

Microsoft Excel 2003

Manual - Advanced Level



SAMPLE

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Installing the Sample Files

- Use Windows Explorer to create a folder called **Excel 2003 Advanced Samples**, in the **My Documents** folder.
- If you are installing the sample files from the CD-ROM, place the CD-ROM in the CD drive and copy the files from the **excel_2003_advanced_eur\exercise_files** to the **My Documents\Excel 2003 Advanced Samples** folder.
- If these files have been copied to your network server, then ask your trainer/supervisor for more information about how to copy these files to your PC's hard disk.
- **Notes for tutors:**
The above instructions are for Windows that has not been set-up for a multi-user environment (with individual profiles). The instructions above may require modification within a Windows multiuser environment. Where possible pre-install the relevant work files prior to use by students/delegates.

SAMPLE

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 may be 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), All Web Pages, 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 2003 allows you to query and refresh data from the Internet.

XML: Microsoft Excel 2003 now allows you to import XML files and map out individual elements to specified cells in a Worksheet. However, this added feature is only available in the Professional Edition of Office 2003, and not other versions of Office. (If you are not sure which Office edition you are currently using, ask your instructor for assistance).

Pivot Tables: Pivot Tables are useful for accessing and integrating external databases into Excel. They will be covered in chapter 3 of this manual.

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 recognised by Excel.

The following text file formats 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 (@).

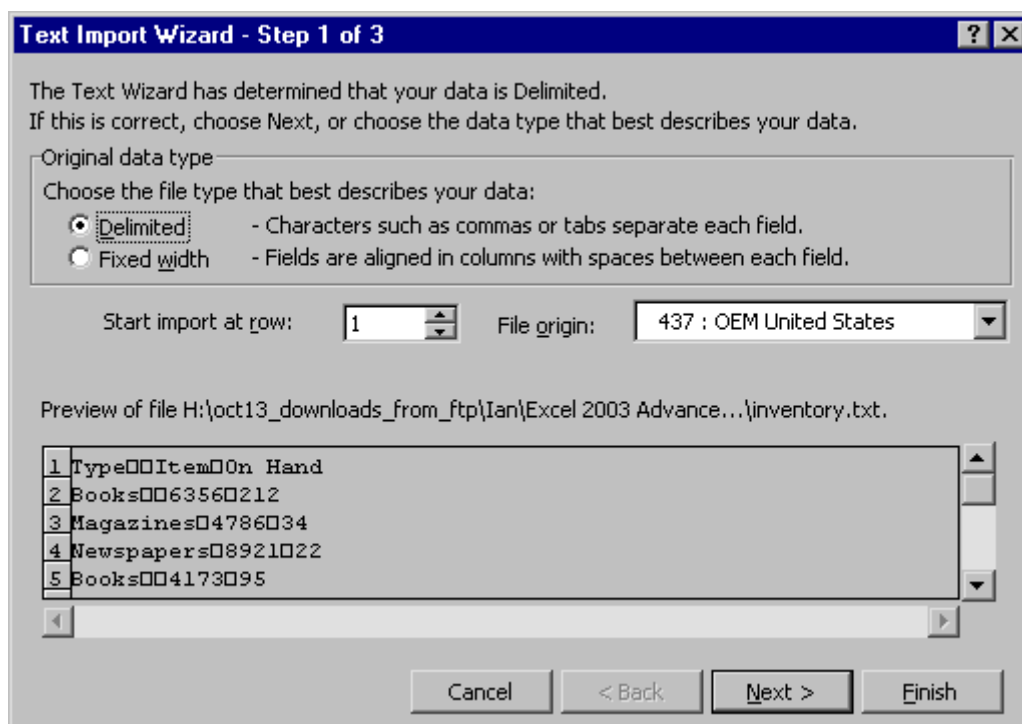
NOTE: If the text to be imported is not recognised by Excel, Excel will launch the Text Wizard to provide assistance.

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.

SAMPLE

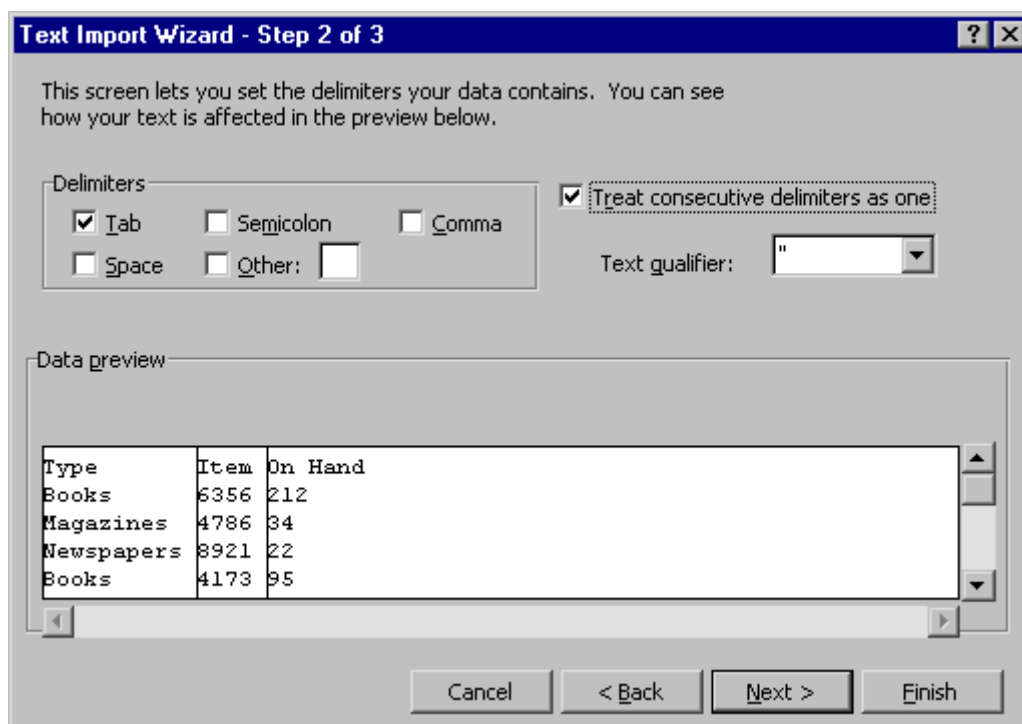
- Click Open to display the Text Import Wizard - Step 1 of 3 dialog box:



- Excel will analyse 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.

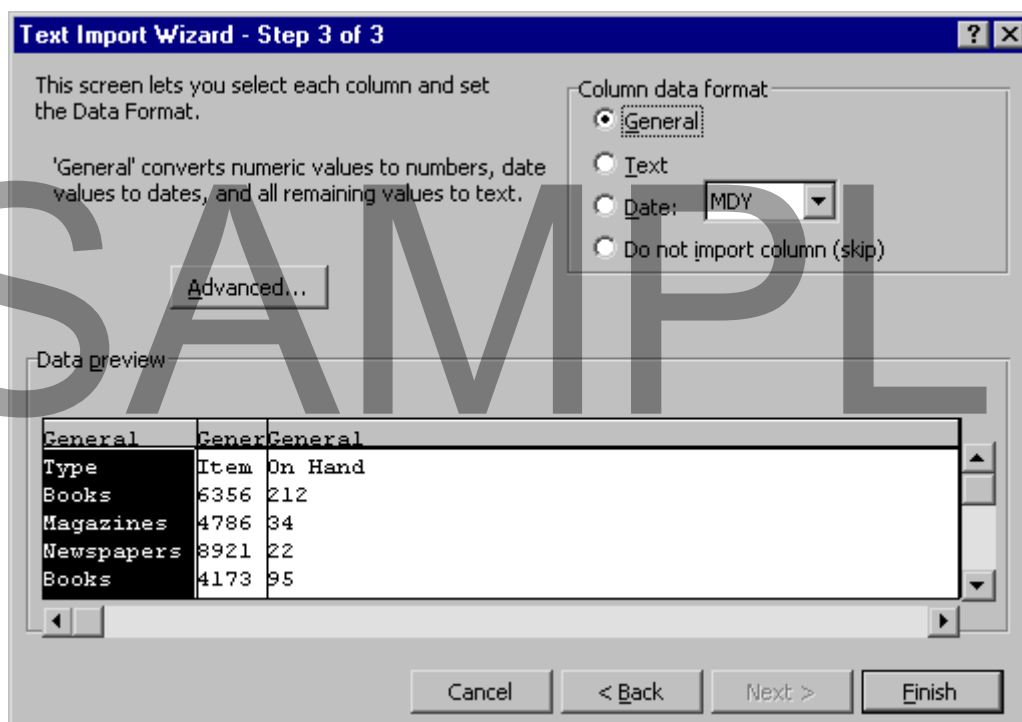
Note: You can always use the **Back** button to go back to the previous dialog box and revise the options:

SAMPLE



- 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.

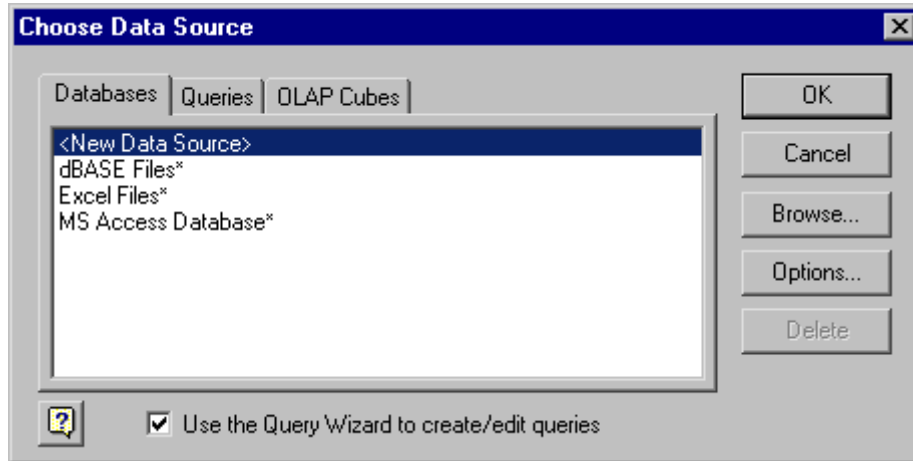
Using Microsoft Query

Adding a Data Source

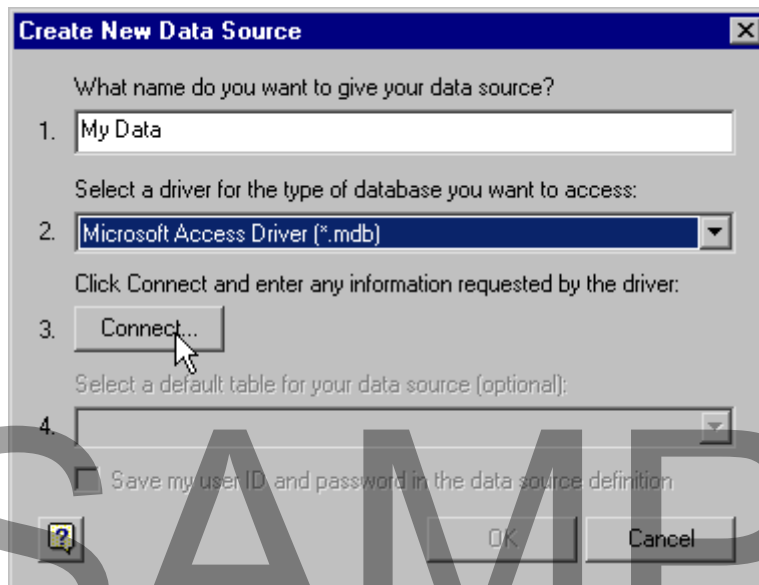
- **Microsoft Query** allows you to obtain data from an external database. You can use the wizard to create filters and define sort order of data from an external database. Since Microsoft Query is a stand-alone program, it can be started independently; however, you can run Microsoft Query from within

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

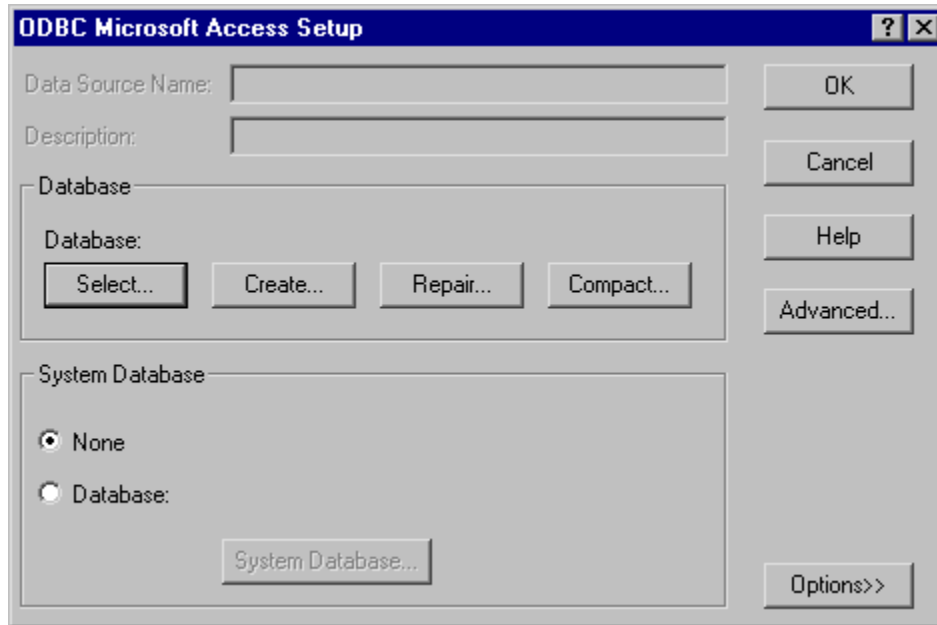
- Make sure that Microsoft Query is installed.
- From the main menu, choose **Data > Import External Data > New Database Query** to display the **Choose Data Source** dialog box:



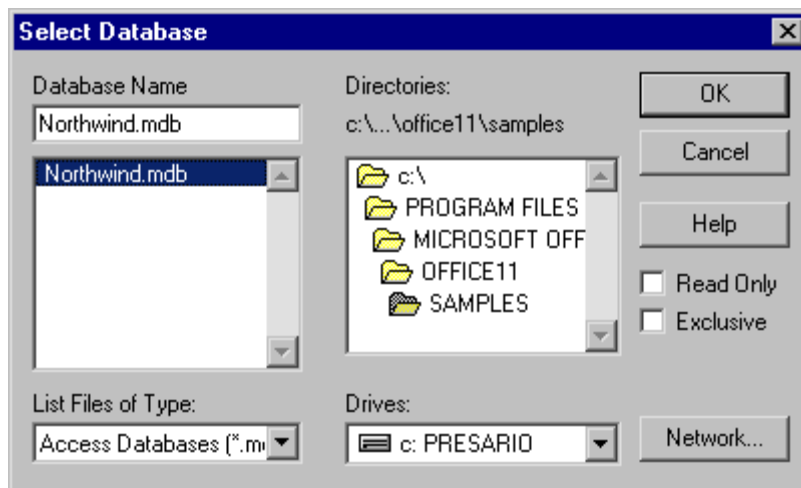
- Click on the **Databases** tab.
- With **<New Data Source>** selected, click **OK** to display the **Create New Data Source** dialog box:



- 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:



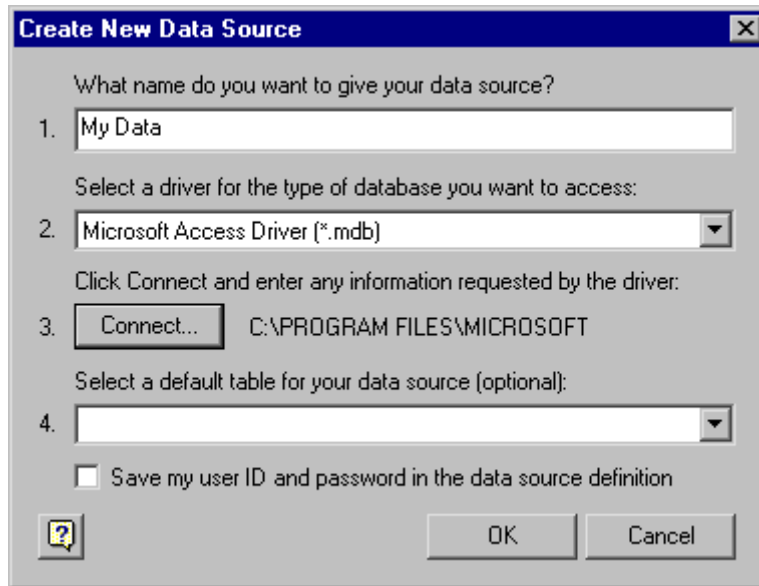
- Click on the **Select** button to display the **Select Database** dialog box:



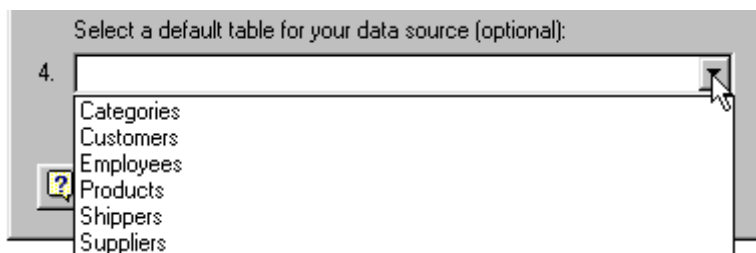
- Locate and select the database you want. In our example, we will use the NorthWind Traders database. You will normally find this in the following location:

\\Program Files\Microsoft Office\Office 11\SAMPLES\Northwind.mdb

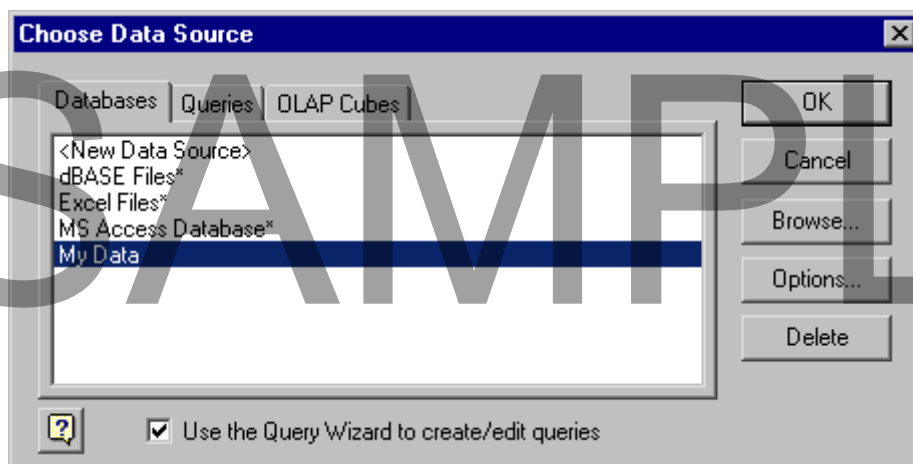
- Click **OK** to select the database.
- From the **ODBC Microsoft Access Setup** dialog box, click **OK** to connect to the database and redisplay the **Create New Data Source** dialog box. (Notice that field **3** contains a file path):



- 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:



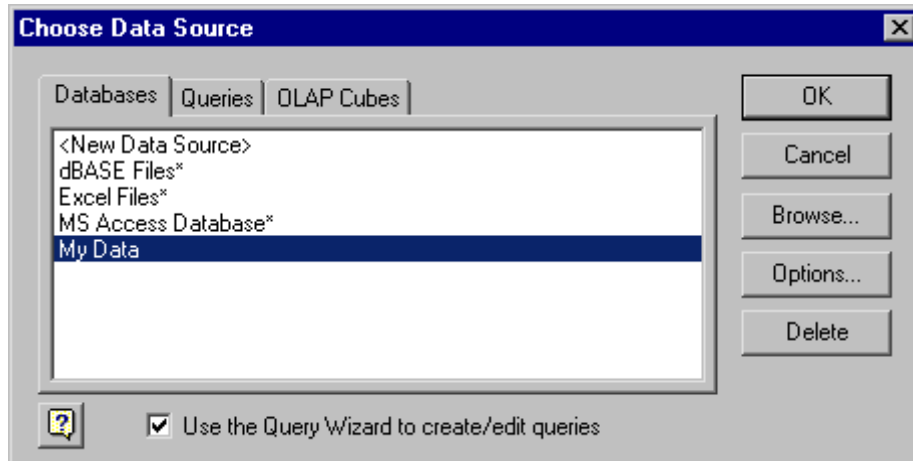
- From the **Create New Data Source** dialog box, click **OK** to return to the **Choose Data Source** dialog box. (Notice that the new data source, **My Data**, has been added):



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

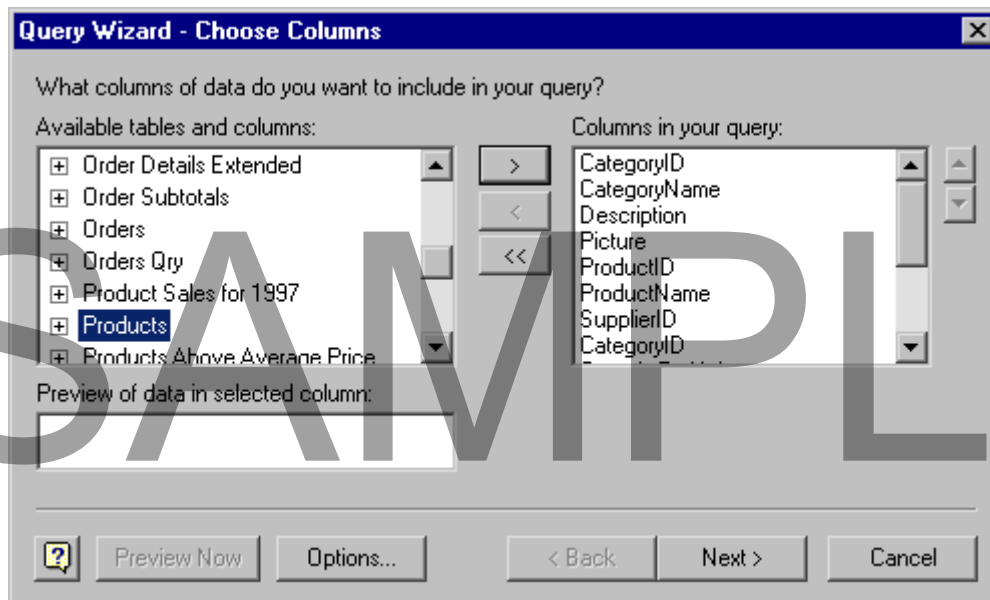
Creating a Query

- 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:

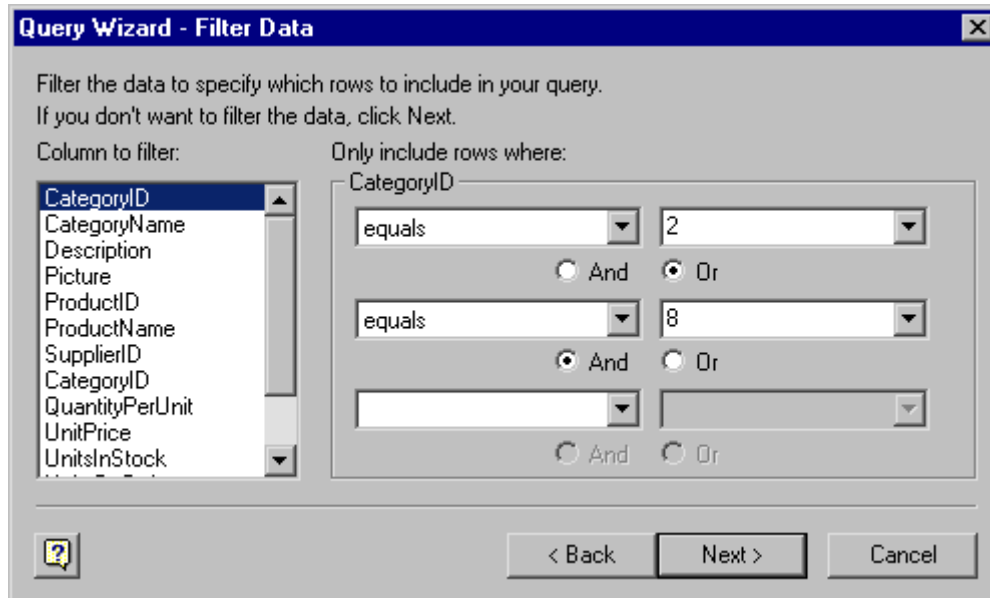


In our example, we will add the columns in the **Categories** and the **Products** tables to the query.

- 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.

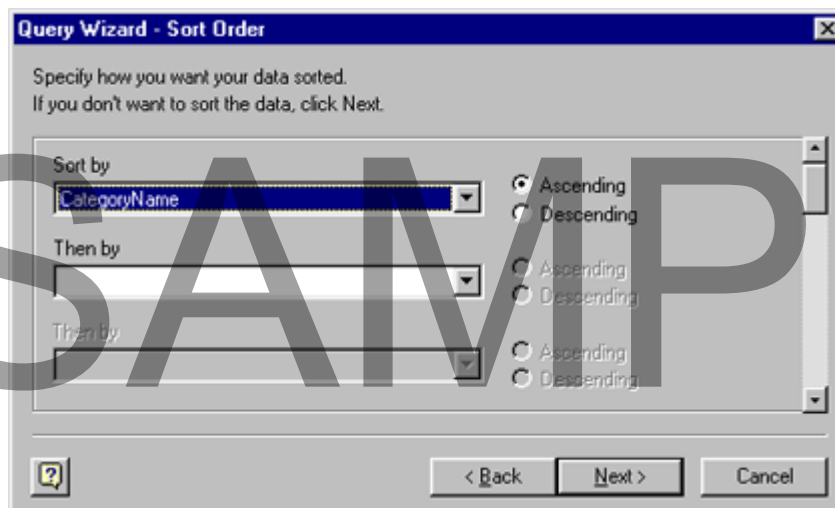
Note: You can add another filter by selecting the **And** or **Or** radio buttons:



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:

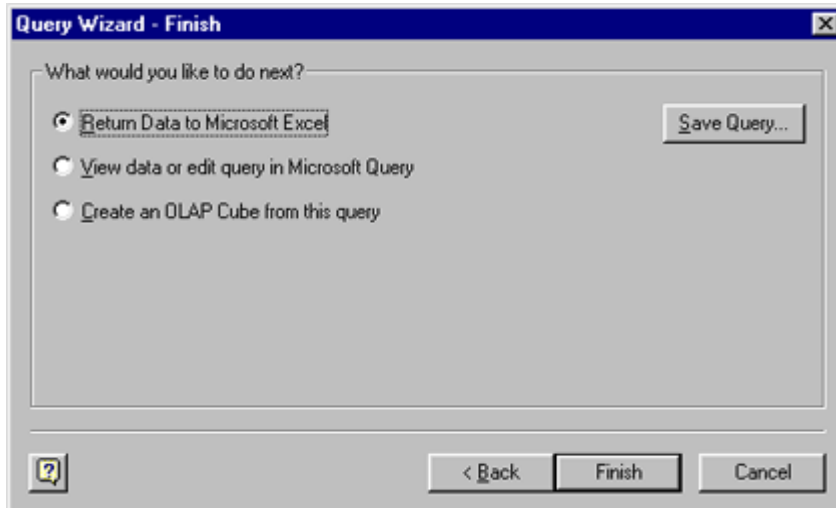


In our example, we will sort the data by **CategoryName** in **Ascending** order.

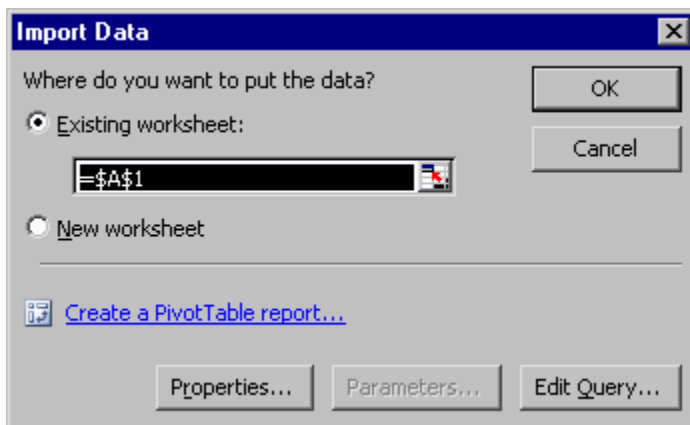
- Click **Next** to continue to the **Query Wizard - Finish** dialog box.

- 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:

SAMPLE

	A	B	C
1	Category	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

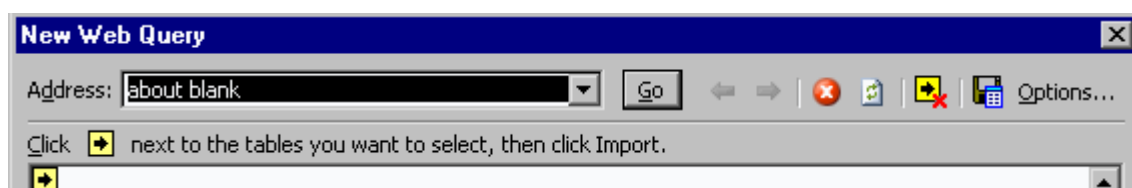
- The Internet can provide valuable information to your spreadsheet analysis. Microsoft Excel 2003 has integrated a web query component that allows you to insert data obtained directly from a Web page into your spreadsheet. The data can be refreshed as needed. For example, you can obtain stock quotes 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.

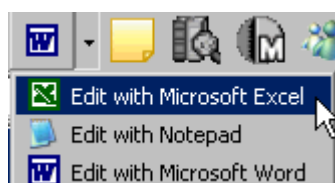
To access the New Web Query dialog box from Excel

- 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

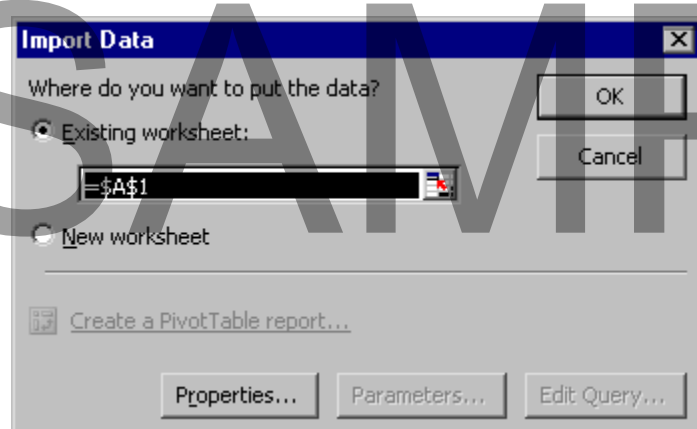
- Once you have previewed the Web page you want in the **New Web Query** dialog box, you can select the data you want to import. The Web Query function works best with data within HTML table tags. Importable data will be identified by yellow arrow icons .

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.

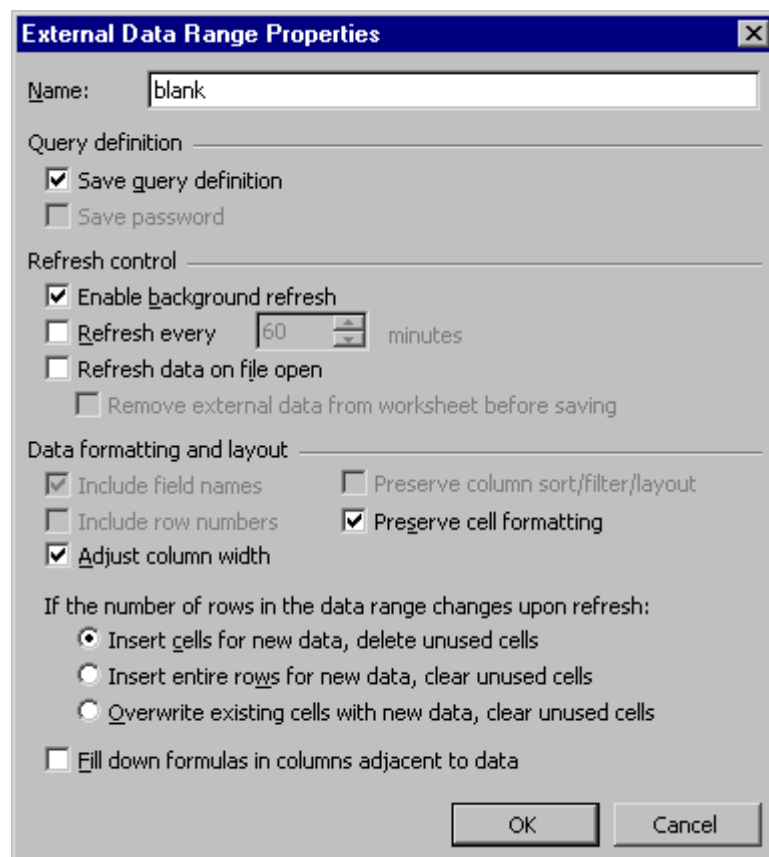
- When all the data you want to import is selected, click on the **Import** button to display the **Import Data** dialog box:



- 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.

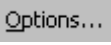
Note: It may take a moment to run the Web Query. You can check the query status by double-clicking the **Refresh**  button.

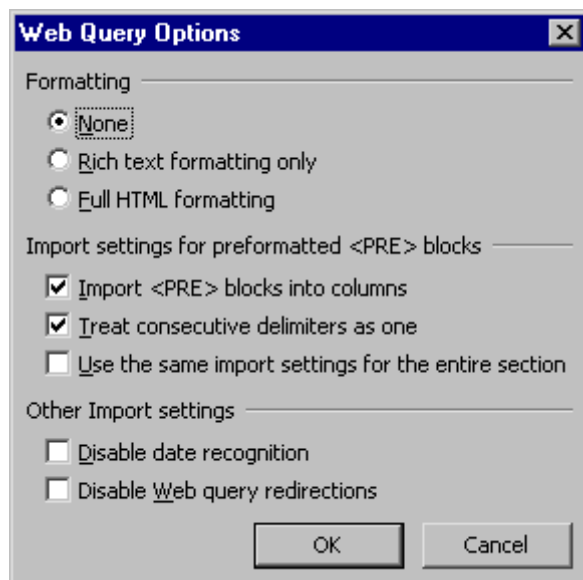
Saving a Web Query

- 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

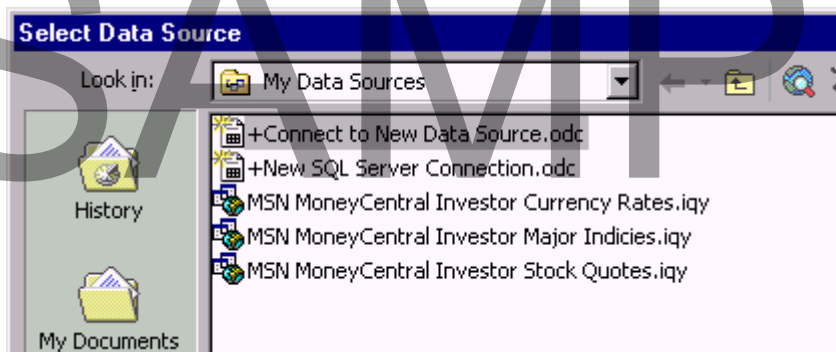
- From the **New Web Query** dialog box, click on the **Options**  button to display the **Web Query Options** dialog box:



- 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

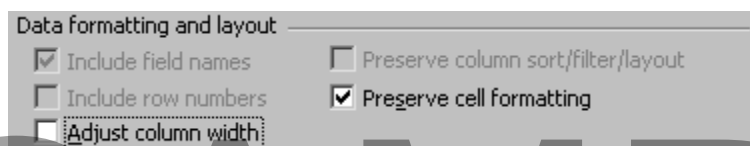
Refreshing external data without losing the formatting

- 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

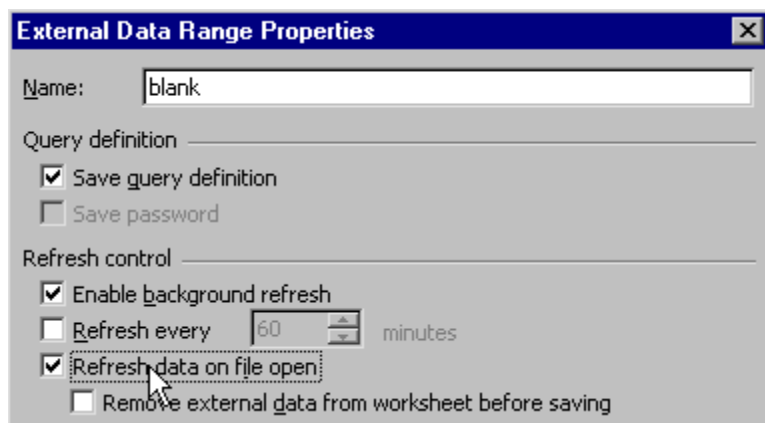
- You can set the external data to refresh automatically when you open the Workbook or periodically while the Workbook is open.
- Select one of the cells that contain external data.
- From the main menu, choose **Data > Import External Data > Data Range Properties**

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 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?
- 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

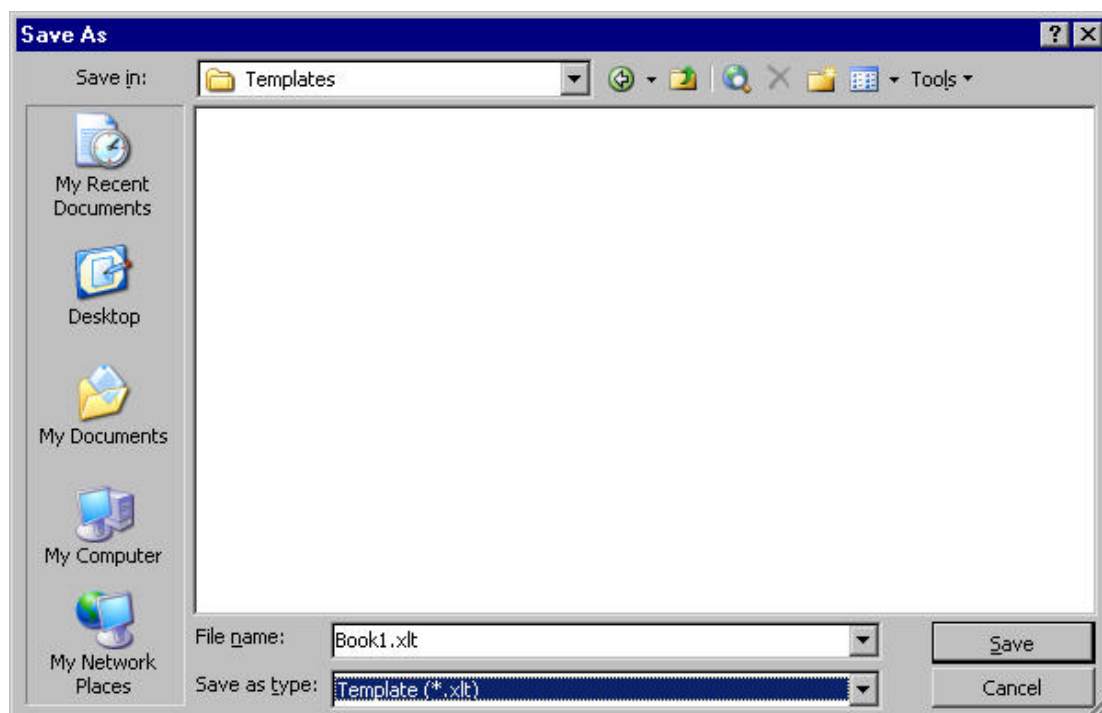
Using Templates

- 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 add the **.XLT** extension to the file name:

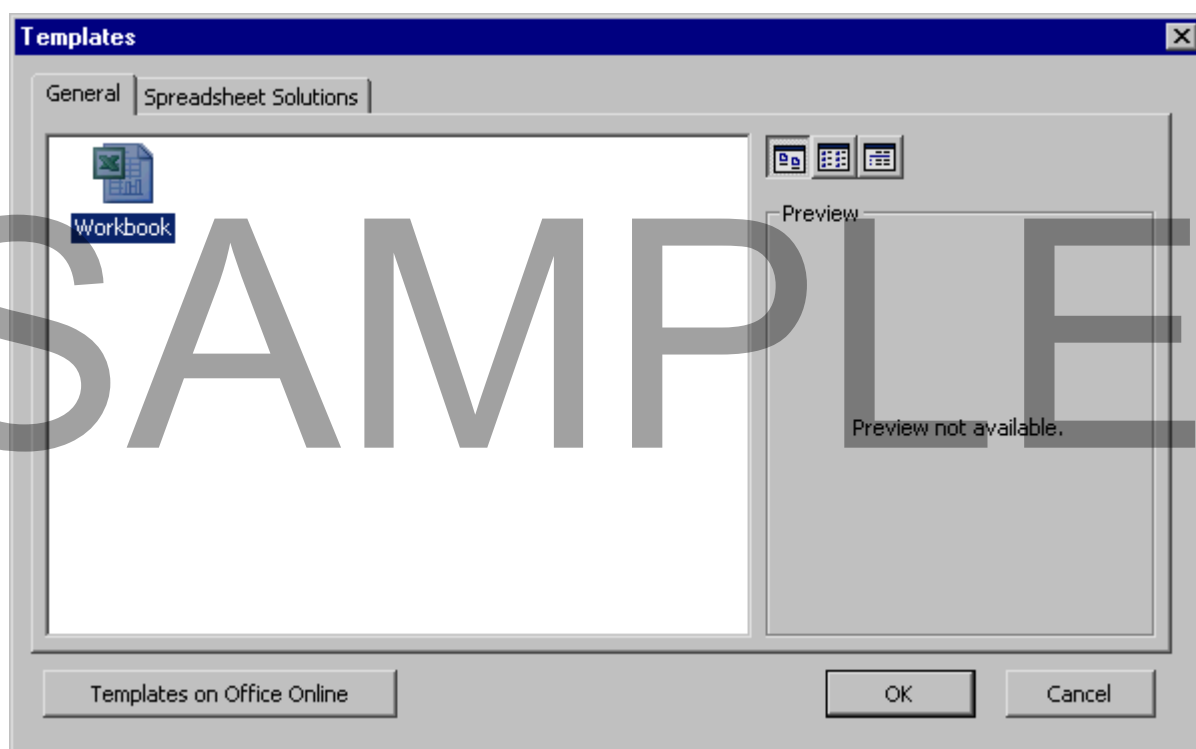
SAMPLE



- 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 **Template** section of the **New Workbook** pane, click on the blue **On my computer** link to display the **Templates** dialog box:



- Click on the **General** or the **Spreadsheet Solutions** tab to locate the template you want. For the default template, click on the **General** tab and select the **Workbook** icon.
- Click **OK**.

Note: Excel 2003 allows you to access additional templates on the Microsoft Office website (note: internet access is required to use this feature). Simply click on the **Templates on Office Online** link in the **New Workbook** pane, and you will be directed to the Office website, where you can search for the template you need. Experiment!

Working with Styles

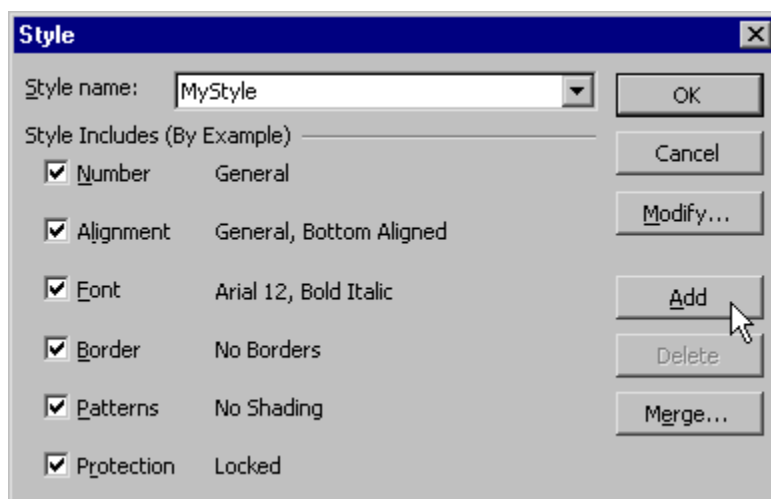
Using Styles

- Whereas a template is a collection 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 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 2003 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:

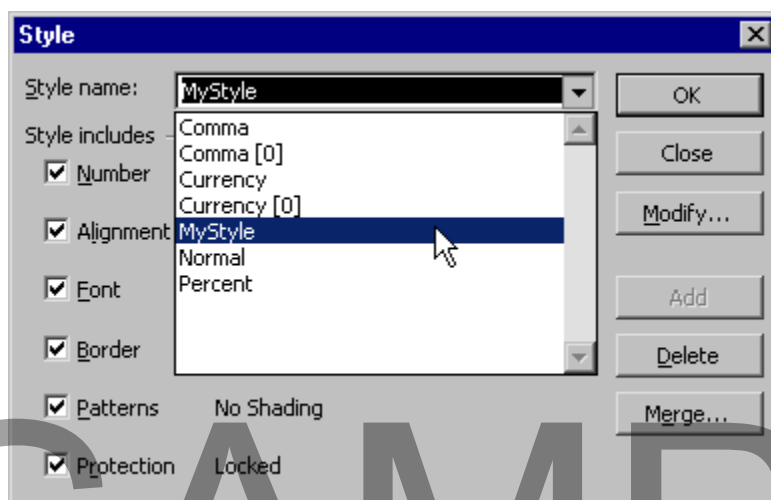
SAMPLE



- Click **Add** to create the style. Click **OK** to close 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:

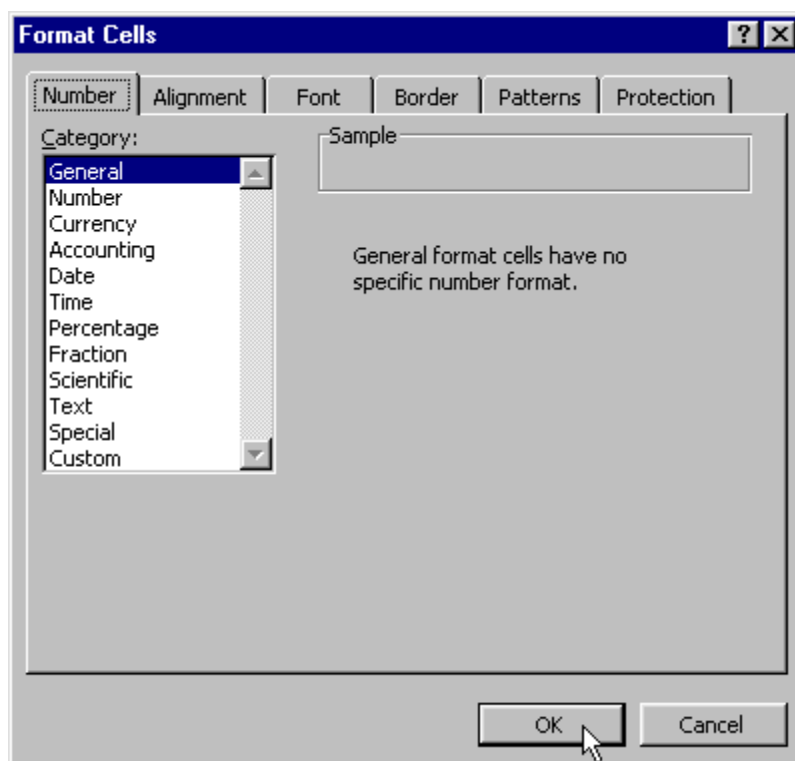


- Click **OK** to close the **Style** dialog box.

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:



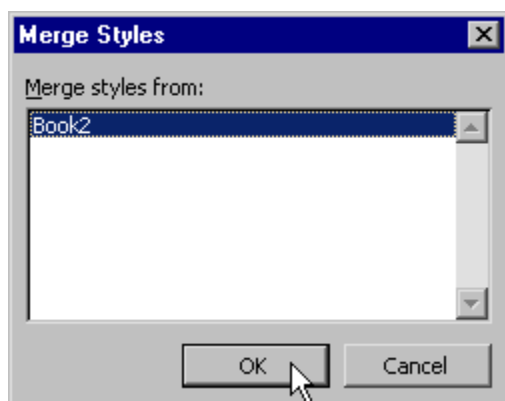
- Use the tabs to access the attributes you want, and make the changes needed.
- Click **OK** to return to the **Style** dialog box.
- Click **OK** to apply the changes to all cells formatted with this style.

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 to which the styles will be copied.
- 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.
- 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?

SAMPLE

Analysing Data

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

- Use Goal Seek
- Use a 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
- Summarise scenarios
- Use Solver
- Install Solver
- Change a constraint
- Delete a constraint
- Understand Pivot Tables
- Create Pivot Tables
- Drop data into Pivot Tables
- Modify data and refresh Pivot Tables
- Group data within Pivot Tables

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 the 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 analysing 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: $=(B1+B2)*5$

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

- 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**:

The screenshot shows the 'Goal Seek' dialog box with the following fields:

- Set cell:** B3
- To value:** 30000
- By changing cell:** \$B\$1

Buttons: OK, Cancel

- 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:

	A	B	C
1	Down payment required	€ 2,000	
2	Trade-in value of old car	€ 4,000	
3	Price of car you can afford	€ 30,000	
4			
5	Goal Seek Status [X]		
6	Goal Seeking with Cell B3		
7	found a solution.		
8	Target value:	30000	OK
9	Current value:	€ 30,000	Cancel
10			Step
11			Pause
12			
13			

- 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 of changing one variable (input value) of a formula. In the following example, we will find out the effect 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 are **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		Monthly Payment	
2	Car Purchase Price	£25,000		£533.87
3	Less Down Payment	£1,000	£1,000	
4	Car Loan Amount	£24,000	£2,000	
5	Interest Rate	12%	£2,500	
6	Term (months)	60	£3,000	

- 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		Monthly Payment	
2	Car Purchase Price	£25,000		£533.87
3	Less Down Payment	£1,000	£1,000	£533.87
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

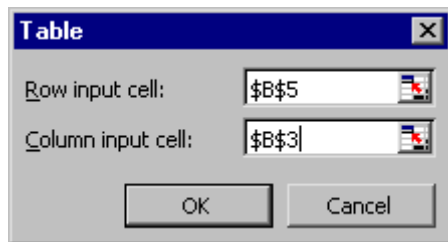
Creating a two-variable Data Table

- A two-variable **Data Table** allows you to see the effects of changing two variables (input values) of a formula. In the following example, you 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		Monthly Payment				
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				

- 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**.

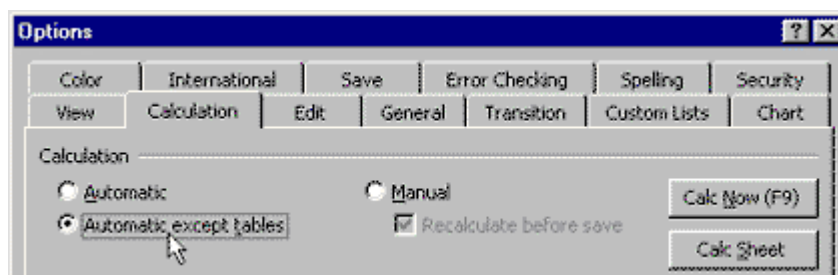
In the **Column input cell**, enter the cell reference for the column **Input Cell**. In our example, the column Input Cell is **B3**.

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

	A	B	C	D	E	F	G
1	Car Loan Analysis		Monthly Payment				
2	Car Purchase Price	€ 25,000	€ 533.87	8%	9%	10%	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

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 analysing 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 to 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.

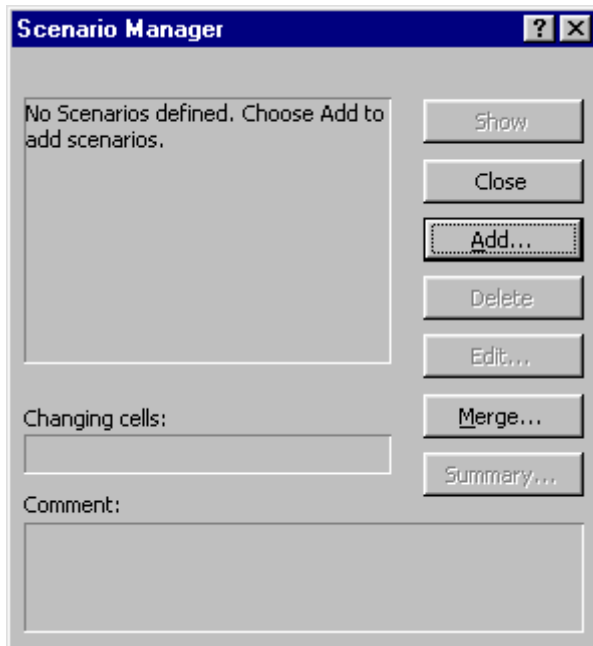
Adding a Scenario

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

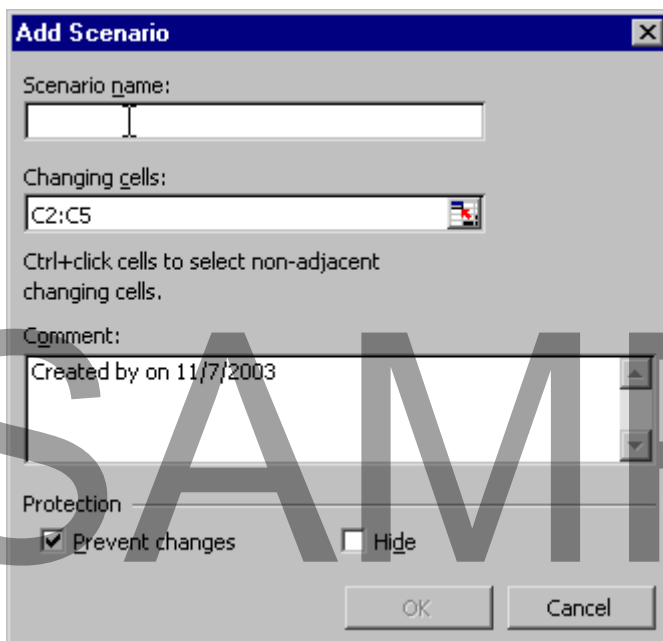
	A	B	C	D
		Costs for this year	Expected % increase	Estimated cost for next year
1				
2	Rent	£30,000.00	10	£33,000.00
3	Staff	£95,000.00	10	£104,500.00
4	Energy	£20,000.00	20	£24,000.00
5	Other	£55,000.00	5	£57,750.00
6	Total	£200,000.00		£219,250.00

- 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):

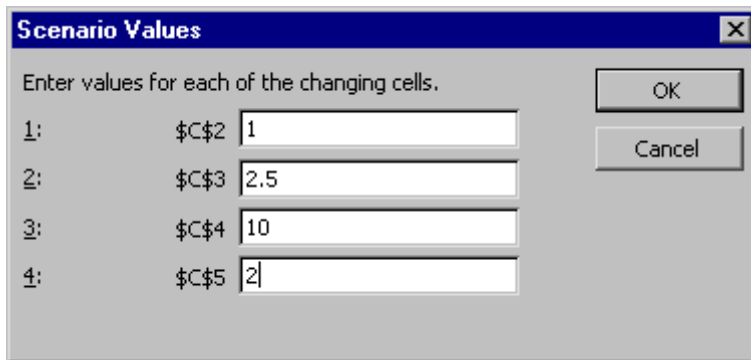


- Click on the **Add** button to display the **Add Scenario** dialog box. In our example, we will create a scenario for Low Inflation, where the expected percentage increases are as follows: Rent - 1%, Staff - 2.5%, Energy - 10%, and Other - 2%:

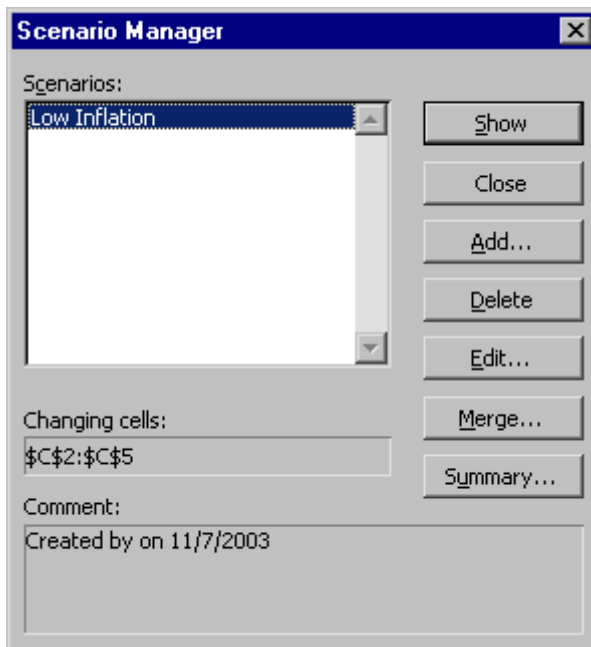


- In the **Scenario name** text box, enter a name for the scenario you are about to create. In this case, enter the name **Low Inflation**.
- Click **OK** to display the **Scenario Values** dialog box:
- Change the value in text box **1** to **1**, change the value in text box **2** to **2.5**, change the value in text box **3** to **10**, and change the value in text box **4** to

2:



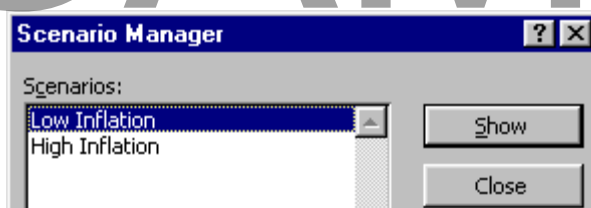
- Click **OK** to add the scenario and return to the **Scenario Manager** dialog box. (Notice that 'Low Inflation' is now listed in the **Scenarios** list box):



- 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	£30,000.00	1	£30,300.00
3	Staff	£95,000.00	3	£97,375.00
4	Energy	£20,000.00	10	£22,000.00
5	Other	£55,000.00	2	£56,100.00
6	Total	£200,000.00		£205,775.00

- 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):

Edit Scenario

Scenario name:
Low Inflation

Changing cells:
C2:C5

Ctrl+click cells to select non-adjacent changing cells.

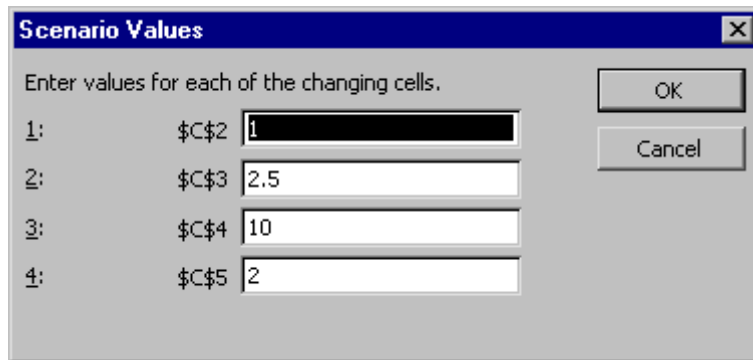
Comment:
Created by on 11/7/2003
Modified by on 11/7/2003

Protection

Prevent changes Hide

OK Cancel

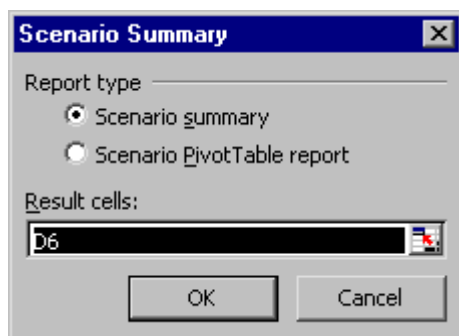
- Click **OK** to display the **Scenario Values** dialog box:



- 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.

Summarising 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.

SAMPLE

- Click **OK** to display the summary in a new Worksheet:

	A	B	C	D	E	F	G	
1								
2		Scenario Summary						
3				Current Values:	Low Inflation	High Inflation		
5		Changing Cells:						
6		\$C\$2		1	1	12		
7		\$C\$3		3	3	15		
8		\$C\$4		10	10	35		
9		\$C\$5		2	2	8		
10		Result Cells:						
11		\$D\$6		£205,775.00	£205,775.00	£229,250.00		
12		Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.						
13								
14								

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.

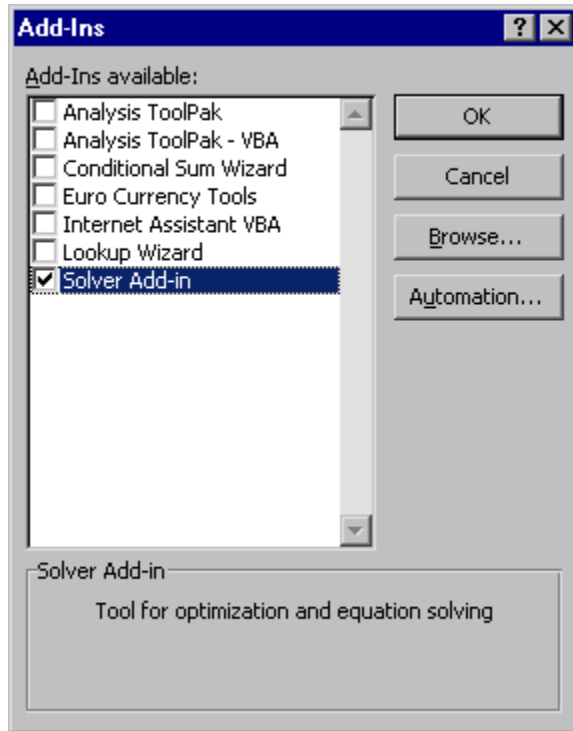
Adjustable Cell: The cells that Solver will change the contents of to achieve the desired objective.

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 listed, you can install it easily.
- From the main menu, choose **Tools > Add-Ins** to display the **Add-Ins** dialog box:



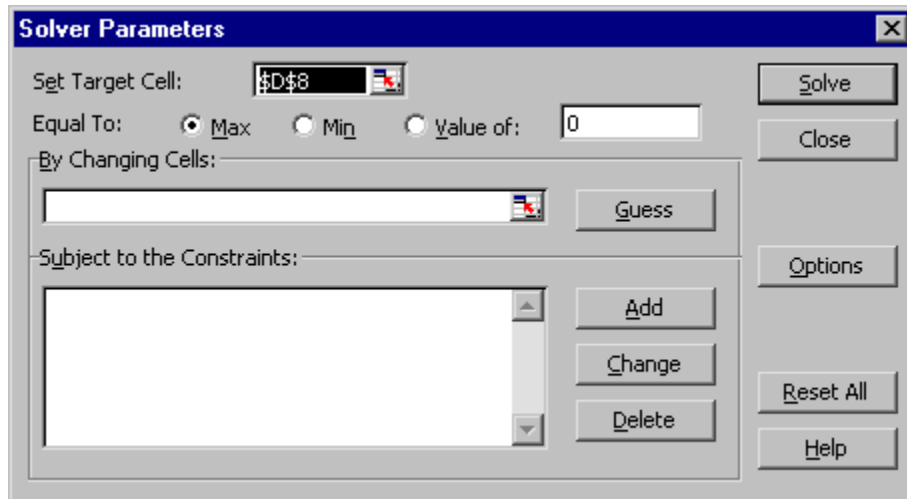
- Select the **Solver Add-in** checkbox.
- Click **OK** to install.

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

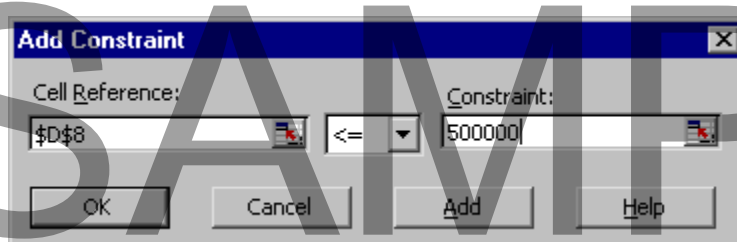
- Select the **Target Cell**. In our example, select cell **D8**.
- From the main menu, choose **Tools > Solver** to display the **Solver Parameters** dialog box. (Notice that the **Set Target Cell** text box contains cell reference **\$D\$8**):



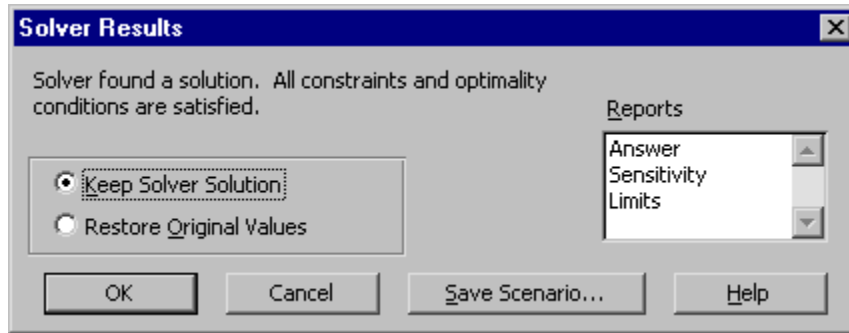
- In the **Equal To** area, set the **Max**, **Min**, or **Value of** constraint by selecting the appropriate radio button, and entering the value into the text box. In our example, we will select **Value of** and enter **500000** in the text box to set the budget constraint.
- In the **By Changing Cells**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

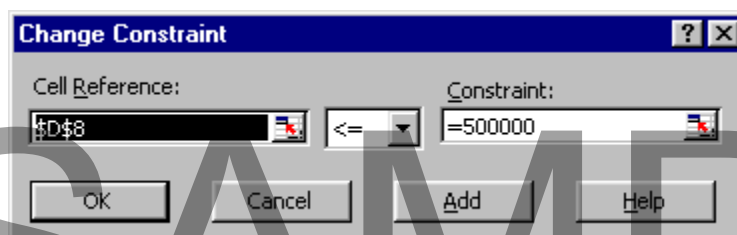


- Select the Keep Solver Solution or Restore Original Values radio button.
- Click **OK** to apply your choice. In our example, the worksheet will appear as follows: (You may notice that the solution suggests the purchase of part of a car. You can create another constraint to force Excel to solve for 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.

Using Pivot Tables

Understanding Pivot Tables

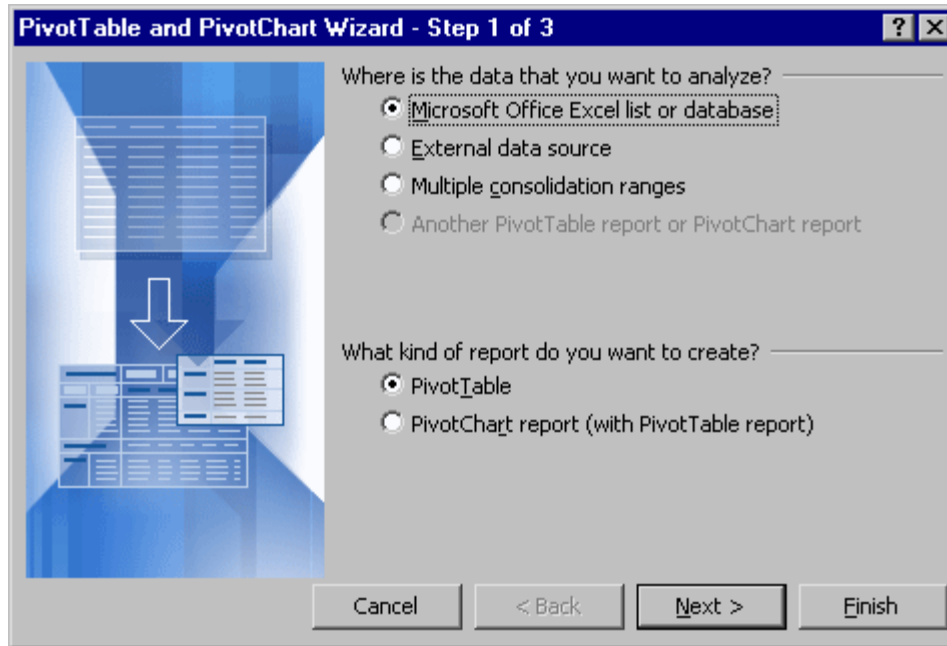
- As the name suggests, a Pivot Table is simply a table of data, but has the advantage of allowing you to summarise fields in different dimensions. They seem difficult at first, but the best way to get used to them is to use a pivot table and experiment!
- The example below uses a table containing information relating to sales for a company that is selling training courses. By using a Pivot Table we could easily extract and summarise information from this table.

Creating Pivot Tables

- Open the workbook containing the data from which you wish to create your pivot table:

	A	B	C	D	E	F	G
1	Example of using a pivot table						
2							
3	Order Number	Course	Price/day for training courses	No. of days training sold	Total value	Customer	Sales Person
4	10847	Excel Training	500	1	500	ZYX Company	Peter
5	10848	Excel Training	500	3	1500	XZY Company	Lou
6	10849	Excel Training	500	2	1000	KLM Company	Robert
7	10850	Excel Training	500	2	1000	ABC Company	Sue
8	10851	Word Training	450	1	450	XZY Company	Peter
9	10852	PowerPoint Training	450	1	450	KLM Company	Robert
10	10853	Word Training	450	2	900	ABC Company	Sue
11	10854	Access Training	600	4	2400	XZY Company	Lou
12	10855	PowerPoint Training	450	1	450	KLM Company	Peter
13	10856	Word Training	450	1	450	XZY Company	Lou
14	10857	Access Training	600	4	2400	ABC Company	Robert
15	10858	Word Training	450	2	900	QWE Company	Peter
16	10859	Access Training	600	1	600	ZYX Company	Robert
17	10860	PowerPoint Training	450	2	900	ABC Company	Lou

- Click within the body of the data and then click on the **Data** drop down menu and select the **PivotTable and PivotChart Report** command. This will display a wizard.
- In step 1 of the PivotTable and PivotChart Wizard, you can specify where the data is located and what type of report you wish to create. In this case accept the default offered:



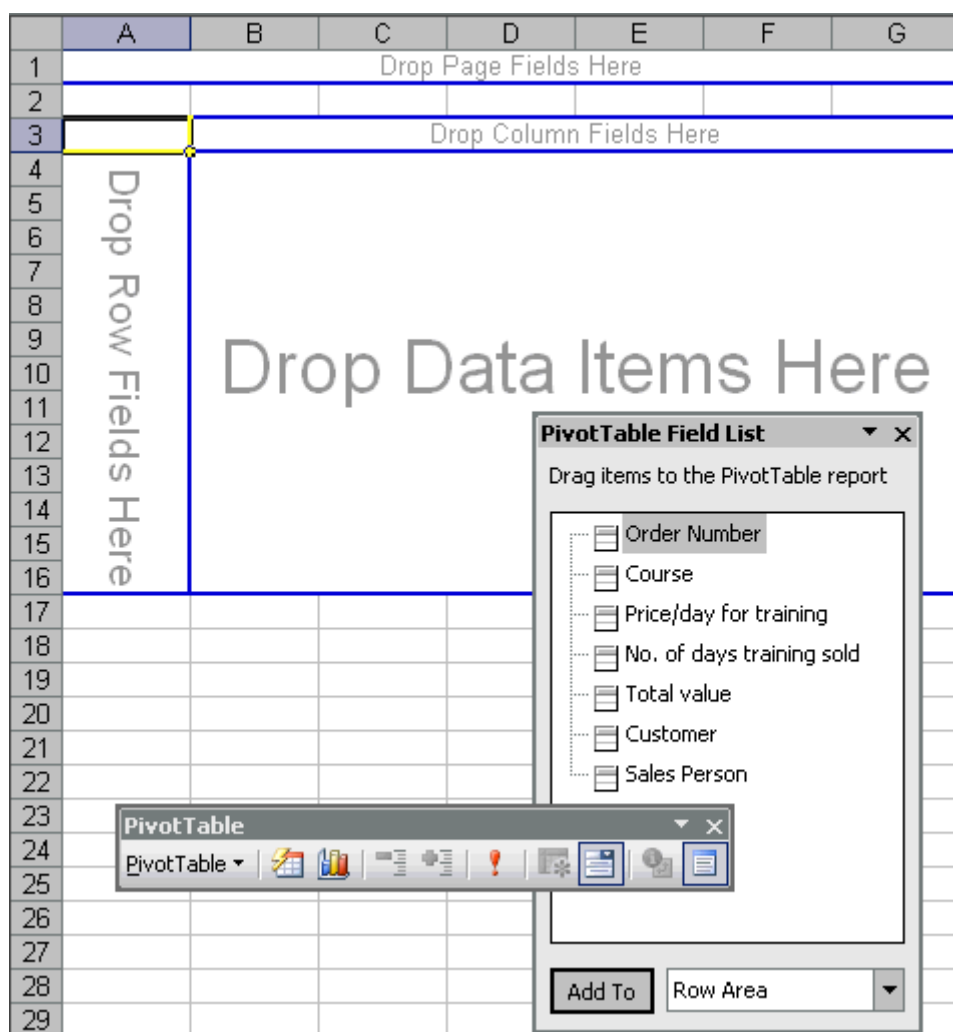
- Click on the **Next** button to continue. This will display the next page of the wizard.
- Step two of the wizard allows you to specify the exact data that you wish to use. Again accept the default offered:

	A	B	C	D	E
1	Example of using a pivot table				
2					
3	Order Number	Course	Price/day for training	No. of days training sold	Total value
4	10847	Excel Training	500	1	500
5	10848	Excel Training	500	3	1500
6	10849	Excel Training	500	2	1000
7	10850	Excel Training	500	2	1000
8	10851	Word Training	450	1	450
9					
10					
11					
12					
13					
14					
15					
16	10859	Access Training	600	1	600
17	10860	PowerPoint Training	450	2	900

- Clicking on the **Finish** button will create your pivot table.

Dropping data into Pivot Tables

- Now examine the Pivot Table you have just created. (As you can see in the illustration below, the **Pivot Table** toolbar is displayed by default):



- As you can see in the illustration above, the **Pivot Table Field List** pane is also launched automatically when you create your Pivot Table.
- To begin creating your Pivot Table, simply drag and drop items from the **Pivot Table Field List** pane to the table. The following example will illustrate this feature:
 - From within the Pivot Table task pane, click on the **Sales Person** field, and drag it into the part of the Pivot Table labelled '**Drop Row Fields Here**'.
 - From within the **Pivot Table** task pane, click on the **Customer** field, and drag it into the part of the Pivot Table labelled '**Drop Column Fields Here**'.
 - From within the **Pivot Table** task pane, click on the **Total Value** field, and drag it into the part of the Pivot Table labelled '**Drop Data Items Here**'.

When you have finished, the table should be as illustrated. As you can see a very easy way of extracting and summarising data!:

	A	B	C	D	E	F	G
1							
2							
3	Sum of Total value	Customer					
4	Sales Person	ABC Company	KLM Company	QWE Company	XZY Company	ZYX Company	Grand Total
5	Lou	900			4350		5250
6	Peter		450	900	450	500	2300
7	Robert	2400	1450			600	4450
8	Sue	1900					1900
9	Grand Total	5200	1900	900	4800	1100	13900
10							

Modifying data and refreshing Pivot Tables

- Following on from our previous example, you will notice that the Pivot Table was created on a new worksheet, within your Excel worksheet.
- In this example, the Pivot Table is located on the **Sheet1** Worksheet, while the original Worksheet that the table is based on is located in the **Pivot Table Data** Worksheet.
- Click on the **Pivot Table Data** Worksheet tab:




- Make some changes, such as in this case change the value within cell **D4**, which we have changed from 1 to **10**:

C	D	E
price/day	No. of days	
training	training sold	Total
courses		
500	10	50
500	3	15
500	2	10

- Click on the **Sheet1** tab, which contains the Pivot Table, and you will notice that the Pivot Table has not been updated to take account of your changed data:

	A	B	C	D	E	F	G
1							
2							
3	Sum of Total value	Customer					
4	Sales Person	ABC Company	KLM Company	QWE Company	XZY Company	ZYX Company	Grand Total
5	Lou	900			4350		5250
6	Peter		450	900	450	500	2300
7	Robert	2400	1450			600	4450
8	Sue	1900					1900
9	Grand Total	5200	1900	900	4800	1100	13900
10							

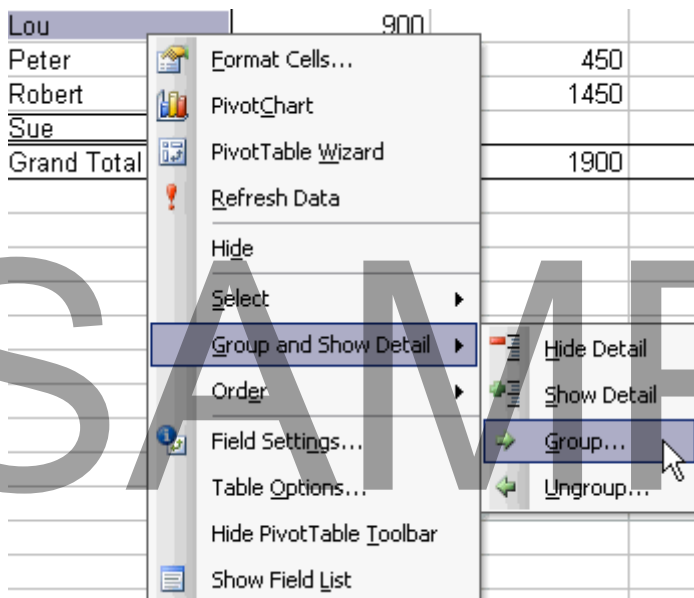
- If you click on the **Refresh Data** icon  (within the Pivot Table toolbar), you will see the data change, as illustrated:

	A	B	C	D	E	F	G
1							
2							
3	Sum of Total value	Customer					
4	Sales Person	ABC Company	KLM Company	QWE Company	XZY Company	ZYX Company	Grand Total
5	Lou	900			4350		5250
6	Peter		450	900	450	5000	6800
7	Robert	2400	1450			600	4450
8	Sue	1900					1900
9	Grand Total	5200	1900	900	4800	5600	18400
10							
11							
12							
13							
14							

The PivotTable toolbar is shown below the table, with the **Refresh Data** icon highlighted.

Grouping data within Pivot Tables

- Following on from the previous example, let's say that Lou and Sue are working together as a team, and we want to group their sales together.
- First we need to click on cell **A5** (the cell containing the text **Lou**).
- While depressing the **Ctrl** key we then need to click on cell **A8** (the cell containing the text **Sue**).
- When you release the **Ctrl** key, both cells should remain selected.
- Right click over the selected cells and from the popup menu displayed select the **Group and Show Detail** command. From the submenu displayed select **Group**:



- The screen will then change to display the grouped results, as illustrated:

	A	B	C	D	E	F	G	
1								
2								
3	Sum of Total value		Customer					
4	Sales Person2	Sales Person	ABC Company	KLM Company	QWE Company	XZY Company	ZYX Company	Grar
5	Group1	Lou	900			4350		
6		Sue	1900					
7	Peter	Peter		450	900	450	500	
8	Robert	Robert	2400	1450			600	
9	Grand Total		5200	1900	900	4800	1100	
10								

Review Questions

How would you:

- Use Goal Seek?
- Use a 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?
- Summarise scenarios?
- Use Solver?
- Install Solver?
- Change a constraint?
- Delete a constraint?
- Understand Pivot Tables?
- Create Pivot Tables?
- Drop data into Pivot Tables?
- Modify data and refresh Pivot Tables?
- Group data within Pivot Tables?

SAMPLE

End of the preview sample



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