Microsoft Excel XP

Manual - Advanced Level

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Importing Data

When you have completed this learning module you will have seen how to:

- Import data from external sources
- Import data into Excel
- Import text files into Excel
- Import text using the Text Import Wizard
- Refresh data from imported text files
- Use Microsoft Query
- Add a data source
- Create a Query
- Query data from the Web
- Access the New Web Query dialog box
- Create a new Web Query
- Save a Web Query
- Set Web Query options
- Run a saved Web Query
- Refresh a Web Query
- Refresh external data without losing the formatting
- Refresh external data automatically

Importing Data from External Sources

Using Database Terminology

- In a corporate environment, data is not usually created and stored within Excel, but maybe stored on mainframes or database servers. Commonly used programs include Access, dBase, FoxPro, Paradox, Oracle, or SQL Server.

- To import data from a database, it is useful to understand the following common database terminology:

  Data Sources: The data source informs the ODBC Manager about the type of data being used and its location.

  Microsoft Query: A stand-alone program supplied with Microsoft Excel. It acts as an interface, allowing you to create queries that are translated into SQL format.

  ODBC: It stands for Open Database Connectivity, and is a term used to describe an industry standard used to connect cross-platform databases.

ODBC Add-in: It allows Excel to communicate with the ODBC Manager directly (without using the Microsoft Query as an intermediary). It also provides the SQL.REQUEST worksheet function, as well as providing an **Application Programmers Interface (API)** for application developers.

ODBC Driver: The ODBC Manager uses the ODBC driver as an intermediate step. ODBC drivers supplied with Excel include Access, dBase, FoxPro, Paradox, SQL Server, Oracle, Excel Worksheets, and text files.

ODBC Manager: This is a Microsoft derived technology that allows programs such as Excel and Microsoft Query to interface with a range of different databases. When you perform a Microsoft query, an SQL statement is sent to the ODBC Manager. The ODBC Manager then acts as an intermediary between the application and the database. This has the advantage that the same query may be used to access different database servers, including SQL Server, Oracle, dBase or Paradox.

Structured Query Language (SQL): An industry standard language used for database communication. Excel queries using Microsoft Query use SQL behind the scenes.

Importing Data into Excel

- You can import data using the following methods:

Open command: From the main menu, choose **File > Open** to display the **Open** dialog box, and select the data file type from the **File of type** dropdown list. (You can choose from the following types of file: Access, Lotus 1-2-3, Quattro Pro, Microsoft Works, dBase, SYLK, Data Interchange Format (DIF), HTML, XML, and previous versions of Excel.) The selected file will be translated by Excel and imported as an Excel spreadsheet.

Export data into text files: From the database application where your data is stored, you can usually export the data you want into text files. You can then import these text files using the **Text Import Wizard**.

Microsoft Query: This program is shipped with Microsoft Excel, and is an excellent tool for querying an external database. Queries allow you to specify the exact data you want from the external database.

Web Queries: Microsoft Excel 2002 allows you to query and refresh data from the Internet.

Pivot Tables: Pivot Tables are useful for accessing and integrating external databases into Excel.

Importing Text Files

Importing text files into Excel

- You can import text from other sources, saving the need to re-enter the data. To import text into Excel, it must be in a format that can be recognized by Excel.

- **The following text file formats that are supported by Excel:**

  Text: Text files are plain text with no formatting information except line returns. Usually this file type contains one record of information per line, but the means of identifying the fields in a record varies.

  Text (Tab Delimited): With this text file format, tabs are used to identify fields in a record.

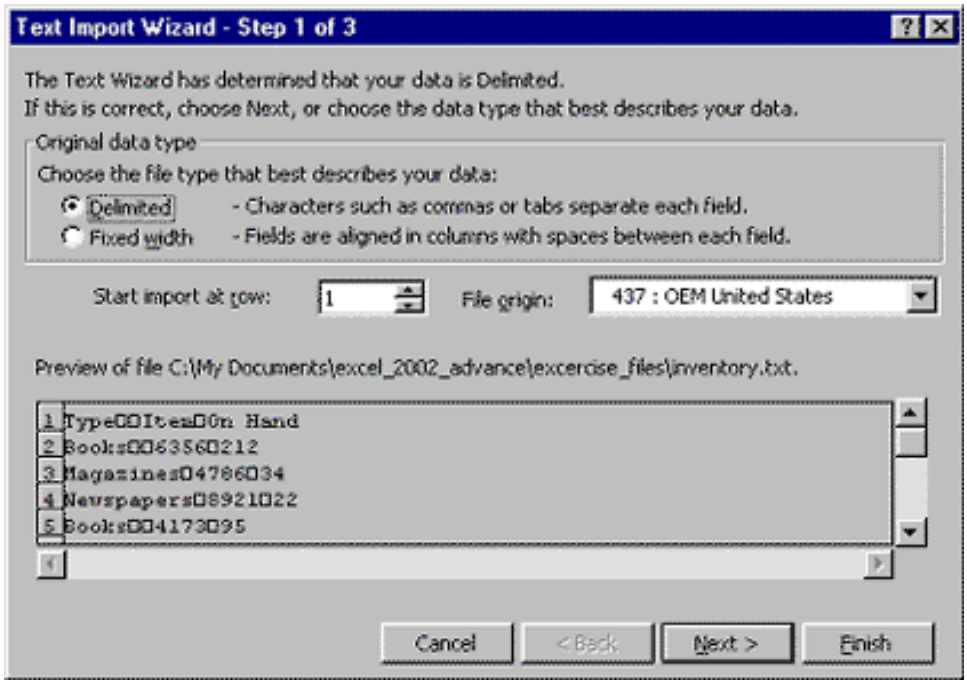
  Formatted Text: Formatted text files make use of position to define fields; each field starts at a defined position on the line. You may find this field type also referred to as Space Delimited, Fixed Width, or Column Delimited.

  Comma Separated Values (CSV): Commas are used by CSV text files to delimit (separate) fields. Although these files are called Comma Separated Values text files, commas are not always used as the delimiter. Examples of other delimiters include vertical bars (|) and at signs (@).

  NOTE: If the text to be imported is not in recognized by Excel, Excel will launch the Text Wizard to provide assistance.

Importing text using the Text Import Wizard

- The **Text Import Wizard** is a set of dialog boxes that guide you through the customization of imported text.
- From the main menu, choose **File > Open** to display the **Open** dialog box.
- From the Files of type dropdown list, select Text Files (*.prn, *.txt, *.csv).
- Select the file you want to open.
- Click **Open** to display the **Text Import Wizard - Step 1 of 3** dialog box:

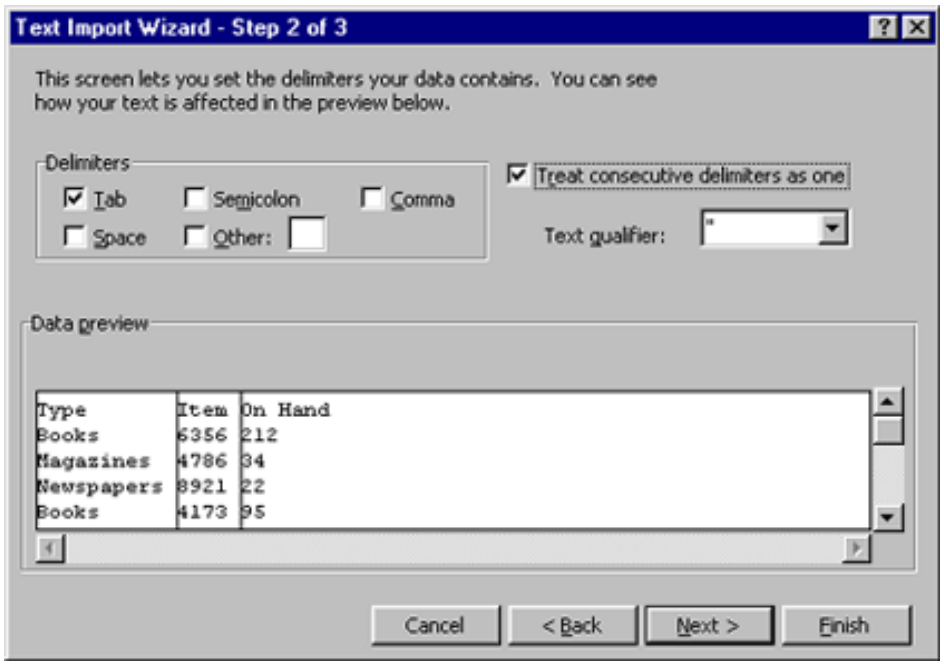


Excel will analyze the selected text file, and determine the file's **data type**, and display a preview of the data to be imported. In the above example, Excel determined the file to be a **Delimited** file.

You can choose to alter the file type selection as needed. If your file contains header rows that you do not want imported, you can change the **Start import at row** number to exclude the header rows. When you change the **Start import at row** number, the preview will be updated to reflect the change.

- When you are satisfied with the options selected, click on the **Next** button to continue to the **Text Import Wizard - Step 2 of 3** dialog box.

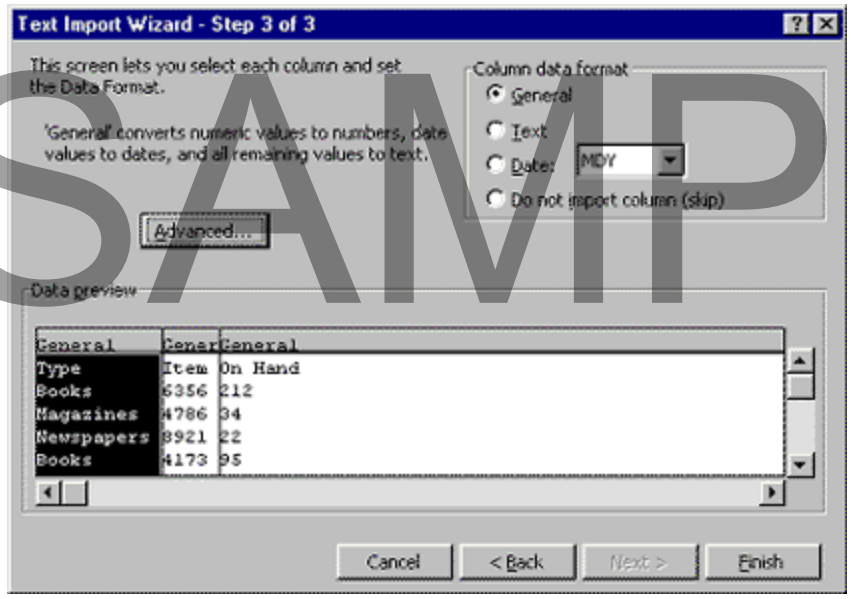
NOTE: You can always use the **Back** button to go back to the previous dialog box and revise the options:



From this dialog box, you can set the delimiters your data contains--choose the type of **Delimiters**, select to **Treat consecutive delimiters as one**, and define the **Text qualifier**. The **Data preview** will display the data based on your choices.

- When you are satisfied with the options selected, click on the **Next** button to continue to the **Text Import Wizard - Step 3 of 3** dialog box.

  NOTE: You can always use the **Back** button to go back to the previous dialog boxes and revise the options:



From this dialog box, you can determine the data format of each column by selecting each column in the **Data preview** area and selecting its **Column data format**. If you do not want to import one of the columns, click on the column in the **Data preview** area, and select the **Do not import column (skip)** radio button in the **Column data format** area.

- When you are satisfied with the options selected, click on the **Finish** button to import the text into Excel.

  NOTE: You can always use the **Back** button to go back to previous dialog boxes and revise the options. Alternatively, you can click **Cancel** to close the wizard without importing the data:

	A	B	C
1	Type	Item	On Hand
2	Books	6356	212
3	Magazines	4786	34
4	Newspape	8921	22
5	Books	4173	95
6	Books	4392	223
7	Candy	7873	87
8	Magazines	2396	12
9	Newspape	5271	9
10	Magazines	2904	35
11	Candy	8762	93
12			

Refreshing data from imported text files

- Select the Worksheet that contains external data from a text file.
- From the main menu, choose **Data > Refresh Data**

  OR from the **External Data** toolbar, click on the **Refresh Data** icon to display the **Import Text File** dialog box.

- Select the text file you want.
- Click **Import**.

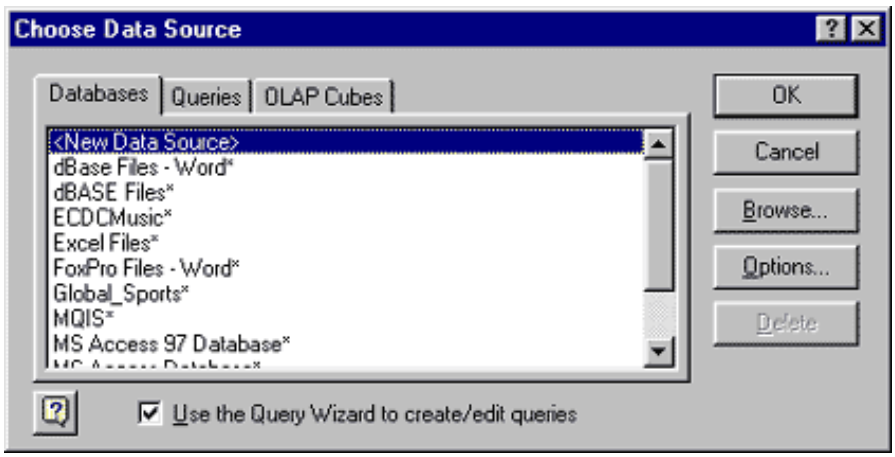
Using Microsoft Query

Adding a Data Source

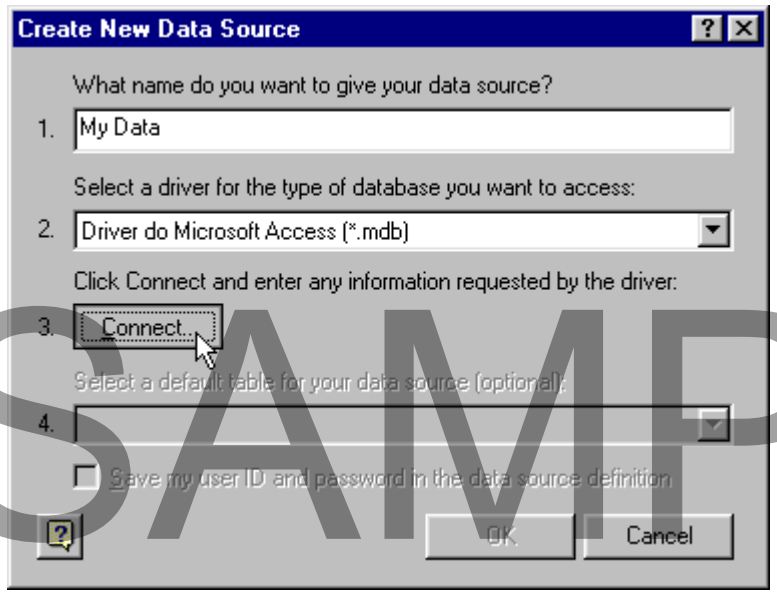
- **Microsoft Query** allows you to obtain data from an external database. You can use the wizard to create filters and define sort order of data from an external database. Since Microsoft Query is a stand-alone program, it can be started independently; however, you can run Microsoft Query from within Excel. For

illustrations purposes, we will run a query with the NorthWind Traders database, which is a sample database supplied with Microsoft Access.

- Make sure that Microsoft Query is installed.
- From the main menu, choose **Data** > **Import External Data** > **New Database Query** to display the Choose Data Source dialog box:



- Click on the **Databases** tab.
- With the **<New Data Source>** selected, click **OK** to display the **Create New Data Source** dialog box:

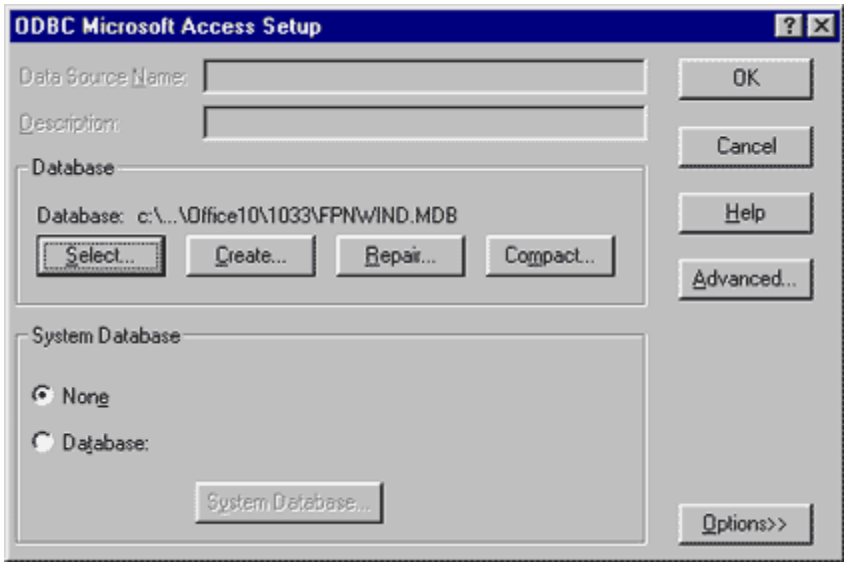


In the field numbered **1**, enter a name for the new data source. In our example, we will enter **My Data**.

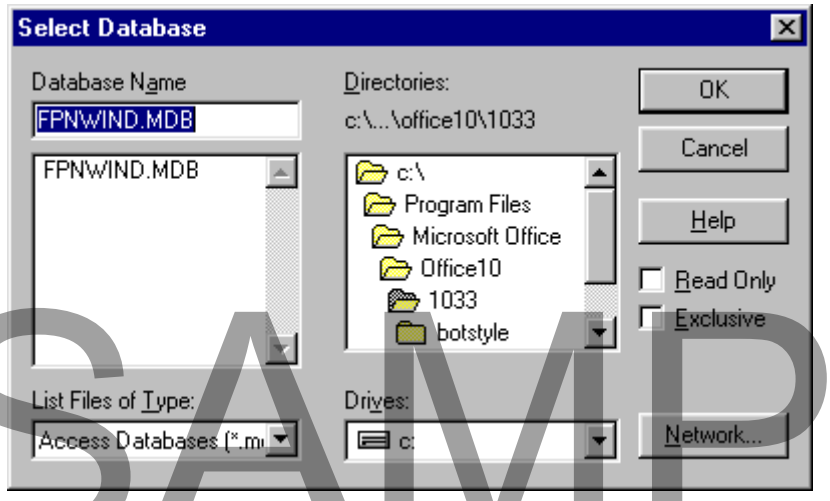
In the field numbered **2**, click on the down arrow and select a driver for your database. In our example, the selected driver is **Microsoft Access Driver**

[*.MDB].

- Click **Connect**. In our example, you will see the **ODBC Microsoft Access Setup** dialog box:



- Click on the **Select** button to display the **Select Database** dialog box:

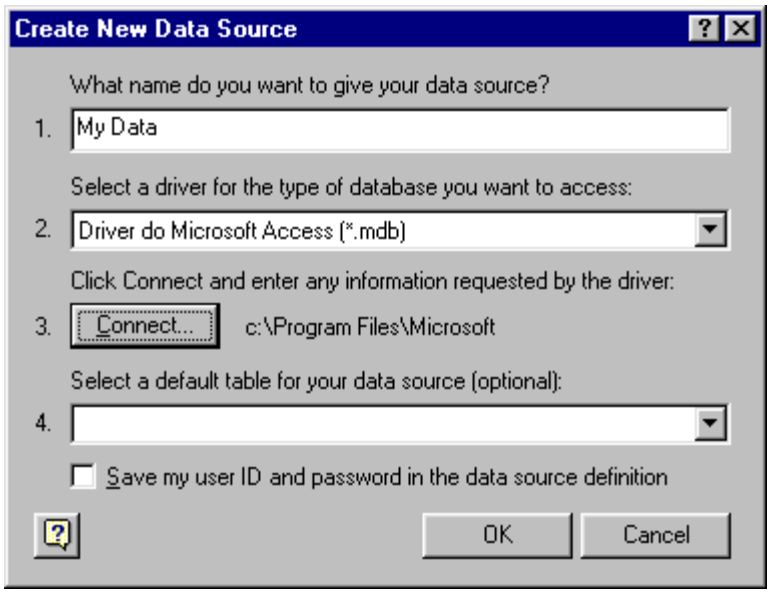


- Locate and select the database you want. In our example, we will use the NorthWind Traders database. You will normally find this in the following location:

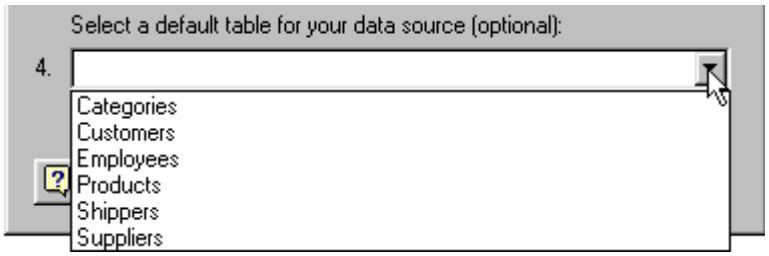
/Program Files/Microsoft Office/Office10/1033/FPNWIND.MDB

- Click **OK** to select the database.
- From the **ODBC Microsoft Access Setup** dialog box, click **OK** to connect to the database and redisplay the **Create New Data Source** dialog box. (Notice that

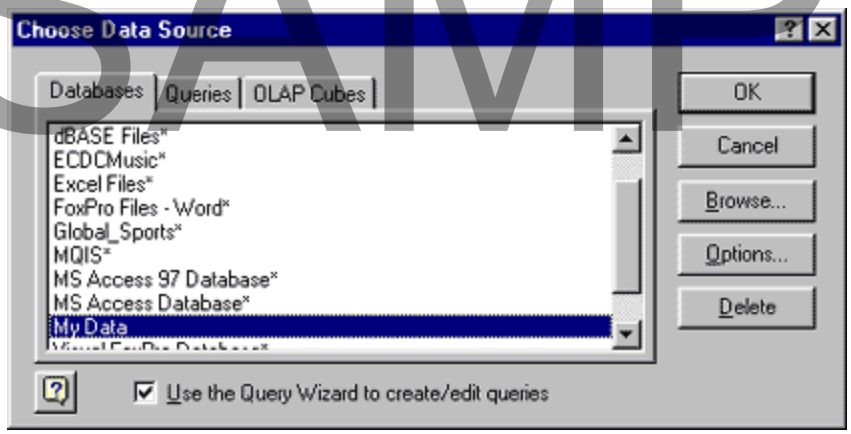
field **3** contains a file path):



- In field **4**, you can enter a default table for your data source. In our example, we will leave this blank, but all the tables in our database are listed in the dropdown list:



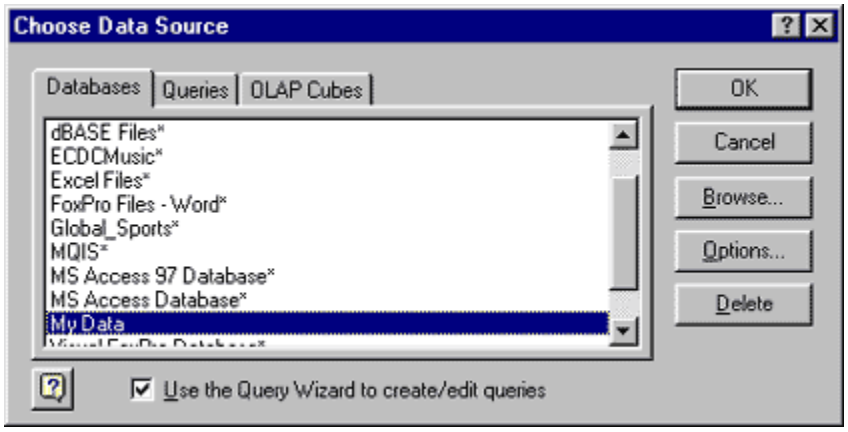
- From the **Create New Data Source** dialog box, click **OK** to return to the **Choose Data Source** dialog box. (Notice that the new data source, **My Data**, has been added):



- To use the selected data source, click **OK**.

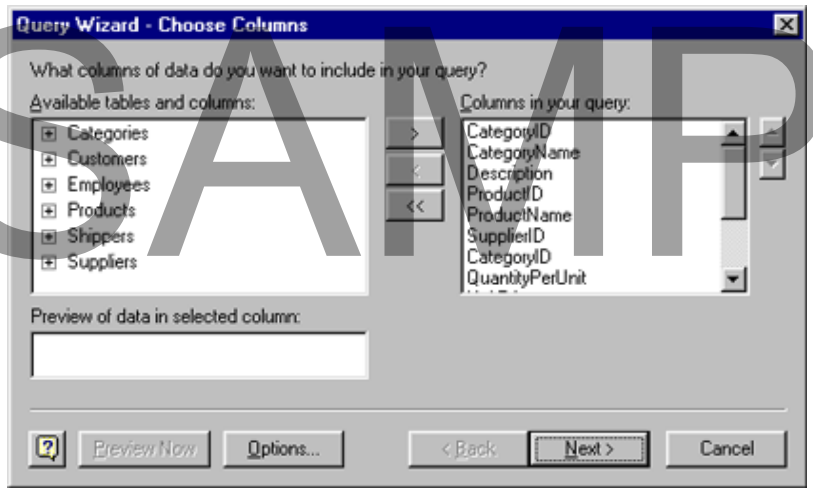
Creating a Query

- From the main menu, choose **Data** > **Import External Data** > **New Database Query** to display the Choose Data Source dialog box.
- Click on the **Databases** tab.
- Select the data source you want to use. In our example, we will select **My Data**:



- Click **OK** to display the **Query Wizard - Choose Columns** dialog box.
- To add the columns you want to include in your query, locate the columns you want by expanding the **plus** icon beside each table, select the column, and click the **right arrow** button.

NOTE: You can add all the columns in a table by selecting the table name and clicking on right arrow button:

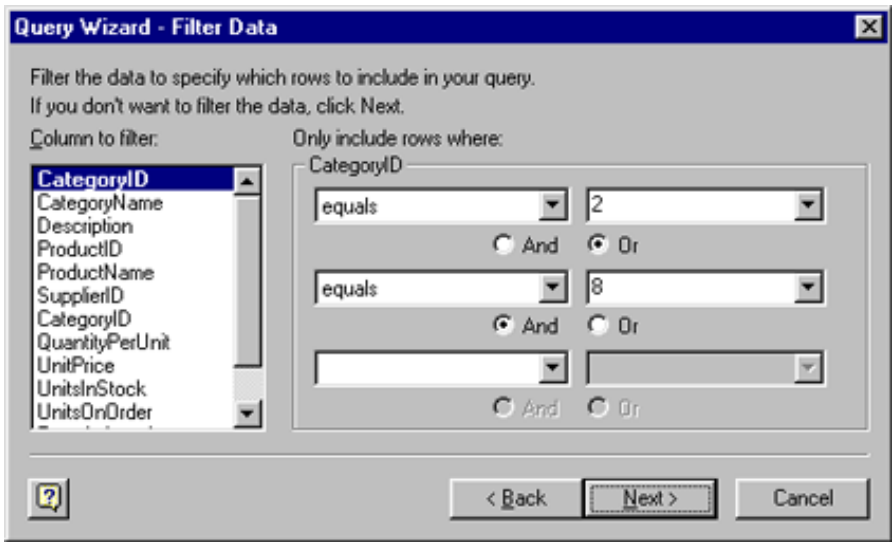


In our example, we will add the columns in the **Categories** and the **Products**

tables to the query.

- Click **Next** to continue to the **Query Wizard - Filter Data** dialog box.
- To add a filter to your query, select the **Column** you want to filter. In the **Only include rows where:** area, select an operand from the first dropdown list and a column value from the second dropdown list.

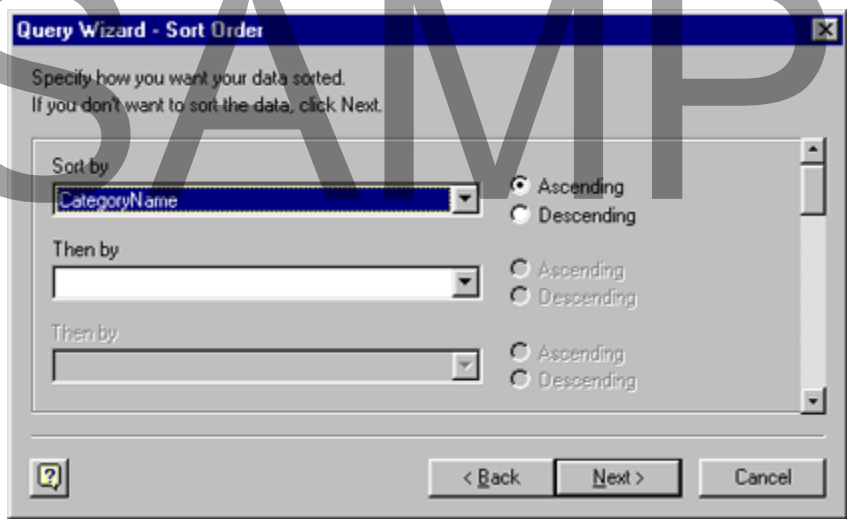
NOTE: You can add another filter by selecting the **And** or **Or** radio buttons:



In our example, we only want data that has a **CategoryID** of **2** or **8**.

- Click **Next** to continue to the **Query Wizard - Sort Order** dialog box.
- To sort your data, select the **Column** you want in the **Sort by** dropdown list and select the **Ascending** or **Descending** radio button.

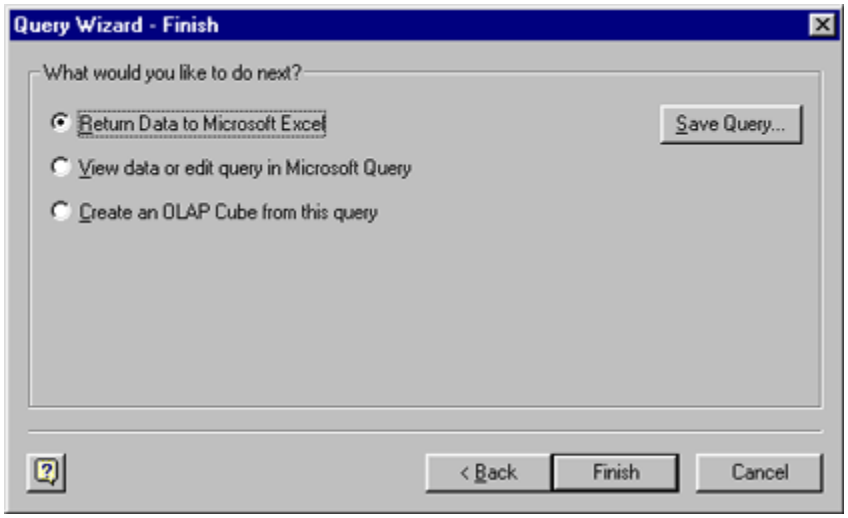
NOTE: You can add another two other sort criteria:



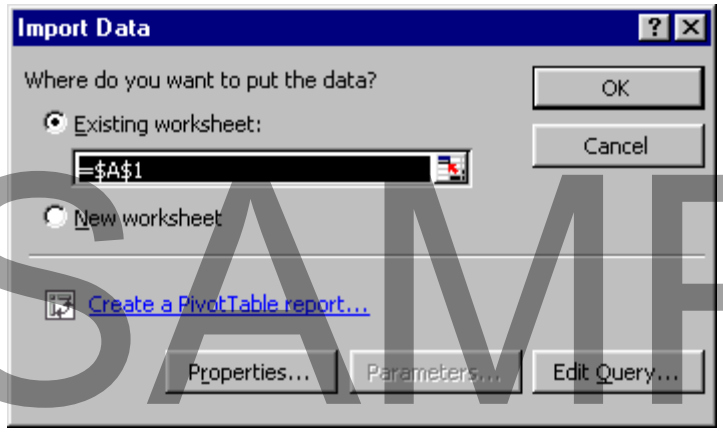
In our example, we will sort the data by **CategoryName** in **Ascending** order.

- Click **Next** to continue to the **Query Wizard - Finish** dialog box.
- To display the results of your query in Excel, select the **Return Data to Microsoft Excel** radio button.

  NOTE: You can save this query for future use by clicking on the **Save Query** button:



- Click **Finish** to display the **Import Data** dialog box:



- You can determine where you want to place the data. Make your selection and click **OK**. In our example, the worksheet may appear as follows:

	A	B	C
1	CategoryID	CategoryName	Description
2	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
3	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
4	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
5	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
6	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
7	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
8	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
9	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
10	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
11	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
12	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
13	2	Condiments	Sweet and savory sauces, relishes, spreads, and seasc
14	8	Seafood	Seaweed and fish
15	8	Seafood	Seaweed and fish
16	8	Seafood	Seaweed and fish
17	8	Seafood	Seaweed and fish
18	8	Seafood	Seaweed and fish
19	8	Seafood	Seaweed and fish
20	8	Seafood	Seaweed and fish
21	8	Seafood	Seaweed and fish
22	8	Seafood	Seaweed and fish
23	8	Seafood	Seaweed and fish
24	8	Seafood	Seaweed and fish
25	8	Seafood	Seaweed and fish

Querying Data from the Web

Using Web Queries

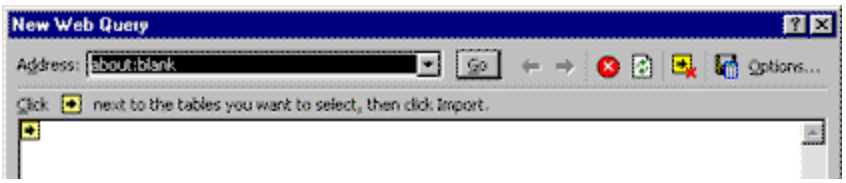
- The Internet can provide valuable information to your spreadsheet analysis. Microsoft Excel 2002 has integrated a web query component that allows you to insert data obtained directly from a Web page into your spreadsheet. The data can be refreshed as needed. For example, you can obtain stock quotes from the Internet and insert the data into your spreadsheet for analysis.

Accessing the New Web Query dialog box

- You can access the **New Web Query** dialog box from Microsoft Excel or from your browser.

To access the New Web Query dialog box from Excel:

- From the main menu, choose **Data** > **Import External Data** > **New Web Query** to display the New Web Query dialog box.
- In the **Address** dropdown list box, enter the URL of the Web page that contains the data you want. Click on the **Go** button to display the Web page in the preview area:



To access the New Web Query dialog box from Internet Explorer:

- In Internet Explorer, browse to the Web page that contains the data you want.
- From the toolbar, click on the **Edit** icon arrow, and select **Edit with Microsoft Excel** to display the **New Web Query** dialog box with the Web page displayed in the preview area:

Creating a new Web Query

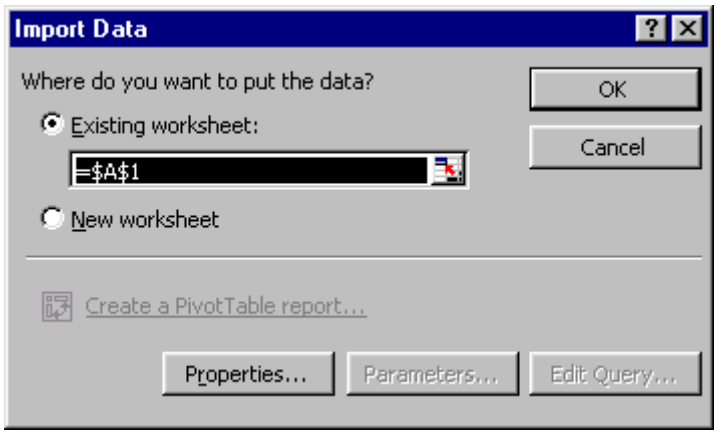
- Once you have previewed the Web page you want in the **New Web Query** dialog box, you can select the data you want to import. The Web Query function works best with data within HTML table tags. Importable data will be identified by yellow arrow icons.

  NOTE: To display the yellow arrow icons, click on the **Show Icons** button, located at the top of the dialog box.

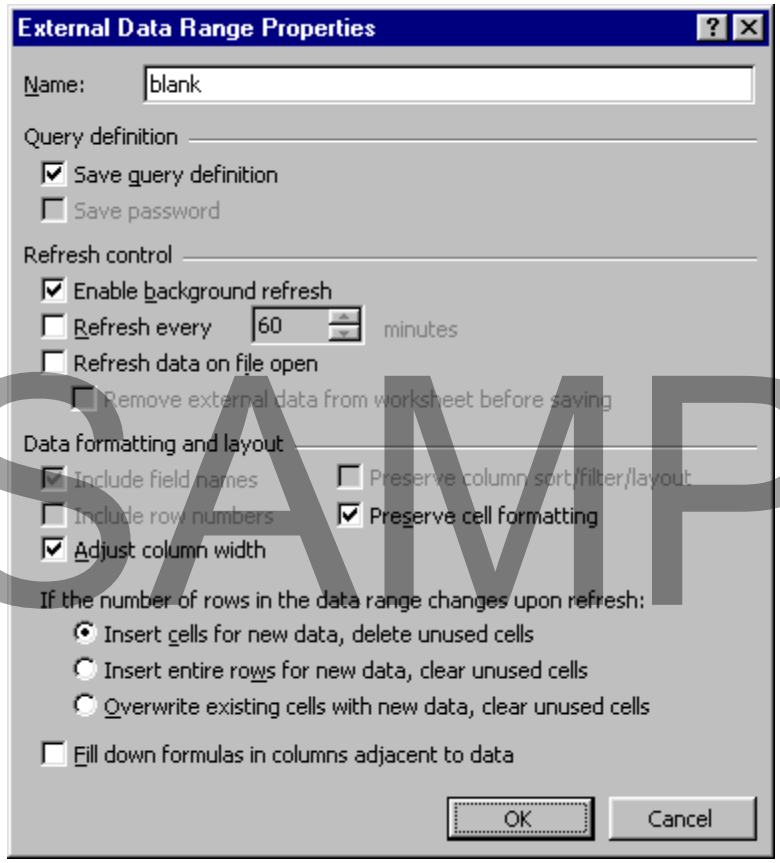
- From the preview area of the **New Web Query** dialog box, locate the data you want to import, and click on its corresponding yellow arrow icon. The icon will change to a green check mark icon to indicate that it is selected.

  NOTE: To import the entire page, click on the yellow arrow icon in the top-left corner of the preview area.

- When all the data you want to import is selected, click on the **Import** button to display the **Import Data** dialog box:



- From the **Import Data** dialog box, select the **Existing worksheet** radio button to import the data into the existing worksheet, or select the **New worksheet** radio button to import the data into a new worksheet. (If you are importing the data into an existing worksheet, you can place the data in the cell or cell range you want.)
- To change the properties of the data, click on the **Properties** button, and select the options you want in the **External Data Range Properties** dialog box:



- When you are satisfied with the property options, click **OK** to return to the **Import Data** dialog box.

- From the **Import Data** dialog box, click **OK** to import the data into Excel.

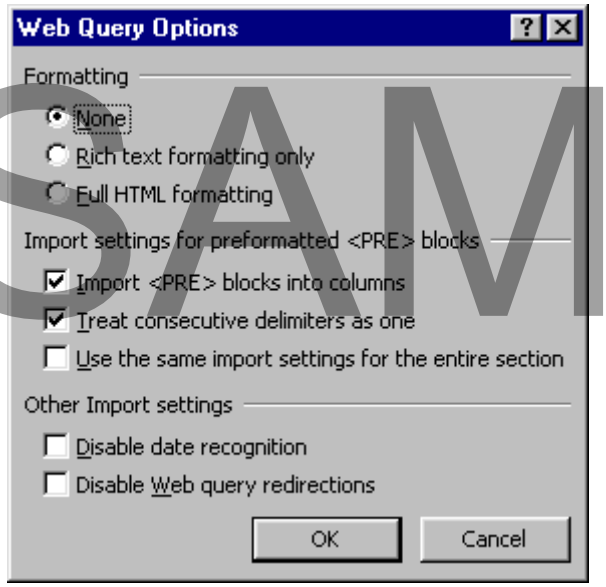
  NOTE: It may take a moment to run the Web Query. You can check the query status by double-clicking the **Refresh** button.

Saving a Web Query

- By default, Web Queries are saved along with your Workbook. (You can change this by deselecting the **Save query definition** checkbox in the **External Data Range Properties** dialog box.
- If you want to access the query from another file, you can save the query as a separate file.
- From the main menu, choose **Data** > **Import External Data** > **Edit Query** to display the Edit Query dialog box.
- Click on the **Save Query** icon to display the **Save As** dialog box.
- Enter a file name in the **File name** dropdown list box.
- Click **Save** to save the query as a text file with an **.iqy** file extension.
- From the **Edit Web Query** dialog box, click **Cancel** to close the dialog box.

Setting Web Query options

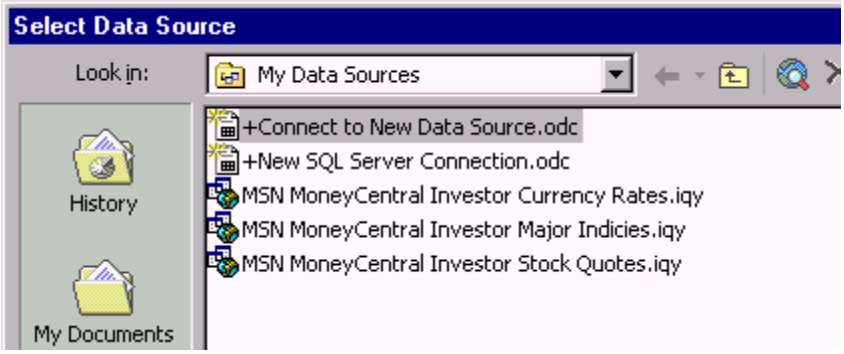
- From the **New Web Query** dialog box, click on the **Options** Options... button to display the **Web Query Options** dialog box:



- Set the **Formatting** and **Import** options you want.
- Click **OK** to apply the options.

Running a saved Web Query

- You can run a previously saved Web Query or one that was preloaded with Microsoft Excel. Excel includes Web Queries such as stock quotes and foreign exchange rates.
- From the main menu, choose **Data > Import External Data > Import Data** to display the **Select Data Source** dialog box:



- Select the Web Query you want.
- Click **Open** to display the **Import Data** dialog box.
- From the **Import Data** dialog box, select the **Existing worksheet** radio button to import the data into the existing worksheet, or select the **New worksheet** radio button to import the data into a new worksheet.
- Click **OK** to import the data.

Refreshing a Web Query

- Open the Worksheet that contains external data from a Web Query.
- Select one of the cells that contain Web Query data.
- From the main menu, choose **Data > Refresh Data**

  OR from the **External Data** toolbar, click on the **Refresh Data** icon.

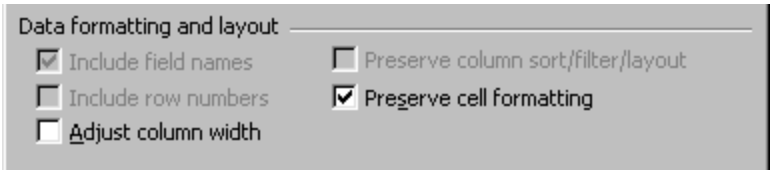
Refreshing Data

Refreshing external data without losing the formatting

- Select one of the cells that contain external data.
- From the main menu, choose **Data** > **Import External Data** > **Data Range Properties**

OR from the External Data toolbar, click on the **Data Range Properties** icon to display the External Data Range Properties dialog box.

- To preserve the cell formatting, select the **Preserve cell formatting** checkbox.
- To keep any custom column widths, deselect the **Adjust column width** checkbox:



- Click **OK** to close the External Data Range Properties dialog box.

- To refresh the data, choose **Data > Refresh Data**

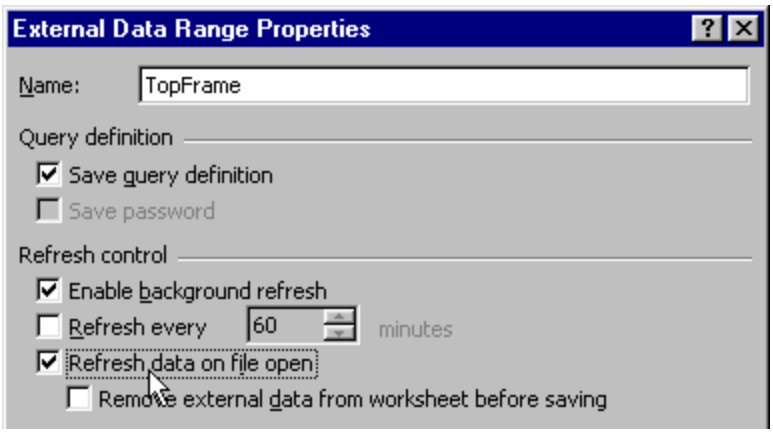
  OR from the **External Data** toolbar, click on the **Refresh Data** icon.

Refreshing external data automatically

- You can set the external data to refresh automatically when you open the Workbook or periodically while the Workbook is open.
- Select one of the cells that contain external data.
- From the main menu, choose **Data** > **Import External Data** > **Data Range Properties**

  OR from the External Data toolbar, click on the **Data Range Properties** icon to display the External Data Range Properties dialog box.

- Select the **Refresh data on file open** checkbox, or select the **Refresh every** checkbox, and set the time period in **minutes**:



- Click **OK**.

NOTE: To reduce file size, you can save the Workbook with the query definition but without the external data. Select the **Remove external data from worksheet before saving** checkbox. The data will be automatically refreshed next time you open the Workbook.

Review Questions

How would you:

- Import data from external sources?
- Import data into Excel?
- Import text files into Excel?
- Import text using the Text Import Wizard?
- Refresh data from imported text files?
- Use Microsoft Query?
- Add a data source?
- Create a Query?
- Query data from the Web?
- Access the New Web Query dialog box?
- Create a new Web Query?
- Save a Web Query?
- Set Web Query options?
- Run a saved Web Query?
- Refresh a Web Query?
- Refresh external data without losing the formatting?
- Refresh external data automatically?

Templates and Styles

When you have completed this learning module you will have seen how to:

- Create a template
- Use templates
- Create a style
- Use styles
- Edit a style
- Delete a style
- Copy styles from another Workbook

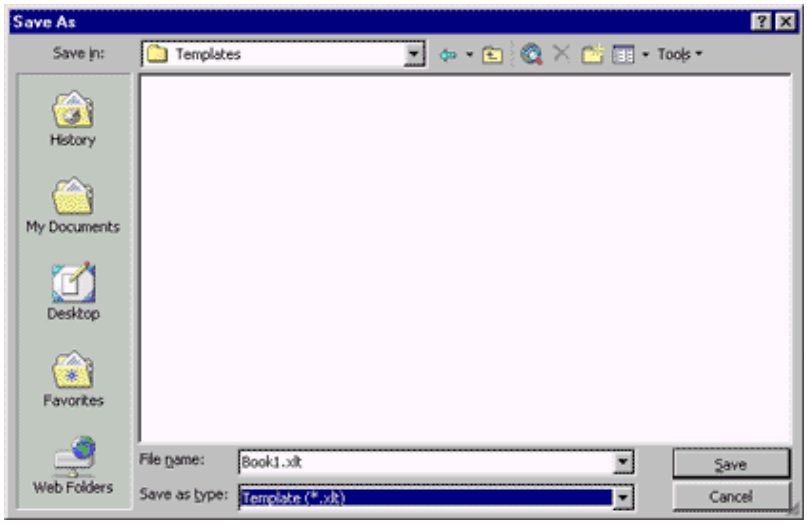
Working with Templates

Using Templates

- When working with spreadsheets, you may wish to use the same layout or design. Instead of re-creating the design, you can create a **template**.
- Templates have the **.XLT** file extension, and can contain layout and formatting information, including text and graphics, layouts and styles, headers and footers, formulas, and macros.
- When templates are used to create a new Workbook, a copy is made, leaving the original template file intact for further use.

Creating a Template

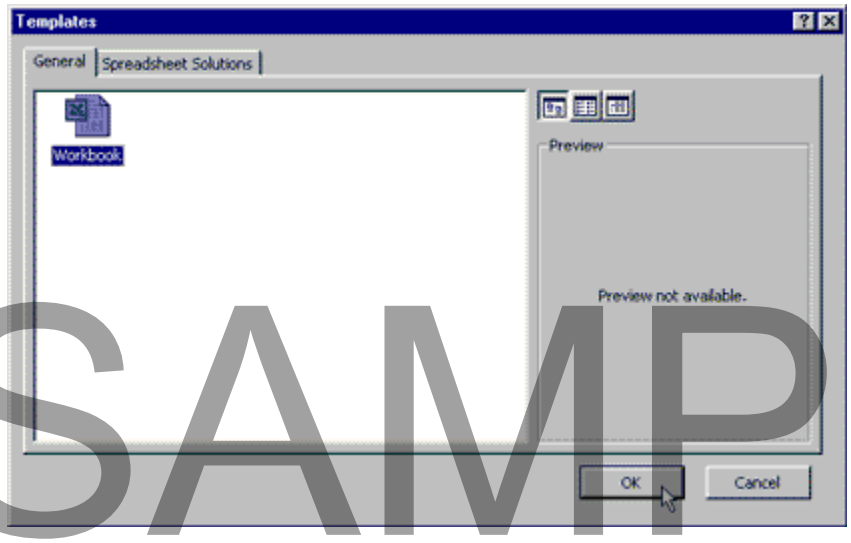
- Create a Workbook that contains all layout and formatting elements you want in your template.
- From the main menu, choose **File > Save As** to display the **Save As** dialog box.
- In the **File name** dropdown list box, type a template name.
- From the **Save as type** dropdown list box, select **Template (*.XLT)** to display the existing templates in the default **Templates** folder and to add the **.XLT** extension to the file name:



- Click **Save** to save the template in the **Templates** folder.

Applying Templates

- From the main menu, choose **File > New** to display the **New Workbook** pane.
- From the **New from template** section of the **New Workbook** pane, click on **General Templates** to display the **Templates** dialog box:



- Click on the **General** or the **Spreadsheet Solutions** tab to locate the template you want.
- Select the template icon you want.
- Click **OK**.

NOTE: For the default template, click on the **General** tab and select the **Workbook** icon.

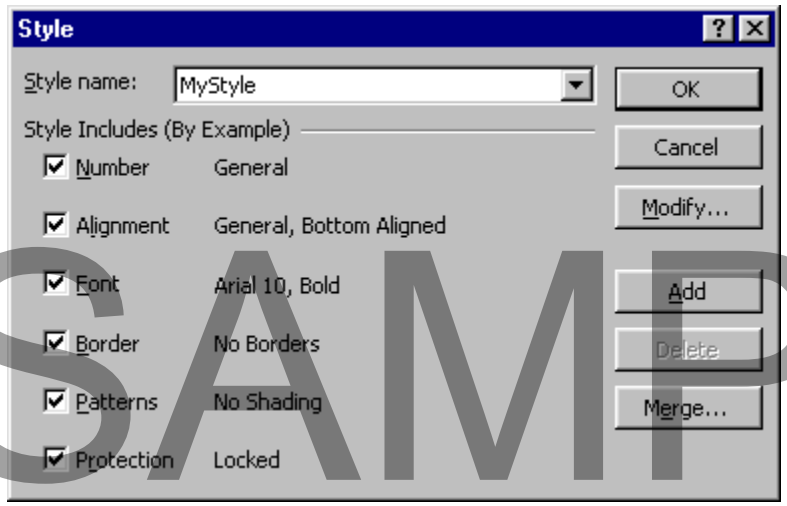
Working with Styles

Using Styles

- Whereas a template is a collecting of layout and formatting information for a workbook, a **style** is a collection of formatting information for a cell. Styles can contain formatting information, including Number, Font, Alignment, Border, Patterns, and Protection.
- You can use styles to reapply the pre-defined formatting to multiple cells. When styles are used to format cells, you can reformat the Worksheet by modifying the styles. It is possible to copy styles from one Workbook to another.
- Excel 2002 comes with a number of pre-defined styles. By default, all cells are assigned the **Normal** style.

Creating a Style

- Select the cell that contains the formatting you want in your style.
- From the main menu, choose **Format > Style** to display the **Style** dialog box.
- In the **Style name** dropdown list box, type a style name.
- Select the attributes (**Number**, **Alignment**, **Font**, **Border**, **Patterns**, and **Protection**) you want to include in the new style:

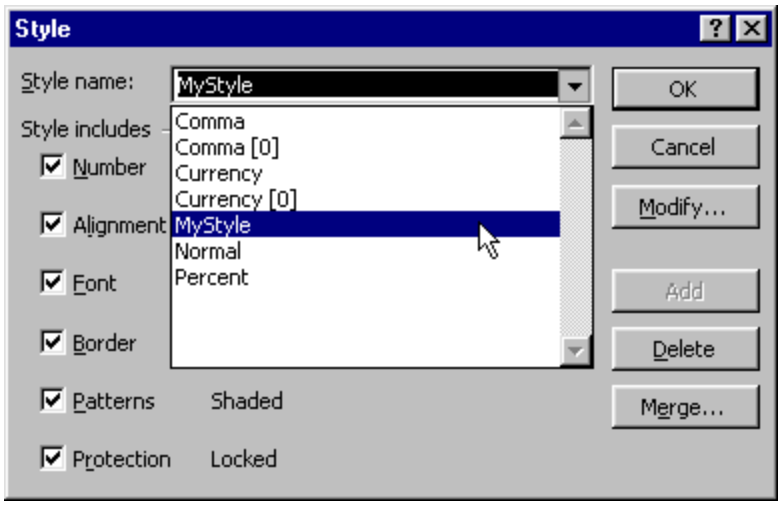


- Click **Add** to create the style
- Click **OK** to closes the **Style** dialog box.

Applying a Style

- Select the cell or cell range you want to format.

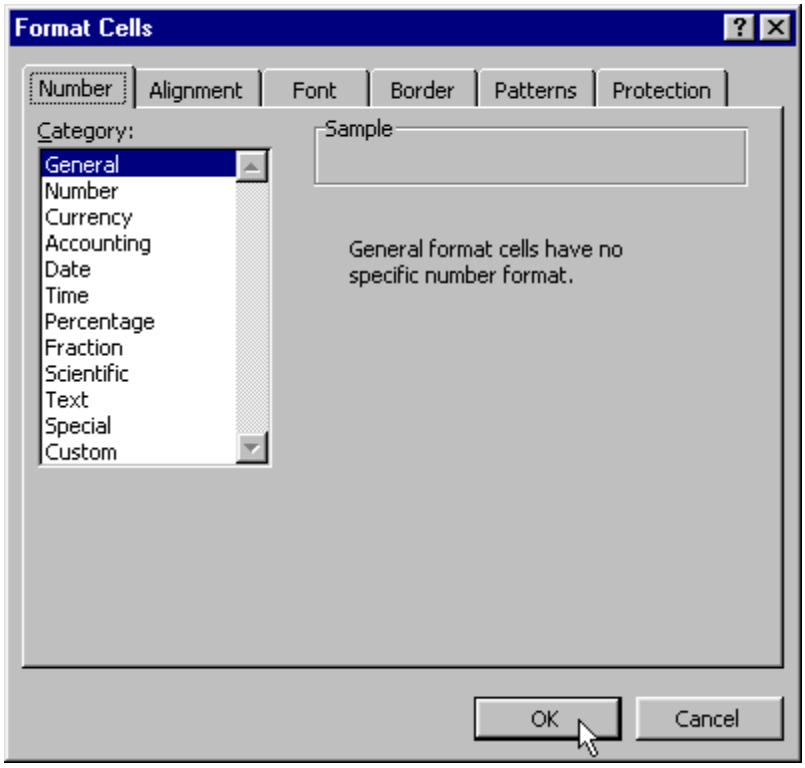
- From the main menu, choose **Format > Style** to display the **Style** dialog box.
- From the **Style name** dropdown list box, select the style you want to use:



- Click **OK** to closes the **Style** dialog box.

Editing a Style

- From the main menu, choose **Format > Style** to display the **Style** dialog box.
- From the **Style name** dropdown list box, select the style you want to edit.
- Click on the **Modify** button to display the **Format Cells** dialog box:



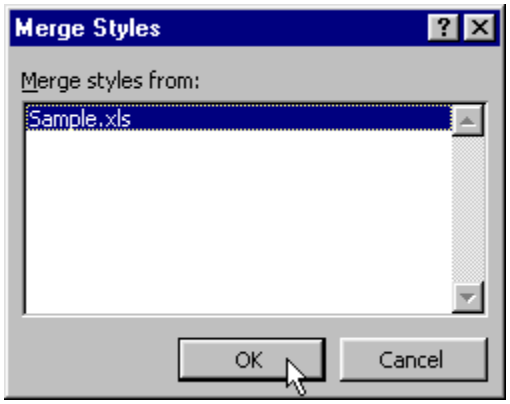
- Use the tabs to access the attributes you want, and make the changes needed.
- Click **OK** to return to the **Style** dialog box.
- Click **OK** to apply the changes to all cells formatted with this style.

Deleting a Style

- From the main menu, choose **Format > Style** to display the **Style** dialog box.
- From the **Style name** dropdown list box, select the style you want to delete.
- Click on the **Delete** button.
- Click **OK** to close the **Style** dialog box.

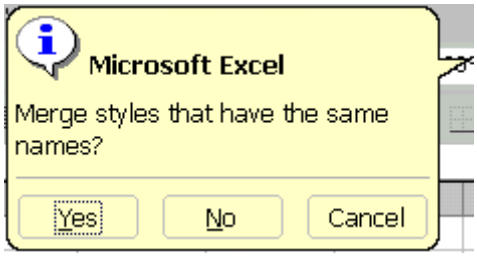
Copying Styles from another Workbook

- Open the Workbook with the styles you want to copy.
- Switch to the Workbook that the styles will be copied to.
- From the main menu, choose **Format > Style** to display the **Style** dialog box.
- Click on the **Merge** button to display the **Merge Styles** dialog box:



- Select the Workbook that contains the styles you want.
- Click **OK** to copy the styles from the selected Workbook.

If the target Workbook contains styles with the same name, the following warning message will appear. Click **Yes** to replace all the existing styles with the copied styles:



- Click **OK** to close the **Style** dialog box.

Review Questions

How would you:

- Create a template?
- Use templates?
- Create a style?
- Use styles?
- Edit a style?
- Delete a style?
- Copy styles from another Workbook?

Analyzing Data

When you have completed this learning module you will have seen how to:

- Use Goal Seek
- Use Data Table
- Create a one-variable Data Table
- Create a two-variable Data Table
- Speed up calculations with Data Tables
- Use Scenario Manager
- Add a scenario
- Show a scenario
- Delete a scenario
- Edit an existing scenario
- Summarize scenarios
- Using Solver
- Install Solver
- Use Solver
- Change a constraint
- Delete a constraint

What-If Analysis

Using What-If Analysis

- Excel provides a number of tools to help you find answers to "What-If" type questions. **What-If Analysis** allows you to see the effect that input value changes have on the result of formulas. For example, what happens to a car loan payment if you reduced the down payment or increased the interest rate?

- Excel provides the following What-If Analysis tools:

  Goal Seek: Allows you to find the correct input to produce the desired outcome. Simple to use, but limited in power and flexibility.

  Data Tables: Allows you to see how the results are affected by changes in the input values displayed in a table. Simple to use, but limited in power and flexibility.

  Scenario Manager: Allows you to create, manipulate, and save a number of different scenarios that use different input variables, producing different results. Simple to use, but limited in power and flexibility.

Solver: Allows you to find the best solution to complex problems that revolve around the manipulation of multiple variables and constraints. More difficult to use, but very powerful and extremely flexible.

Goal Seek

Using Goal Seek

- Sometime when you are analyzing a problem, you know the end result you want to achieve, but want to determine the input values to achieve this result. The **Goal Seek** command will allow us to accomplish this easily.

  Goal seeking is the means to say, "This is the final value that I want to achieve, what input value do I need?"

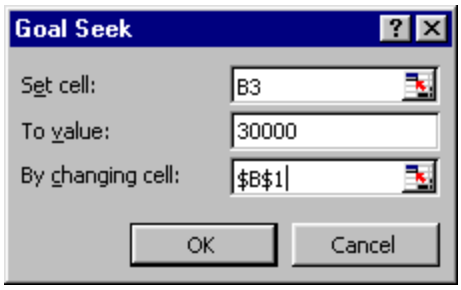
  Excel calculates the input value needed by varying the value in the formula until the result is achieved.

Applying Goal Seek

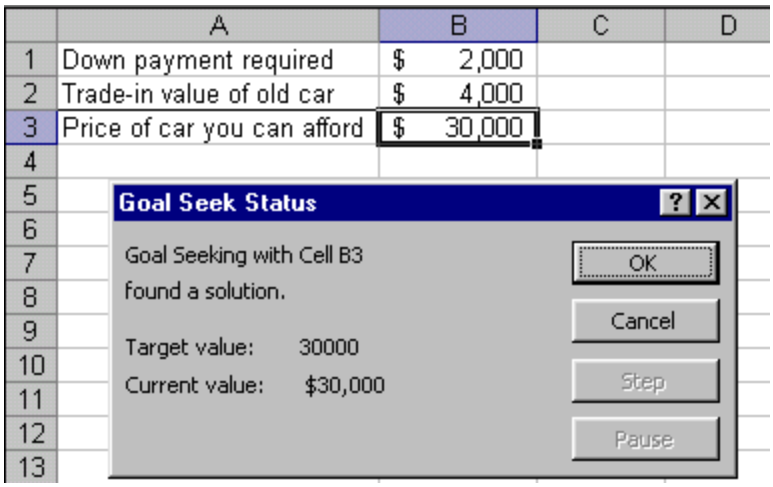
- Build a formula using cell references for each variable of your formula. The following example shows a simple calculation of the **Price of car you can afford**. The formula in cell **B3** is: **=(B1+B2)/0.2**

	A	B	C
1	Down payment required	$ 1,000	
2	Trade-in value of old car	$ 4,000	
3	Price of car you can afford	$ 25,000	
4			
5			

- Select the cell containing the formula for which you have an end result to achieve. In our example, select cell **B3**.
- From the main menu, choose **Tools > Goal Seek** to display the **Goal Seek** dialog box. The cell reference for the selected cell will appear in the **Set cell** text box.
- In the **To value** text box, enter the end result you want to achieve. In our example, we want to purchase a more expensive car; enter **30000**.
- In the **By changing cell** text box, enter the cell containing the input value that you want changed to achieve the end result. In our example, we want to know what **Down payment** is required. Click on cell **B1**:



- Click **OK** to run the **Goal Seek**.
- When the **Goal Seek** is complete, the **Goal Seek Status** dialog box will appear, and the results are reflected in the Worksheet:



- Click **OK** to accept the new values.
- Click **Cancel** to close the **Goal Seek Status** dialog box and leave the values unchanged.

Data Tables

Using Data Tables

- You can use **Data Tables** to calculate and compare the outcome of different inputs of a formula. The different combinations of input values and results are presented in a table format for easy comparison. Depending on your needs, you can change one or two variables in Data Tables.

Creating a one-variable Data Table

- A one-variable **Data Table** allows you to see the effects changes of one variable (input value) of a formula. In the following example, we will find out the effects

the Down Payment has on the monthly Payments.

- Begin by designing the Worksheet with your initial input values. The input value that you want varied is referred to as the **Input Cell**. In our example, the Input Cell is **B3**.

- Create the Data Table by listing the substitution values of your Input Cell together, either in a column or in a row. In our example, we will list the substitution values in range **C3:C6**.
- Enter the formula, using the **Input Cell** in the formula, as follows:

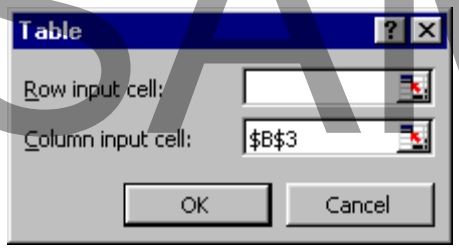
  If your substitution values are **column-oriented**, enter the formula in the cell that is one column to the right and one cell above the first substitution value. In our example, the first substitution value is in cell **C3** so we will enter the formula in cell **D2**.

  If your substitution values **row-oriented**, enter the formula in the cell that is one row below and one cell to the left of the first substitution value. For example, if your first substitution value were in cell **C3**, then you would enter your formula in cell **B4**.

- Select a cell range that includes the formula and all the substitution values. In our example, the selected range is **C2:D6**:

	A	B	C	D
1	**Car Loan Analysis**			**Payments**
2	Car Purchase Price	$25,000		$533.87
3	Less Down Payment	$1,000	$1,500	
4	Car Loan Amount	$24,000	$2,000	
5	Interest Rate	12%	$2,500	
6	Term (months)	60	$3,000	
7				

- From the main menu, choose, **Data > Table** to display the **Table** dialog box:



If your Data Table is **column-oriented**, in the **Column input cell**, enter the cell reference for the **Input Cell**. In our example, the Input Cell is **B3**.

If your Data Table is **row-oriented**, in the **Row input cell**, enter the cell

reference for the **Input Cell**.

- Click **OK** to create the one-variable **Data Table**:

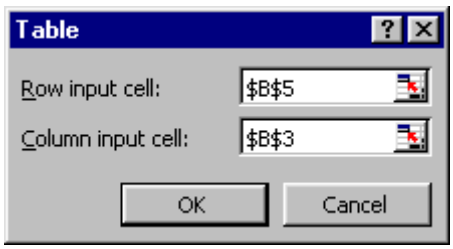
	A	B	C	D
1	**Car Loan Analysis**			**Payments**
2	Car Purchase Price	$25,000		$533.87
3	Less Down Payment	$1,000	$1,500	$522.74
4	Car Loan Amount	$24,000	$2,000	$511.62
5	Interest Rate	12%	$2,500	$500.50
6	Term (months)	60	$3,000	$489.38
7				

Creating a two-variable Data Table

- A two-variable **Data Table** allows you to see the effects changes of two variables (input values) of a formula. In the following example, we will find the effects the Down Payment and the interest rate have on the monthly Payments.
- Begin by designing the Worksheet with your initial input values. The input values that you want varied are referred to as the **Input Cells**. In our example, the Input Cells are **B3** and **B5**.
- Create the Data Table by entering your formula, using both Input Cells in your formula, in a cell that will define the top-left corner of your Data Table. In our example, we will enter the formula in cell **C2**.
- List the substitution values of your first Input Cell down a column to the below your formula. In our example, we will list the Down Payment substitution values in cell range **C3:C6**.
- List the substitution values of your second Input Cell across in a row to the right of your formula. In our example, we will list the Interest Rate substitution values in cell range **D2:G2**.
- Select a cell range that includes the formula and all the substitution values. In our example, the selected range is **C2:G6**:

	A	B	C	D	E	F	G
1	**Car Loan Analysis**			**Payments**			
2	Car Purchase Price	$25,000	$533.87	8%	9%	10	11
3	Less Down Payment	$1,000	$1,500				
4	Car Loan Amount	$24,000	$2,000				
5	Interest Rate	12%	$2,500				
6	Term (months)	60	$3,000				
7							

- From the main menu, choose, **Data > Table** to display the **Table** dialog box:



In the **Row input cell**, enter the cell reference for the row **Input Cell**. In our example, the row Input Cell is **B5**.

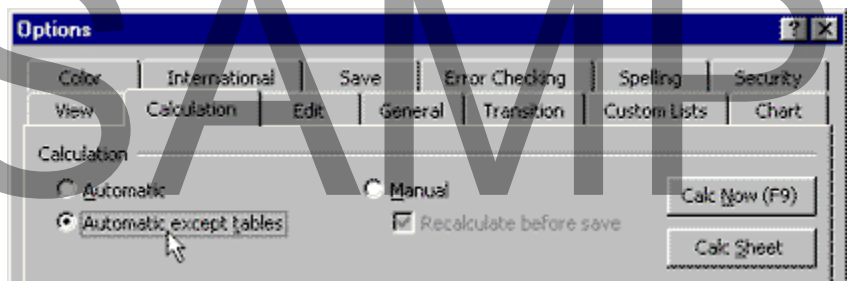
In the **Column input cell**, enter the cell reference for the column **Input Cell**. In our example, the column Input Cell is **B3**.

- Click **OK** to create the two-variable **Data Table**:

	A	B	C	D	E	F	G
1	**Car Loan Analysis**			**Payments**			
2	Car Purchase Price	$25,000	**$533.87**	$0.08	$0.09	$0.10	$0.11
3	Less Down Payment	$1,000	$1,500	$476.50	$487.82	$499.31	$510.95
4	Car Loan Amount	$24,000	$2,000	$466.36	$477.44	$488.68	$500.08
5	Interest Rate	12%	$2,500	$456.22	$467.06	$478.06	$489.20
6	Term (months)	60	$3,000	$446.08	$456.68	$467.43	$478.33
7							

Speeding up calculations with Data Tables

- By default, Excel will recalculate Data Tables every time the Worksheet requires recalculation, slowing your calculations.
- You can adjust this option, such that Data Tables are not automatically recalculated with the Worksheet.
- From the main menu, choose **Tools > Options** to display the **Options** dialog box, and click on the **Calculation** tab.
- Select the **Automatic except tables** radio button:



- Click **OK**.

Scenario Manager

Using Scenario Manager

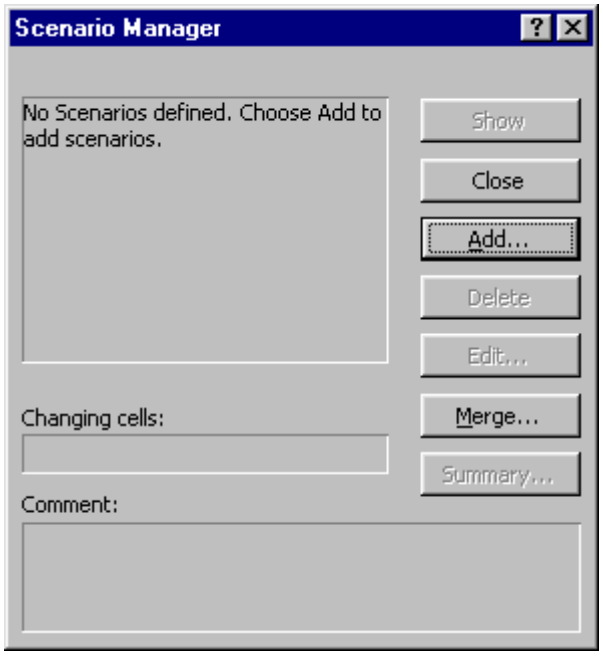
- In analyzing your data, you will frequently want to look at a number of differing options within your spreadsheet. **Scenario Manager** allows you to change multiple cells in order and see the effect of the changes, and keep your scenarios for review later.
- Scenarios are useful in forecasting the results of models, and can be printed in summary form.
- For example, we can use Scenario Manager to see the changes in total expenditures depending on scenarios that affect expense items differently.

Adding a Scenario

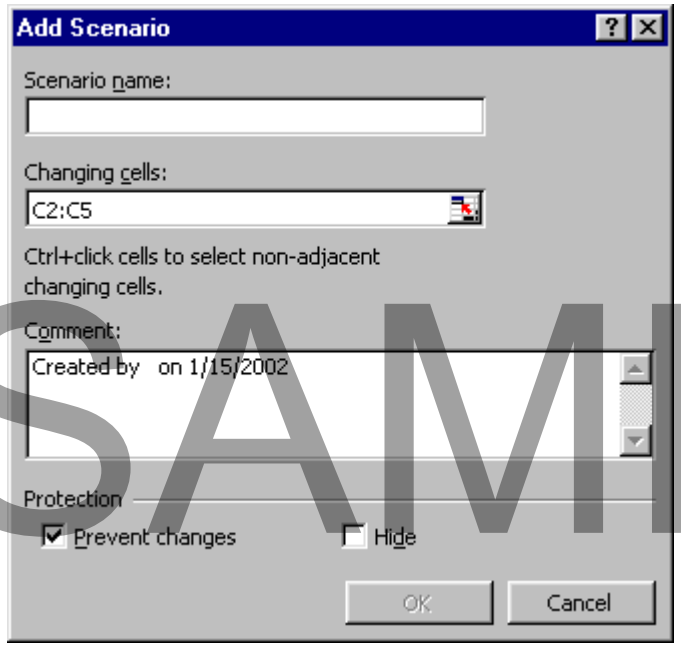
- Begin by creating the initial scenario using our best guess on the percentage increases:

	A	B	C	D
1		Costs for this year	Expected % increase	Estimated cost for next year
2	Rent	$ 30,000	10%	$ 33,000
3	Staff	$ 95,000	10%	$ 104,500
4	Energy	$ 20,000	20%	$ 24,000
5	Other	$ 55,000	5%	$ 57,750
6	Total	$ 200,000		$ 219,250
7				

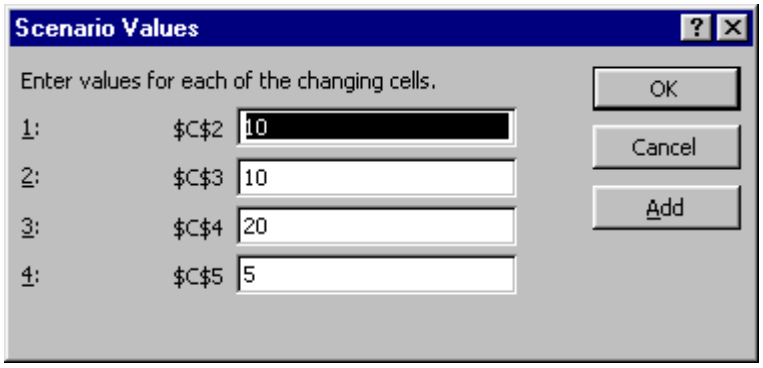
- Select the cells containing values that will change with different scenarios. In our example, select cell range **C2:C5**.
- From the main menu, choose **Tools > Scenarios** to display the **Scenario Manager** dialog box. (Notice that no scenarios have been defined):



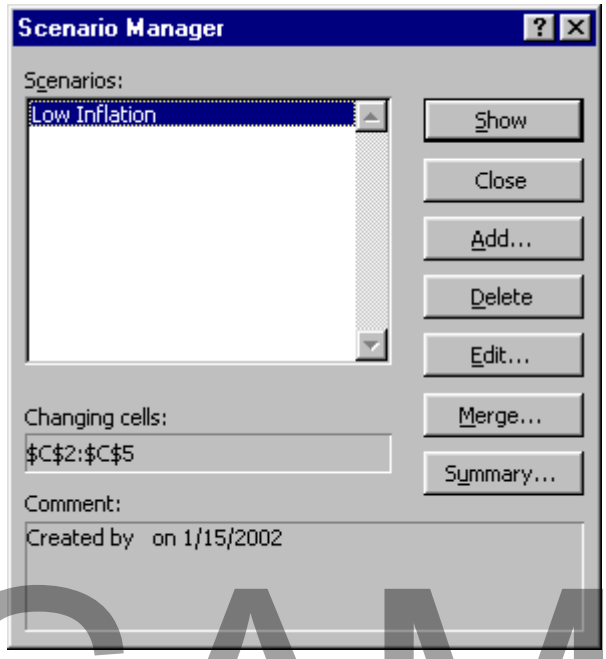
- Click on the **Add** button to display the **Add Scenario** dialog box. In our example, we will create a scenario for Low Inflation, where the expected percentage increases are as follow: Rent - 1%, Staff - 2.5%, Energy - 10%, and Other - 2%:



- In the **Scenario name** text box, enter a name for the scenario you are about to create. In this case, enter the name **Low Inflation**.
- Click **OK** to display the **Scenario Values** dialog box:



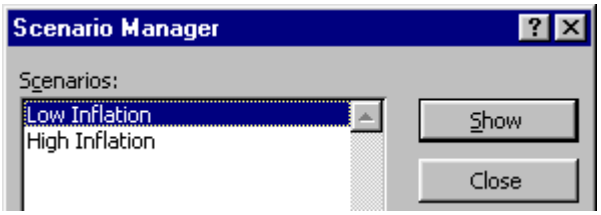
- Change the value in text box **1** to **1**, change the value in text box **2** to **2.5**, change the value in text box **3** to **10**, and change the value in text box **4** to **2**.
- Click **OK** to add the scenario and return to the **Scenario Manager** dialog box. (Notice that 'Low Inflation' is now listed in the **Scenarios** list box):



- Click **Close** to close the **Scenario Manager** dialog box.

Showing a Scenario

- From the main menu, choose **Tools > Scenarios** to display the **Scenario Manager** dialog box:



- From the **Scenarios** list box, select the scenario you want to see.
- Click on the **Show** button to display the results of the scenario in the Worksheet:

	A	B	C	D
1		Costs for this year	Expected % increase	Estimated cost for next year
2	Rent	$ 30,000	1	$ 30,300
3	Staff	$ 95,000	3	$ 97,375
4	Energy	$ 20,000	10	$ 22,000
5	Other	$ 55,000	2	$ 56,100
6	Total	$ 200,000		$ 205,775
7				

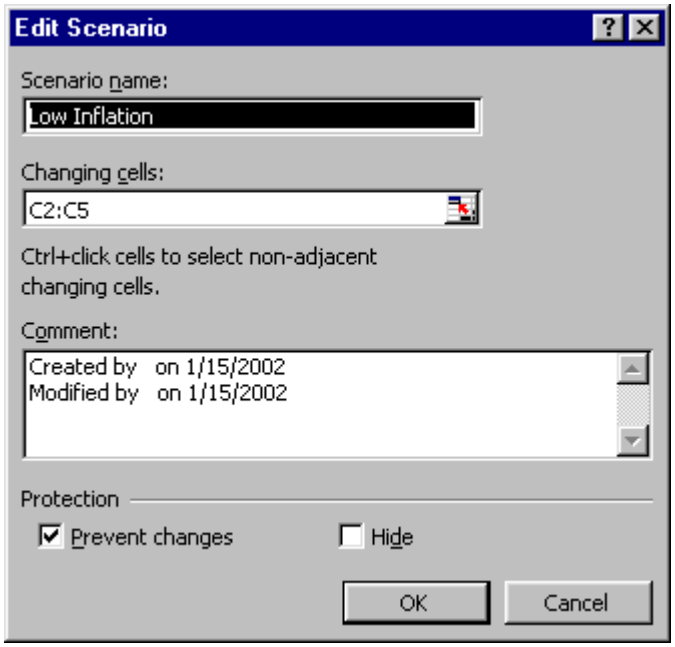
- Click **Close** to close the **Scenario Manager** dialog box.

Deleting a Scenario

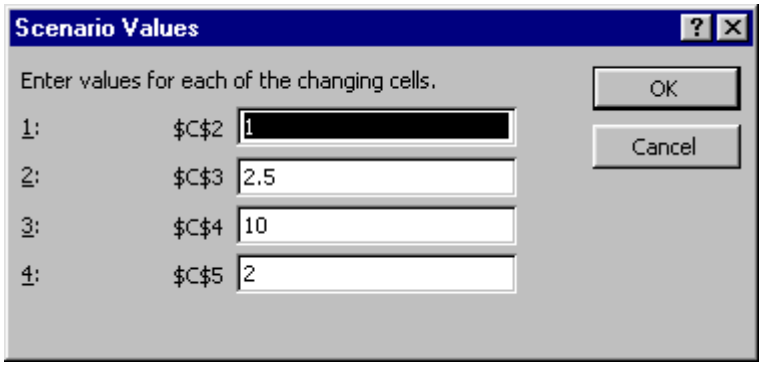
- From the main menu, choose **Tools > Scenarios** to display the **Scenario Manager** dialog box.
- From the **Scenarios** list box, select the scenario you want to delete.
- Click on the **Delete** button to delete the scenario.
- Click **Close** to close the **Scenario Manager** dialog box.

Editing an existing Scenario

- From the main menu, choose **Tools > Scenarios** to display the **Scenario Manager** dialog box.
- From the **Scenarios** list box, select the scenario you want to edit.
- Click on the **Edit** button to display the **Edit Scenario** dialog box. (Notice that Excel automatically adds a 'Modified' message in the Comment text area):



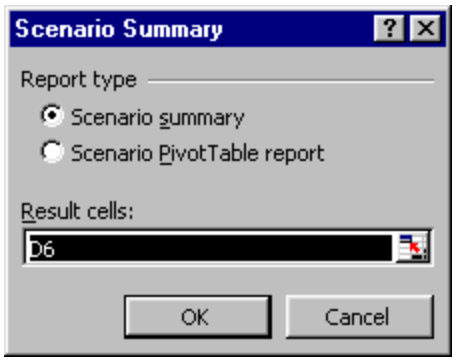
- Click **OK** to display the **Scenario Values** dialog box:



- Make the changes you want.
- Click **OK** to add the scenario and return to the **Scenario Manager** dialog box.
- Click **Close** to close the **Scenario Manager** dialog box.

Summarizing Scenarios

- From the main menu, choose **Tools > Scenarios** to display the **Scenario Manager** dialog box.
- Click on the **Summary** button to display the **Scenario Summary** dialog box:



- Select the **Scenario summary** radio button.
- In the **Result cells** text box, enter the cell or range of the values you want to see in the summary. In our example, we will enter cell **D6** to display the total estimated cost for next year.
- Click **OK** to display the summary in a new Worksheet:

	A	B	C	D	E	F
1						
2		**Scenario Summary**				
3				Current Values:	Low Inflation	High Inflation
5		**Changing Cells:**				
6		**C2**		1	1	12
7		**C3**		3	3	15
8		**C4**		10	10	35
9		**C5**		2	2	8
10		**Result Cells:**				
11		**D6**		$ 205,775	$ 205,775	$ 229,250
12		Notes: Current Values column represents values of changing cells at				
13		time Scenario Summary Report was created. Changing cells for each				
14		scenario are highlighted in gray.				

Solver

Using Solver

- **Solver** is the most versatile What-if Analysis tool. It can handle many different variables, and where possible Solver will produce the optimum answer.

- In order to understand Solver, you will need to know the following terms:

  Target Cell: The cell that will be set to a value, maximum or minimum. Often this cell is where you specify the maximum cost of a project.

  Adjustable Cell: The cells that Solver will change the contents to achieve the

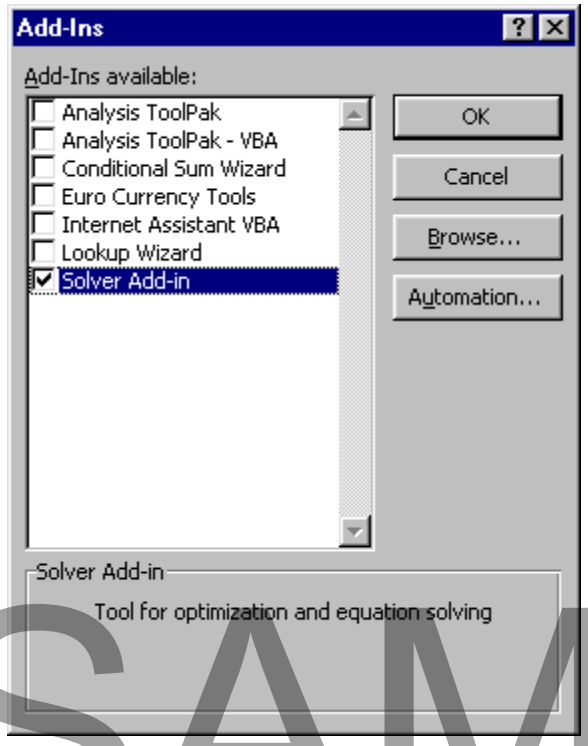
desired objective.

Constraints: Contains the restrictions that Excel must observe.

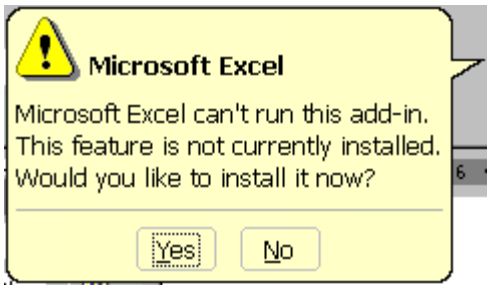
- For example, we can use Solver to figure out the optimal combination of cars we should purchase based on budget and other constraints.

Installing Solver

- By default, **Solver** is not installed with the basic Excel installation. If Solver is installed, it is listed under the **Tools** menu. If **Solver** is not list, you can install it easily.
- From the main menu, choose **Tools > Add-Ins** to display the **Add-Ins** dialog box:



- Select the **Solver Add-in** checkbox.
- Click **OK**. You will be asked if you want to install **Solver**:



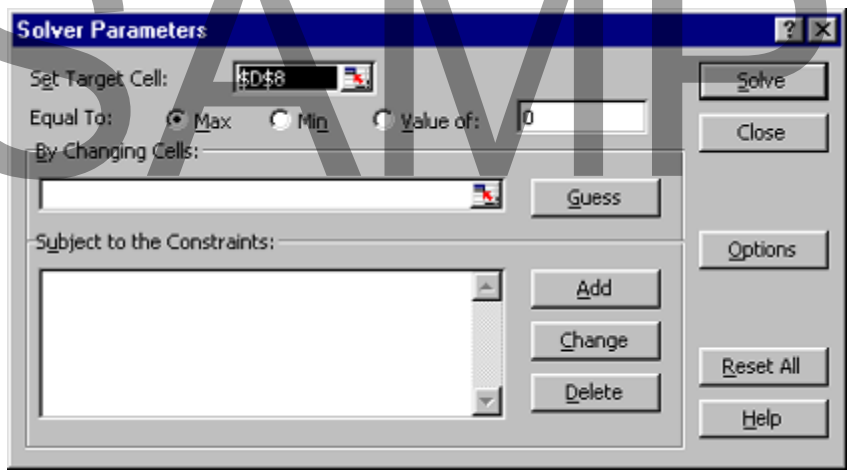
- Click **Yes** and follow the instructions to install **Solver**.

Applying Solver

- Begin by constructing a Worksheet with the data you want **Solver** to use. In the following example, we have a budget of $500,000 to purchase as many new cars as possible for the new company car fleet. We need a mix of small, medium, and large cars:

	A	B	C	D
1		**The New Car Fleet**		
2				
3	**Class of Car**	**Cost per Car**	**# of Cars**	**Cost**
4	Small	$14,000	1	$14,000
5	Medium	$20,000	1	$20,000
6	Large	$40,000	1	$40,000
7				
8		**Total cost of the car fleet**		**$74,000**
9				

- Select the **Target Cell**. In our example, select cell **D8**.
- From the main menu, choose **Tools > Solver** to display the **Solver Parameters** dialog box. (Notice that the **Set Target Cell** text box contains cell reference **D8**):

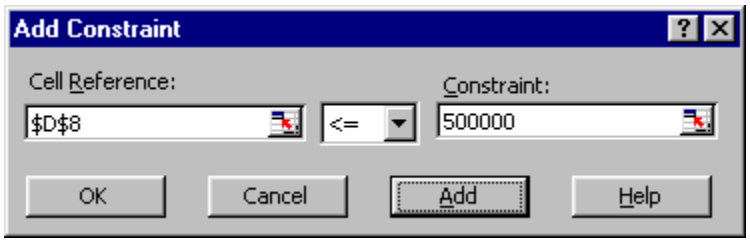


- In the **Equal To** area, set the **Max**, **Min**, or **Value of** constraint by selecting the appropriate radio button, and entering the value into the text box. In our example, we will select **Value of** and enter **500000** in the text box to set the budget constraint.

- In the **By Changing Cells** area, select the cell(s) that we want to change to meet our target. In our example, we will be changing the numbers of cars in each class; select cell range **C4:C6**.

  NOTE: If you are not sure which cells to select, click on the **Guess** button, and Excel will suggest a range based on your worksheet.

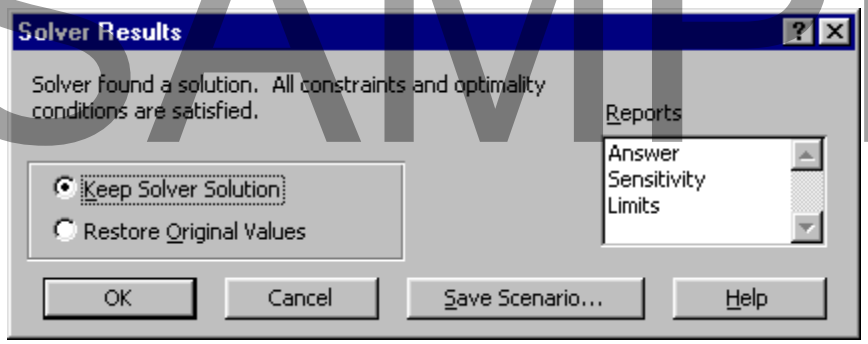
- In the **Subject to the Constraints** area, click on the **Add** button to display the **Add Constraint** dialog box.
- In the **Cell Reference** text box, select the cell that the constraint will be applied to. In the dropdown list, select the operand you want. In the **Constraint** text box, enter a value or cell reference. For our example, to enter the budget constraint of $500,000, we will use **$D$8** as the cell reference, select the **<=** (less than or equal to) operand, and enter **500000** as the constrained value:



- Click **OK** to return to the **Solver Parameters** dialog box

  OR click **Add** to add another constraint.

- When you are satisfied with your **Solver Parameters**, click **Solve**. After a short time you will see the **Solver Results** dialog box:



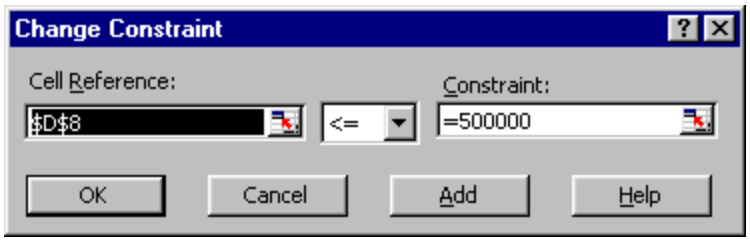
- Select the **Keep Solver Solution** or **Restore Original Values** radio button.

- Click **OK** to apply your choice. In our example, the worksheet will appear as follows: (You may notice that the solution suggests the purchase of part of a car. You can create another constraint to force Excel to solve for whole number only):

	A	B	C	D
1	The New Car Fleet			
2				
3	Class of Car	Cost per Car	# of Cars	Cost
4	Small	$14,000	3.715847	$52,022
5	Medium	$20,000	4.879781	$97,596
6	Large	$40,000	8.759563	$350,383
7				
8	Total cost of the car fleet			$500,000

Changing a Constraint

- From the **Solver Parameters** dialog box, select a constraint you want to modify.
- Click on the **Change** button to display the **Change Constraint** dialog box:



- Make the changes you want.
- Click **OK** to return to the **Solver Parameters**.

Deleting a Constraint

- From the **Solver Parameters** dialog box, select a constraint you want to delete.
- Click on the **Delete** button.

Review Questions

How would you:

- Use Goal Seek?
- Use Data Table?
- Create a one-variable Data Table?
- Create a two-variable Data Table?

- Speed up calculations with Data Tables?
- Use Scenario Manager?
- Add a scenario?
- Show a scenario?
- Delete a scenario?
- Edit an existing scenario?
- Summarize scenarios?
- Using Solver?
- Install Solver?
- Use Solver?
- Change a constraint?
- Delete a constraint?

Macros and Custom Controls

When you have completed this learning module you will have seen how to:

- Record a Macro
- Assign a shortcut key to your Macro
- Run a Macro using the main menu
- Run a Macro using a shortcut key
- Run a Macro using a button
- Work with buttons
- Create a new button
- Rename a button
- Format buttons
- Link an existing Macro to a button
- Delete a button

Working with Macros

Using Macros

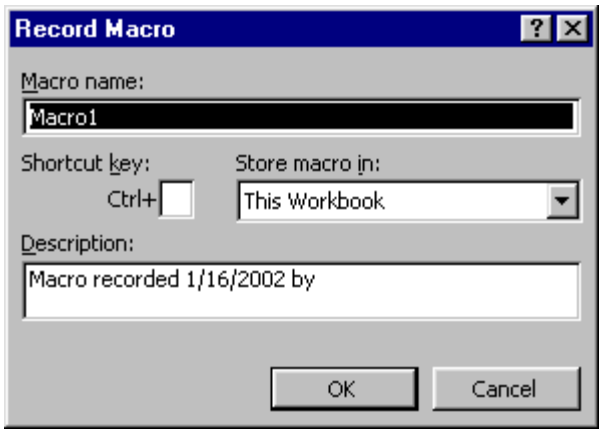
- A **Macro** is a series of instructions that enable you to make Excel 2002 perform commands or actions for you. They are useful for complex or repetitive tasks that you perform regularly.

  Macros do not necessarily involve programming. The easiest way to create a new Macro is to have Excel record your actions and then store these actions as a Macro. Actions can be any combination of the Excel commands.

  Macros are very flexible since they can be played back or modified at any time.

Recording a Macro

- From the main menu, choose **Tools > Macro > Record New Macro** to display the **Record Macro** dialog box:

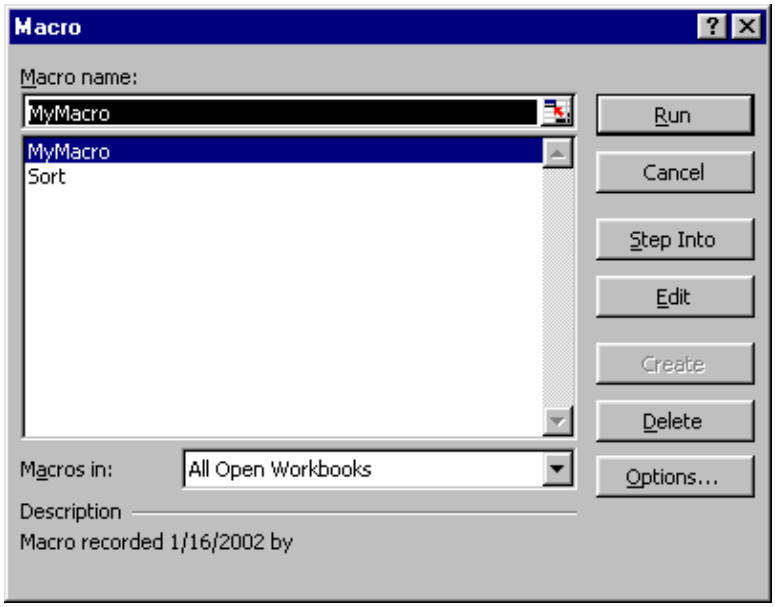


- In the **Macro name** text box, enter a name for the Macro.
- In the **Description** text area, Excel provides a default description of the Macro. Edit the description as required.
- To begin recording, click **OK**.
- Start performing the actions you want the Macro to include. Excel will record the actions.
- When you finish performing the actions, choose **Tools > Macro > Stop Recording**

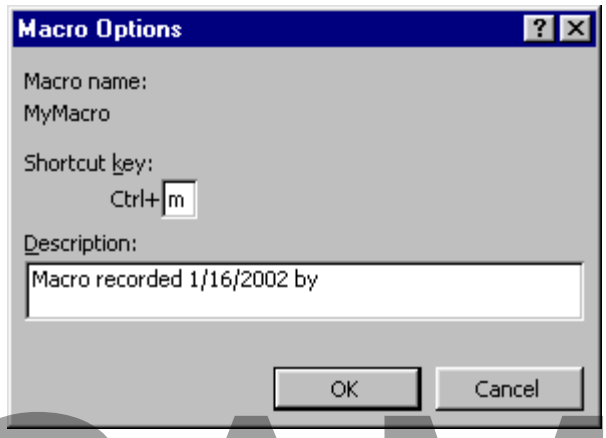
  OR click **Stop Recording** on the **Stop Recording** toolbar:

Assigning a shortcut key to your Macro

- From the main menu, choose **Tools > Macro > Macros** to display the **Macro** dialog box:



- Select the Macro you want to affect.
- Click on the **Options** button to display the **Macro Options** dialog box:

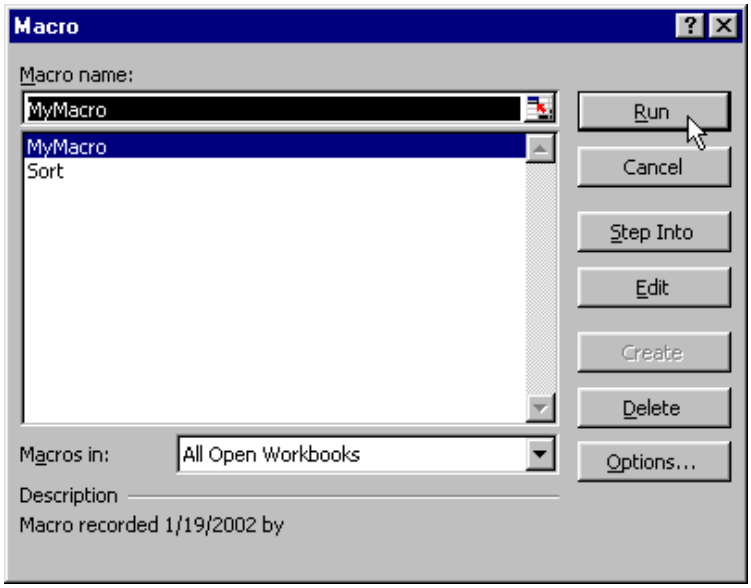


- Type a letter into the **Ctrl+** text box. This key combination will be used to invoke the Macro. In the above example, the key combination is **Ctrl+m**.
- Click **OK** to return to the **Macro** dialog box.
- Click **Cancel** to close the **Macro** dialog box.

Running Macros

Running a Macro using the main menu

- From the main menu, choose **Tools > Macro > Macros** to display the **Macro** dialog box.



- In the **Macro name** list box, select the Macro you want to run.
- Click **Run**.

Running a Macro using a shortcut key

- Press the shortcut key combination. For example, press the **Ctrl+X** key combination where **X** represents the letter you assigned to the Macro.

Running a Macro using a button

- Once you have assigned a Macro to a button. To run it, simply click on the button.

Adding Custom Controls

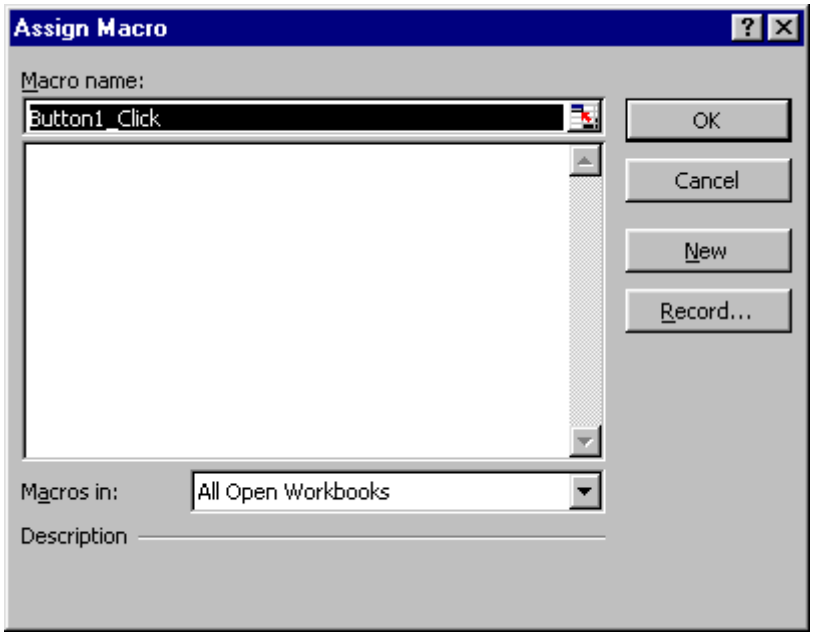
Working with Buttons

- You can create buttons that may be inserted into an Excel 2002 Worksheet and Macros can then be assigned to them.
- If you click on these buttons you can run the Macro (or any other action associated with the button).

Creating a new Button

- From the main menu, choose **View > Toolbars > Forms** to display the **Forms** toolbar:

- Click on the **Button** icon .
- On the Worksheet where you want a button, click and drag the mouse to draw a button.
- When you release the mouse button, the **Assign Macro** dialog box will be displayed:



- Click **Cancel** to close the **Assign Macro** dialog box and create the button.

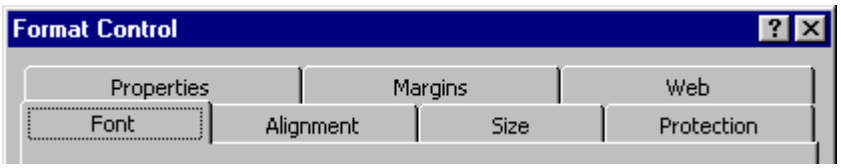
NOTE: From the **Assign Macro** dialog box, you can record a Macro by clicking on the **Record** button and recording the Macro as you would normally.

Renaming a Button

- Right-click on the button you want to affect.
- Select **Edit Text** from the popup menu.
- Edit the text on the button to rename the button.
- Click outside the button to deselect the button.

Formatting Buttons

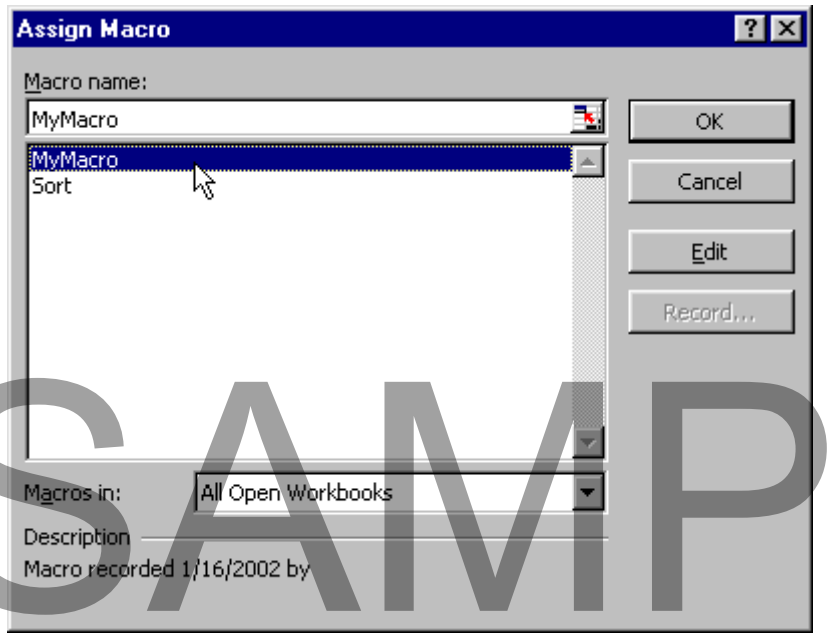
- Right-click on the button you want to affect.
- Select **Format Control** from the popup menu to display the **Format Control** dialog box:



- Click on the appropriate tab to access the formatting properties you want.
- When you have finished, click **OK** to apply the formatting.

Linking an existing Macro to a Button

- Right-click on the button you want to affect.
- Select **Assign Macro** from the popup menu to display the **Assign Macro** dialog box.
- From the **Macro name** list box, select the Macro you want:

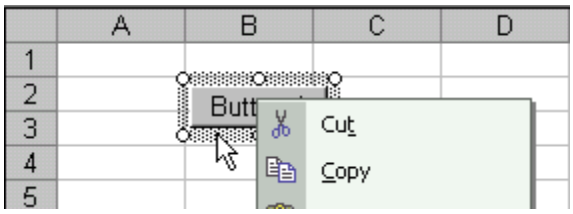


- Click **OK** to assign the selected Macro to your button.

NOTE: The selected Macro replaces any Macro that is already assigned to the button.

Deleting a Button

- Right-click on the button you want to delete to select the button and display the popup menu.
- Click on the gray border around the button to hide the popup menu:



- Press the **Delete** key.

Review Questions

How would you:

- Record a Macro?
- Assign a shortcut key to your Macro?
- Run a Macro using the main menu?
- Run a Macro using a shortcut key?
- Run a Macro using a button?
- Work with buttons?
- Create a new button?
- Rename a button?
- Format buttons?
- Link an existing Macro to a button?
- Delete a button?

Security and Proofing

When you have completed this learning module you will have seen how to:

- Work with security features
- Specify a password for opening a workbook
- Specify a password for saving a workbook
- Remove a workbook password
- Use the Read-only option
- Create backup files automatically
- Protect worksheets
- Un-protect worksheets
- Protect cells
- Use Digital Signatures
- Sign a file
- Remove a Digital Signature from a file
- Use the Spell Checker
- Use Data Validation
- Set Data Validation
- Create the Input Message
- Display an Input Message
- Create the Error Alert
- Display an Error Alert
- Use Text To Speech
- Read back a group of cells
- Use Speak On Enter
- Turn off Speak On Enter
- Work with Comments
- Add a Comment
- Display a Comment
- Edit a Comment
- Delete a Comment

Security Features

Working with Security Features

- If Worksheets are developed for other users, it is important that the users find them easy to use, and hard to 'break'. Protection should be built into the Worksheets to prevent unauthorized tampering with the sheet, but allow data entry to specific parts of the sheet as required.

- **When developing Worksheets for others keep in mind the following:**

  Protect items such as formulas and data that must not be changed.
  Protect or hide any sensitive information contained within the Worksheet.
  You may want Worksheets to be shared across a network.
  You should document any calculation or concepts contained within a Workbook.

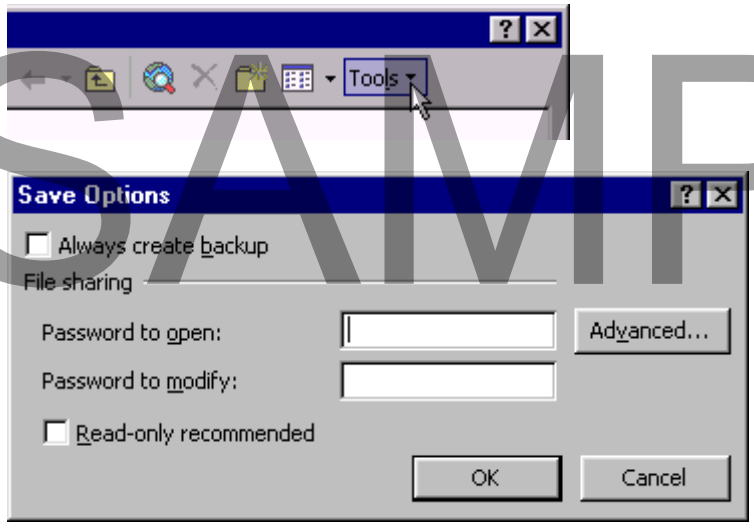
- **Levels of security offered by Excel:**

  Top-level security is offered by use of a password that restricts unauthorized users from opening a Workbook file.
  Workbook protection.
  Worksheet protection.
  Object protection for cells or charts.

Protecting Excel Files

Specifying a password for opening a workbook

- To prevent unauthorized access to your Workbook, you can specify a password that is required before the Workbook is opened. Once the password is set, you will be required to enter this password to open this file or if you refer to a cell in the protected Workbook in a formula.
- From the main menu, choose **File > Save As** to display the **Save As** dialog box.
- Click on the **Tools** icon, and from the dropdown menu, select **General Options** to display the **Save Options** dialog box:



- In the **Password to open** text box, enter your password. The password can be up to 15 characters in length and is case sensitive. (The password required the exact combination of upper and lower case letters.)
- Click **OK**. The **Confirm Password** dialog will appear:

- Re-enter the password.
- Click **OK** to set the password.
- From the **Save As** dialog box, click **Save**.

WARNING! If you forget the password, there is no way of to retrieve the information contained within the Workbook.

End of the preview sample

CHELTENHAM COURSEWARE

This sample is approximately half of the full course. Please see the table of contents at the beginning of this document to see the full list of topics covered in the full course.

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