TOOLBAR BUTTON

You can add new buttons to an existing toolbar. This will allow you to use macros that you use often by clicking on a button.

EXERCISE 15E

Exercise

1. Choose **TOOLS > CUSTOMIZE** from the menu.
2. Select the **Commands** tab and the **Macro** category.

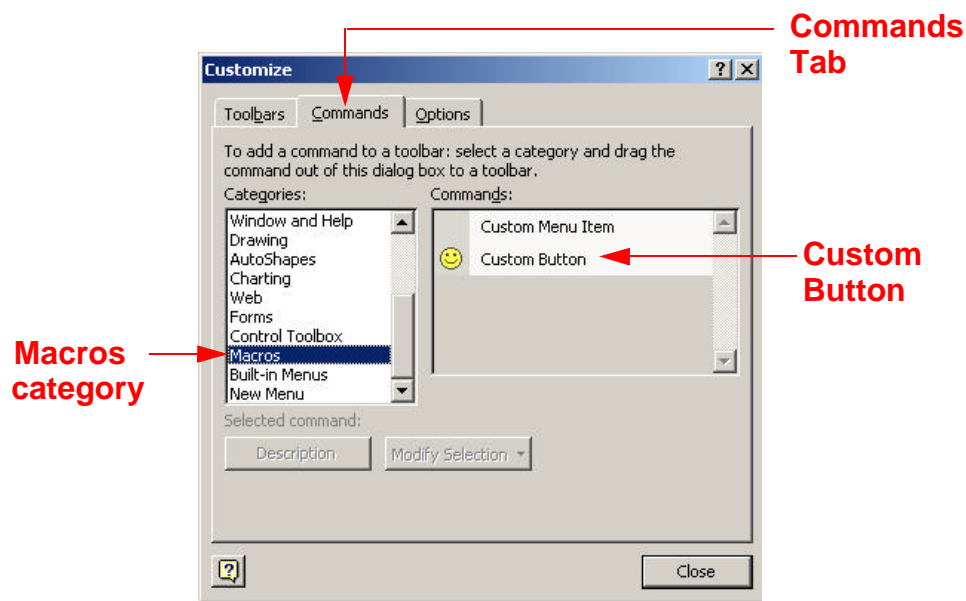


Figure 15-3 The Customize Dialog Box

3. Drag the smiley face onto your toolbar and drop it where you want the button.

- Once the button is on your toolbar, right-click on the button. The following menu will appear:

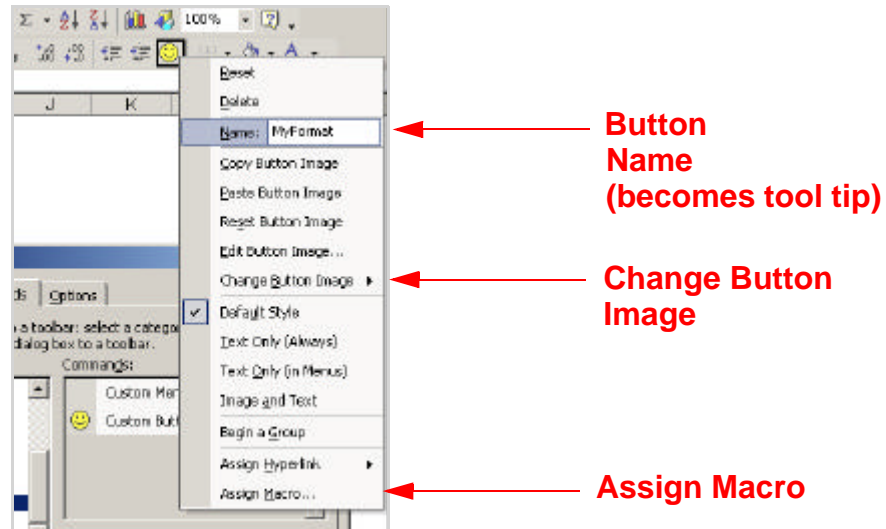
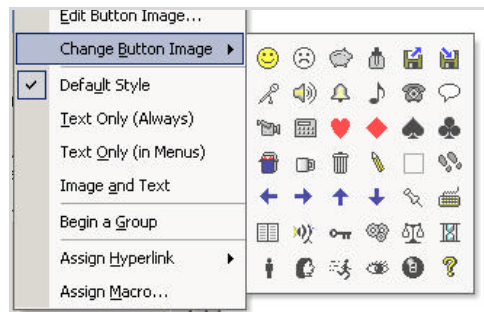


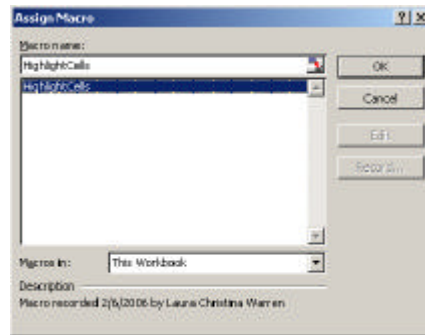
Figure 15-4 The Customize Menu

- Enter a name for your macro button. This name will appear when you point your mouse on the button.
- Choose the **Change Button Image** option.



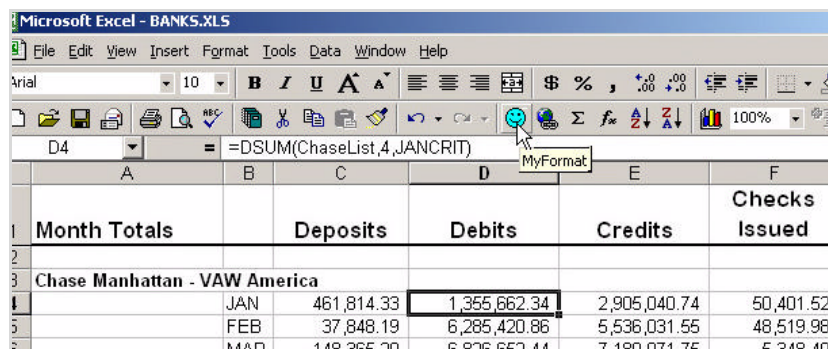
- Choose an image you like.
- Choose the **Assign Macro** button.

Assigning a Macro to a Toolbar Button



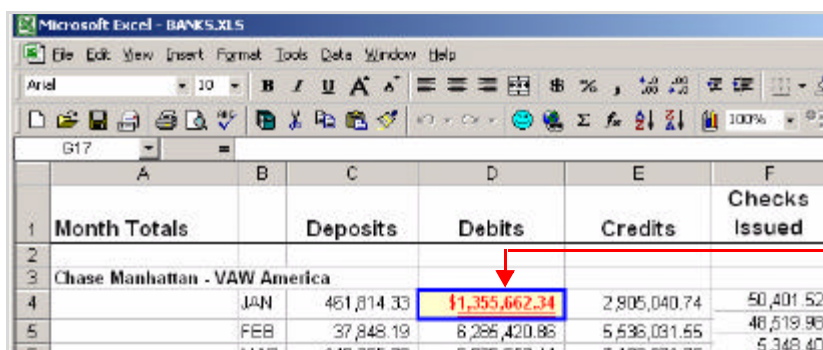
9. Highlight the macro and click **OK**.
10. When you click on the button, your macro runs.

When your mouse hovers over the button, the tool tip displays.



Select cell
and click on
Button
(notice
tool tip)

After the button is clicked, all the macro steps play back.



Formatted
cell

Use your imagination and cut down on keystrokes with macros. They can be fun!

POINTS TO REMEMBER

- You can change the manner in which Excel records your actions by clicking the **RELATIVE REFERENCE** button on the **Stop Recording** toolbar.
- The Offset property allows you to select a cell by calculating a relative offset to the row and column positions of the original cell.
- Getting rid of *Select... Selection* pairs makes macros run faster since the current selection is not constantly changing.
- Since the Range object is used so much, you can substitute Range("A1") with [A1]
- You can add new buttons to an existing toolbar. This will allow you to use macros that you use often by clicking on buttons.

Shortcut Keys

APPENDIX

KEYS FOR MOVING AND SCROLLING IN A WORKSHEET OR WORKBOOK

Press	To
Arrow keys	Move one cell up, down, left, or right
CTRL+arrow key	Move to the edge of the current data region
HOME	Move to the beginning of the row
CTRL+HOME	Move to the beginning of the worksheet
CTRL+END	Move to the last cell on the worksheet, which is the cell at the intersection of the rightmost used column and the bottom-most used row (in the lower-right corner), or the cell opposite the home cell, which is typically A1
PAGE DOWN	Move down one screen
PAGE UP	Move up one screen
ALT+PAGE DOWN	Move one screen to the right
ALT+PAGE UP	Move one screen to the left
CTRL+PAGE DOWN	Move to the next sheet in the workbook
CTRL+PAGE UP	Move to the previous sheet in the workbook
CTRL+F6 or CTRL+TAB	Move to the next workbook or window
CTRL+SHIFT+F6 or CTRL+SHIFT+TAB	Move to the previous workbook or window
F6	Move to the next pane in a workbook that has been split
SHIFT+F6	Move to the previous pane in a workbook that has been split
CTRL+BACKSPACE	Scroll to display the active cell
F5	Display the Go To dialog box
SHIFT+F5	Display the Find dialog box
SHIFT+F4	Repeat the last Find action (same as Find Next)
TAB	Move between unlocked cells on a protected worksheet

KEYS FOR ENTERING DATA ON A WORKSHEET

Press	To
ENTER	Complete a cell entry and move down in the selection
ALT+ENTER	Start a new line in the same cell
CTRL+ENTER	Fill the selected cell range with the current entry
SHIFT+ENTER	Complete a cell entry and move up in the selection
TAB	Complete a cell entry and move to the right in the selection
SHIFT+TAB	Complete a cell entry and move to the left in the selection
ESC	Cancel a cell entry
BACKSPACE	Delete the character to the left of the insertion point, or delete the selection
DELETE	Delete the character to the right of the insertion point, or delete the selection
CTRL+DELETE	Delete text to the end of the line
Arrow keys	Move one character up, down, left, or right
HOME	Move to the beginning of the line
F4 or CTRL+Y	Repeat the last action
SHIFT+F2	Edit a cell comment
CTRL+SHIFT+F3	Create names from row and column labels
CTRL+D	Fill down
CTRL+R	Fill to the right
CTRL+F3	Define a name

KEYS FOR WORKING IN CELLS OR THE FORMULA BAR

Press	To
BACKSPACE	Edit the active cell and then clear it, or delete the preceding character in the active cell as you edit cell contents
ENTER	Complete a cell entry
CTRL+SHIFT+ENTER	Enter a formula as an array formula
ESC	Cancel an entry in the cell or formula bar
CTRL+A	Display the Formula Palette after you type a function name in a formula
CTRL+SHIFT+A	Insert the argument names and parentheses for a function after you type a function name in a formula
CTRL+K	Insert a hyperlink
ENTER (in a cell with a hyperlink)	Activate a hyperlink
F2	Edit the active cell and position the insertion point at the end of the line
F3	Paste a defined name into a formula
SHIFT+F3	Paste a function into a formula
F9	Calculate all sheets in all open workbooks
CTRL+ALT+F9	Calculate all sheets in the active workbook
SHIFT+F9	Calculate the active worksheet
= (equal sign)	Start a formula
ALT+= (equal sign)	Insert the AutoSum formula
CTRL+; (semicolon)	Enter the date
CTRL+SHIFT+: (colon)	Enter the time
CTRL+SHIFT+" (quotation mark)	Copy the value from the cell above the active cell into the cell or the formula bar
CTRL+` (single left quotation mark)	Alternate between displaying cell values and displaying cell formulas
CTRL+' (apostrophe)	Copy a formula from the cell above the active cell into the cell or the formula bar
ALT+DOWN ARROW	Display the AutoComplete list

KEYS FOR FORMATTING DATA

Press	To
ALT+' (apostrophe)	Display the Style dialog box
CTRL+1	Display the Format Cells dialog box
CTRL+SHIFT+~	Apply the General number format
CTRL+SHIFT+\$	Apply the Currency format with two decimal places (negative numbers appear in parentheses)
CTRL+SHIFT+%	Apply the Percentage format with no decimal places
CTRL+SHIFT+^	Apply the Exponential number format with two decimal places
CTRL+SHIFT+#	Apply the Date format with the day, month, and year
CTRL+SHIFT+@	Apply the Time format with the hour and minute, and indicate A.M. or P.M.
CTRL+SHIFT+!	Apply the Number format with two decimal places, thousands separator, and minus sign (–) for negative values
CTRL+SHIFT+&	Apply the outline border
CTRL+SHIFT+_	Remove outline borders
CTRL+B	Apply or remove bold formatting
CTRL+I	Apply or remove italic formatting
CTRL+U	Apply or remove an underline
CTRL+5	Apply or remove strikethrough formatting
CTRL+9	Hide rows
CTRL+SHIFT+((opening parenthesis)	Unhide rows
CTRL+0 (zero)	Hide columns
CTRL+SHIFT+) (closing parenthesis)	Unhide columns

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