

Microsoft Excel 2002 / 2003

ADVANCED FUNCTIONS AND DATABASE MANAGEMENT

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Functions

SUM (x;y;...)

The function SUM() adds the different arguments.

To get the sum of a group of adjacent cells, you have to define the area as being an argument. The formula SUM(C2:C5) will add the contents of the cells C2, C3, C4 et C5.

INT(x)

This function gives the integral value of x.

Example: =INT(14,57) gives 14

SQRT(x) gives the square root of x.

COS(x)

This functions gives the cosines of the angle x expressed in radians.

Example: =COS(PI()) gives -1

REMARK : The angles taken as arguments in trigonometric functions have to be expressed in radians.
To convert an angle expressed in degrees, multiply it by Pi divided by 180.

AVERAGE(x;y;...)

This function gives the average of all arguments, which means the sum of the arguments divided by the number of arguments.

Example: =AVERAGE(12;-1;23;6;17) gives 11,4

RATE(nper;pmt;pv;fr;type;guess)

This function calculates the final interest rate of a loaner.

nper represents the number of reimbursements.

pmt represents the amount payed per reimbursement (negative for a loaner).

pv represents the value to be reimbursed at the beginning.

fr represents the value at the end of the reimbursement. By default, fv is equal to 0.

type has to be equal to 1 if each reimbursement has to be paid at the end of the month or equal to 0 if each reimbursement has to be paid at the beginning of the month.

Example: For a loaner of 40 000 pounds over 4 years with monthly reimbursements of 2000 pounds to be paid at the end of months,
RATE(48;-1000;40000;;1) gives 0,81% (monthly rate)

TODAY() gives the current day.

VALUE(text)

This function converts a text into numeric values. If the text contains non-numeric characters, it displays an error code.

FIXED(number;decimals;no_commas)

This function converts a numeric value into a text. The argument **decimals** enables to determine the numbers of decimals to be converted.

&

The operator **&** enables to chain characters strings and/or values. *Example:* "Country roads" & "take me home" gives: Country roads take me home.

It is often useful to define a formula which applies to a cell a different contents according to the context.

Example: The table of Figure shows the activity report of a group of salereps. You can choose to affect a different comment whether they reached their objectives or not.

To do so, you have to define a **conditional expression**.

The function to be used is: =IF(logical_test;value_if_true;value_if_false)

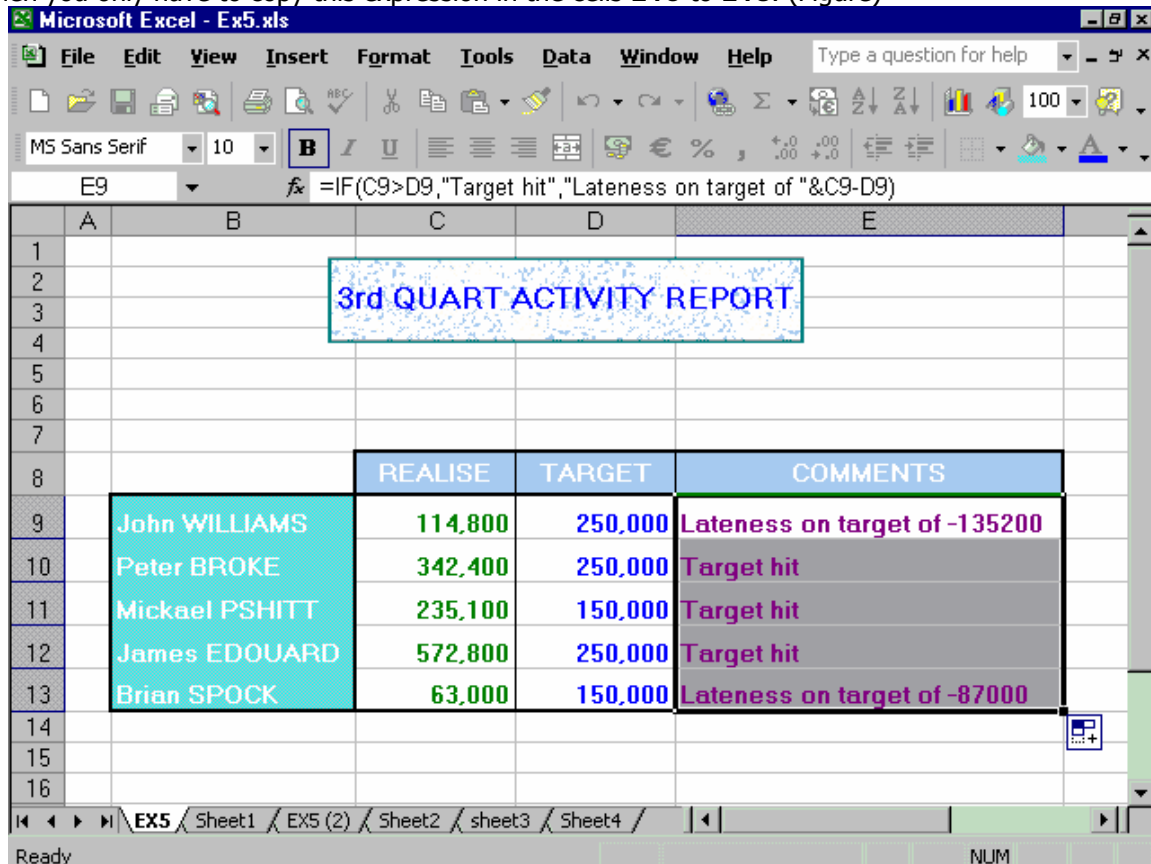
The argument **logical_test** has to be a logical boolean value. The argument **value_if_true**

represents the expression that will be used if the **test** is TRUE, **value_if_false** represents the expression that will be used if the **test** is FALSE.

In our example, the expression to be entered in the cell E9 is:

=IF(C9>D9;" Target hit";"Lateness on target of ")

Then you only have to copy this expression in the cells E10 to E13. (Figure)



The arguments **value_if_true** and **value_if_false** can contain: constants (number or text), cell references, functions and other conditional expressions. Then you can emb up to 7 IF functions in one single formula.

Logical operators:

- x > y True if x is bigger than y.
- x >= y True if x is bigger than or equal to y.
- x < y True if x is smaller than y.
- x <= y True if x is smaller than or equal to y.
- x <> y True if x is different from y.
- x = y True if x and y are equal.

Logical functions:

AND(logical_1;logical_2;...)

This functions gives TRUE if all the arguments are TRUE.

Example: AND(2>1;4<>12;3<4) gives TRUE

OR(logical_1;logical_2;...)


This function gives TRUE if at least one argument is TRUE.

NOT(x) gives True if the argument is FALSE.

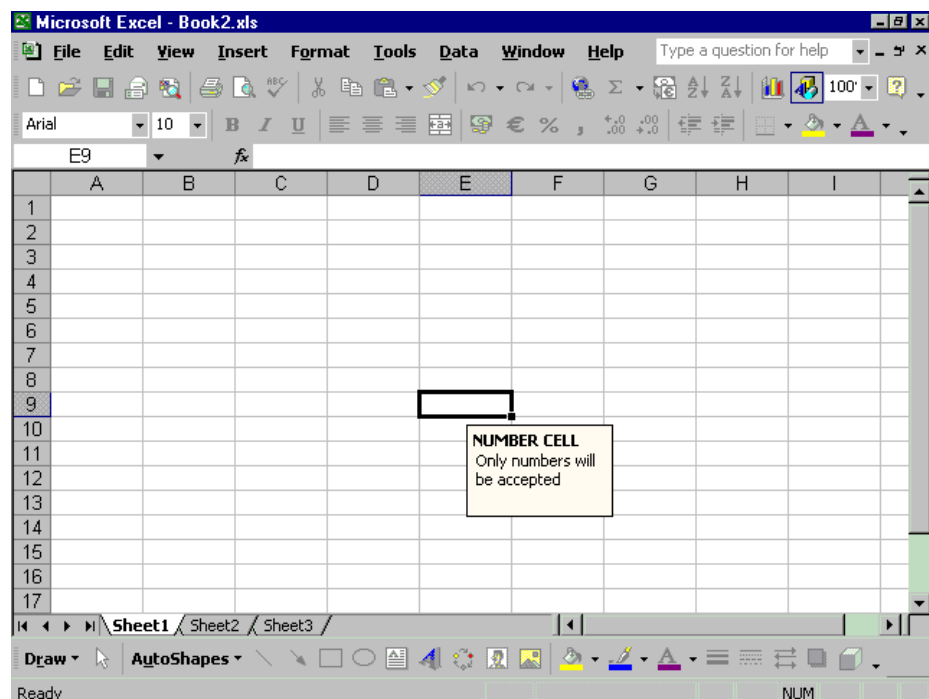
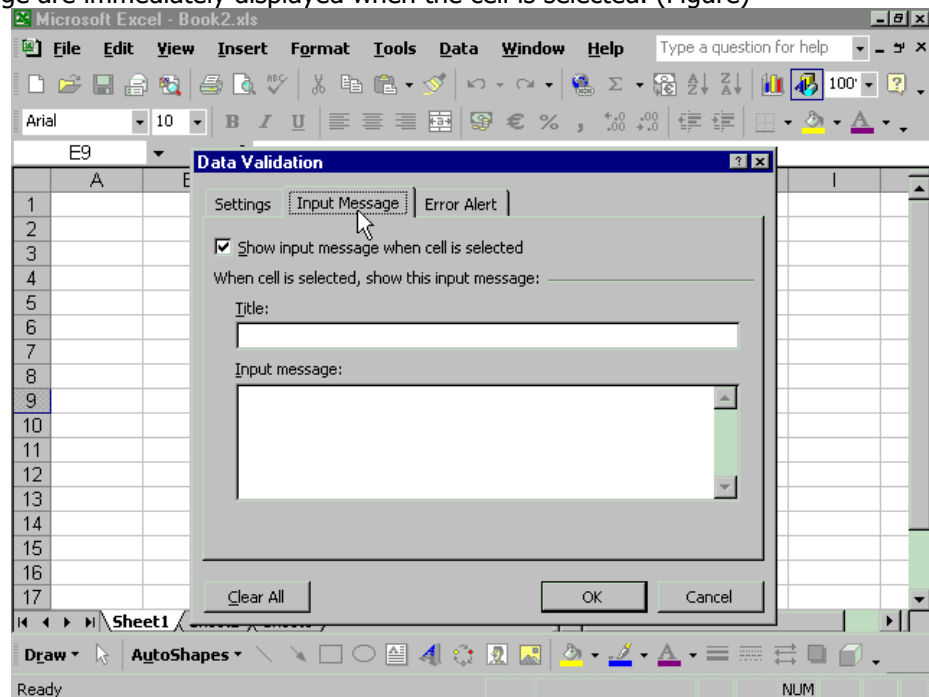
TRUE() always gives TRUE.

FALSE() always gives FALSE.

To display an entry message for a cell

- ☐ Select the cell for which you want to display a message.
- ☐ Select **Validation...** in the **Data** menu. A dialog box appears.
- ☐ Activate the **Input Message** card. (Figure)
- ☐ Make sure that the box **Show input message when cell is selected** is marked.
- ☐ In the text box **Title:**, enter the title of the message (it will be displayed in bold).
- ☐ In the text box **Input Message**, enter the message.
- ☐ Confirm with .

The title and the message are immediately displayed when the cell is selected. (Figure)

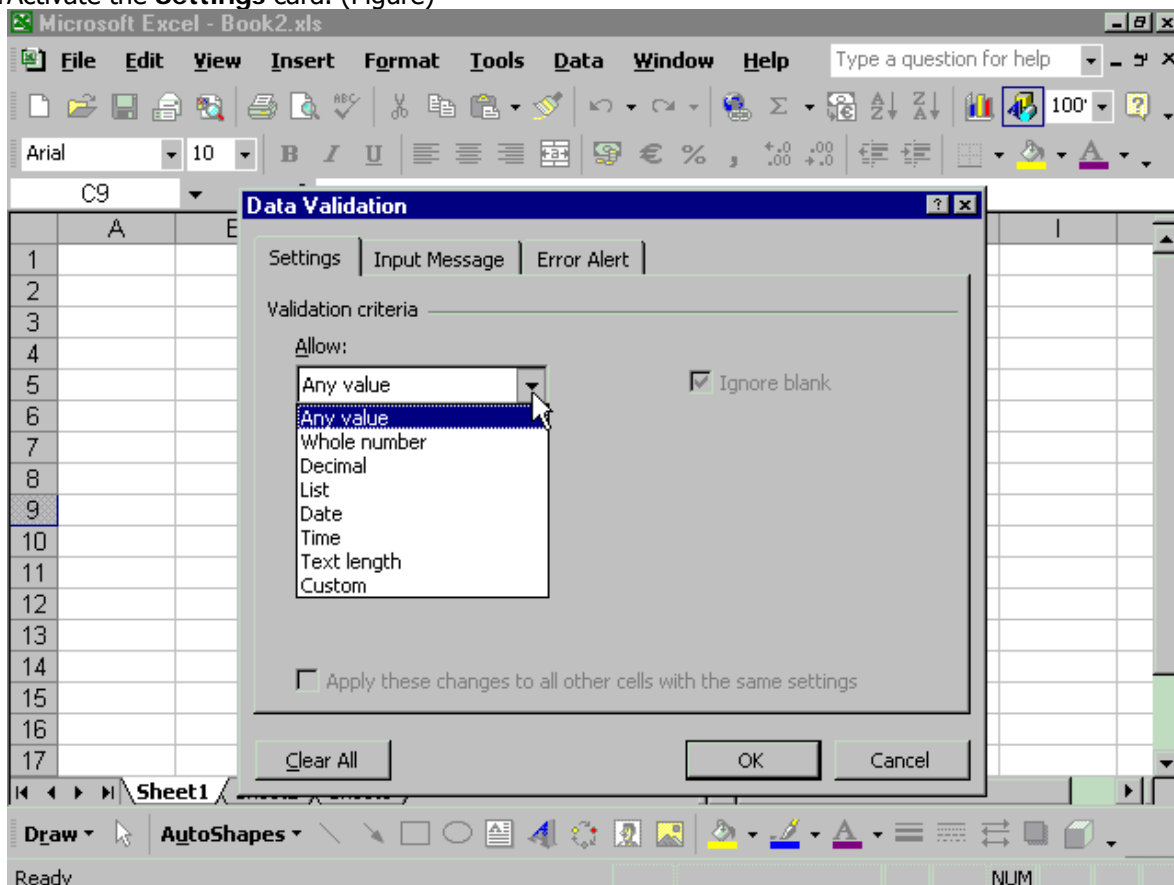


DEFINE ENTRY RECTRICTIONS

The best way to control the data entry is to fix conditions allowing only a certain type of entry. For example, you can limit the entry to integer numbers, to a chain of characters.... You can also create dropdown lists.

To define restrictions,


- ☐ Select the concerned cell.
- ☐ Select **Validation...** in the **Data** menu.
A dialog box appears.
- ☐ Activate the **Settings** card. (Figure)



To limit the entry to numbers, texts, dates or times:

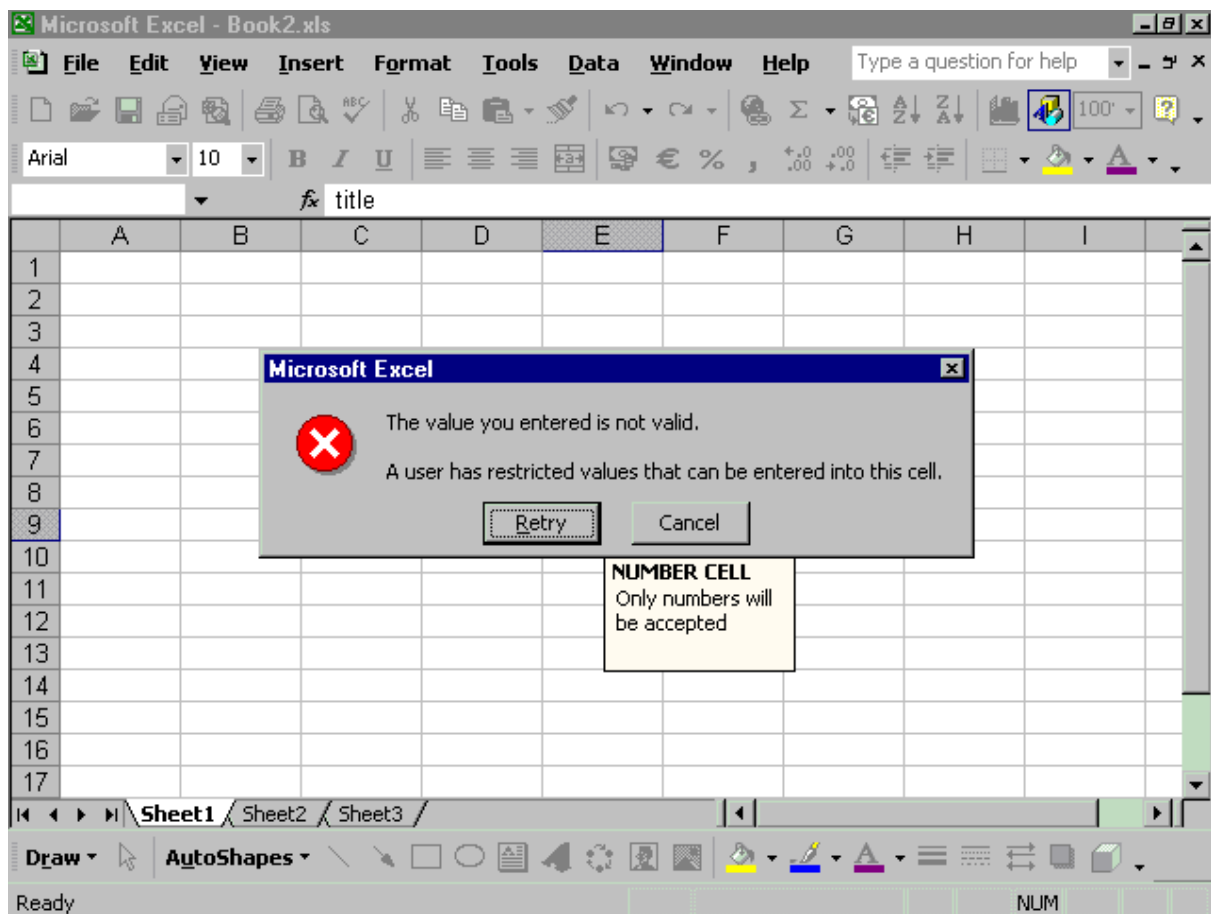
- ☐ Select between **Whole number**, **Decimal**, **Date**, **Time** or **Text length** in the dropdown list **Allow**.
- ☐ Select the operator in the dropdown list **Data**.
- According to the selected operator, the content of the cell is different.
- ☐ Enter the comparison values.

To limit the filling of a cell to a list:

- ☐ Select **List** in the dropdown list **Allow**.
- ☐ Activate the text box **Source**.
- ☐ Select the cells of the calculation sheet containing the data previously entered.
- ☐ Confirm with .

FILL RESTRICTED CELLS

Every value entered in a cell for which you have defined restrictions will be checked and rejected if the value is not valid. (Figure)



For the cells containing a dropdown list, a little arrow appears at the right-hand side of the cell when it is selected.

Once you have defined restrictions concerning the data entry you can ask Excel to forbid any entry if the conditions are not respected, or to warn the user with a message.

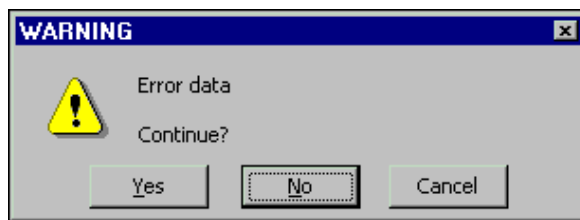
- ☐ Select the concerned cell.
- ☐ Select **Validation...** in the **Data** menu. (Figure)
 - A dialog box appears.
- ☐ Activate the card **Error Alert**. (Figure)
- ☐ Make sure that **Show error alert after invalid data is entered** is activated.
- ☐ Select **Stop**, **Warning** or **Information** in the dropdown list **Style**: whether you want to stop the entry or warn the user.
- ☐ In the text box **Title**: enter the title of the message (it will be displayed in bold).
- ☐ Enter the message in the text box **Error message**.

According to your choice in the dropdown list **Style**: the warning message will be different:

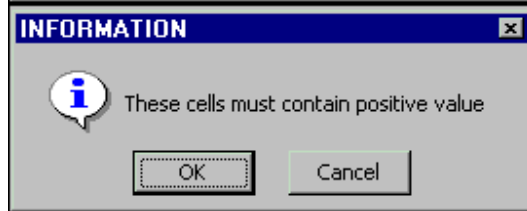
Stop:

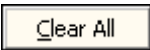


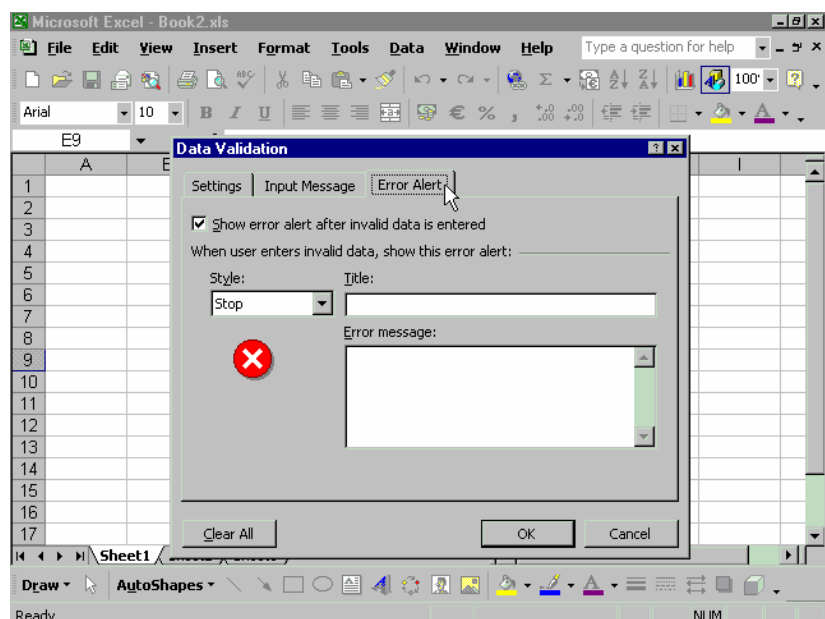
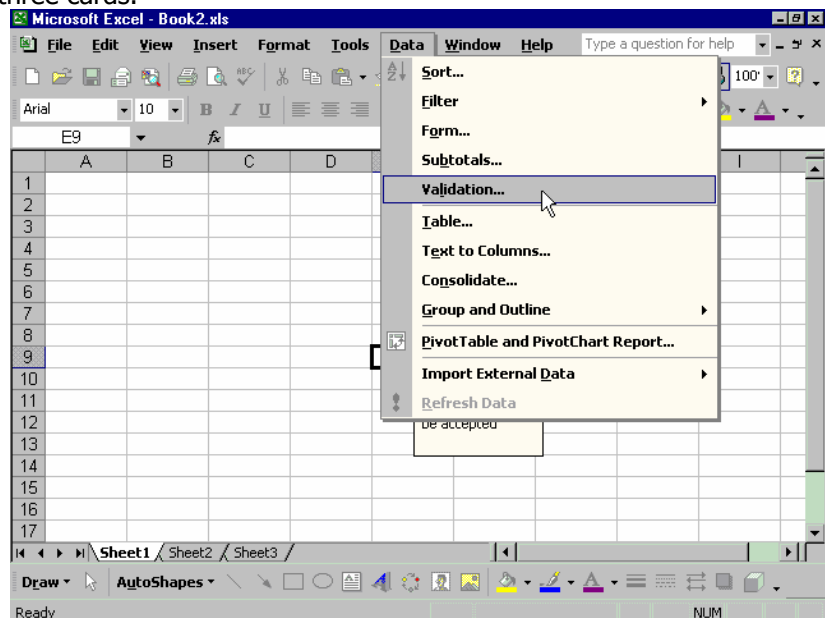
Warning:



Information:



REMARK : In the **Data Validation** dialog box, the button  deletes the restrictions and the messages of the three cards.

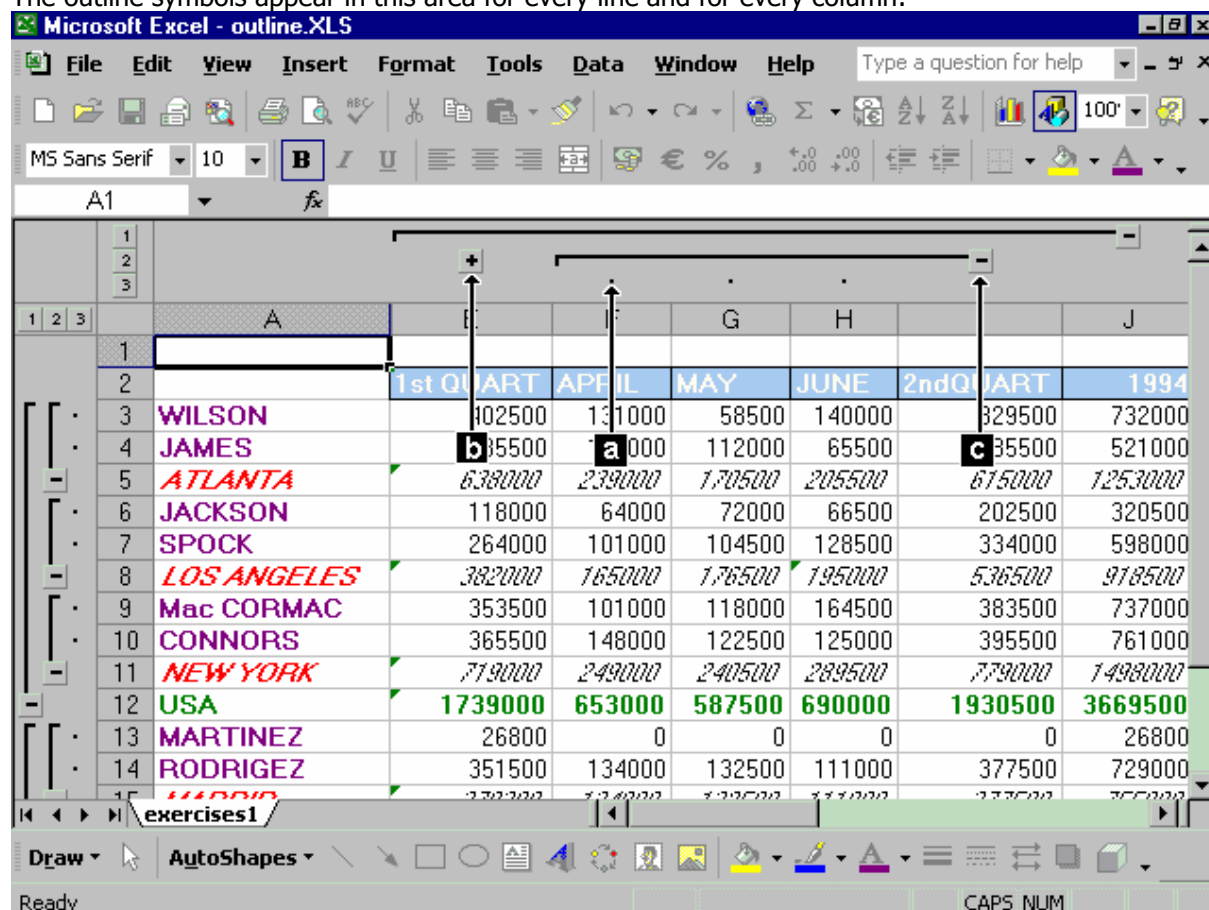


The Outline Function

The Outline function enables to organize calculation sheets containing a large amount of information. By dividing the sheet in detail rows (or columns) and in summary lines (or columns) of different levels, you can display or hide specific elements of the document to make the reading of information easier.

When you create an outline, an area appears above the column header and on the left of the line headers.

The outline symbols appear in this area for every line and for every column:



- indicates a detailed column or row. (Figure a)
- ⊕ indicates a summary column or row of which the contents is hidden. (Figure b)
- ⊖ indicates a summary column or row of which the contents is displayed. (Figure c)

In the symbol areas, in the prolongation of the row and column headers, level symbols appear: 1, 2, 3, ..., 8. They enable to identify rapidly the level of a summary row or column..

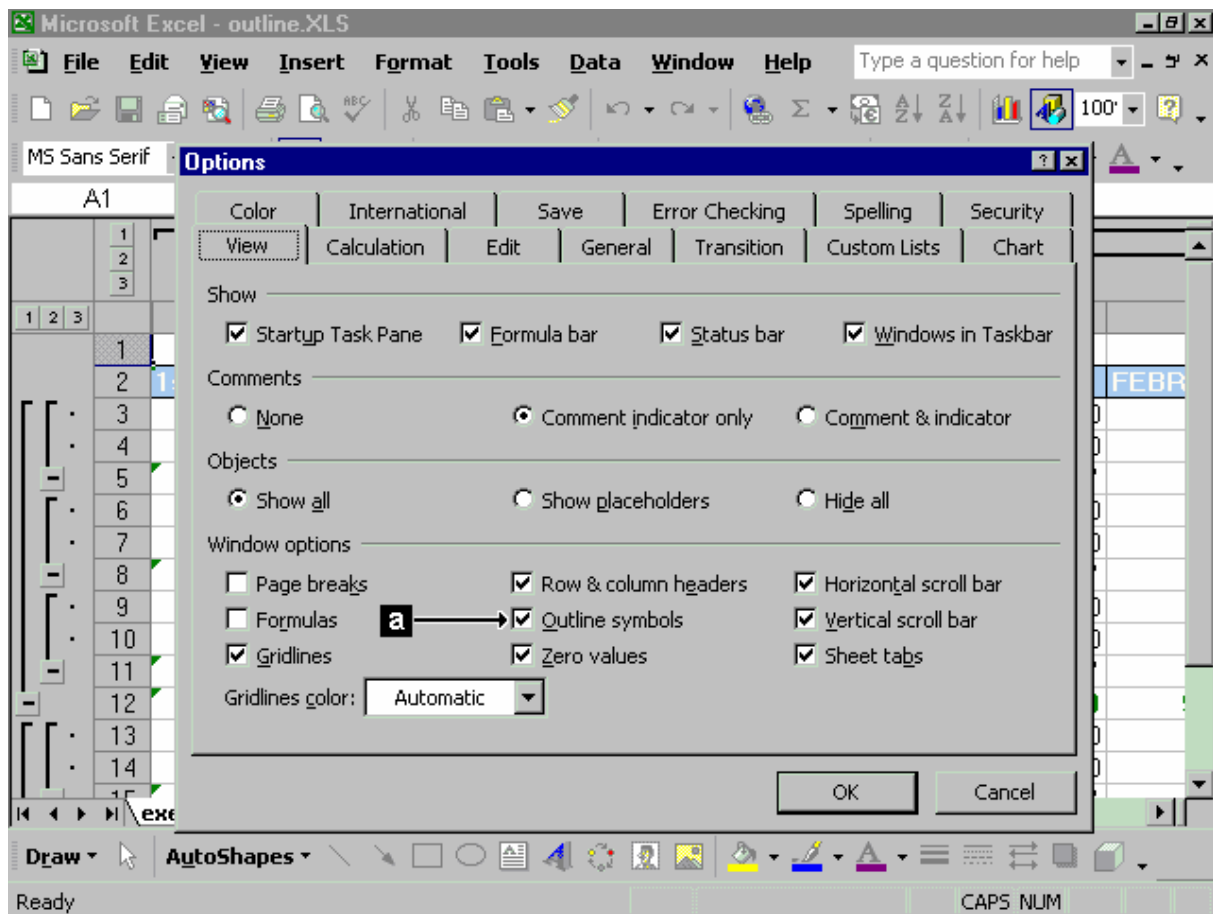
To display or hide the outline symbol,

By using the menu:

- ☐ Select **Options...** in the **Tools** menu.
A dialog box appears.
- ☐ Activate the **View** card. (Figure)
- ☐ Mark or unmark the box **Outline symbols**. (Figure a)
- ☐ Confirm with **OK**.

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Manual creation: You can create an outline by defining a level for every row and column.

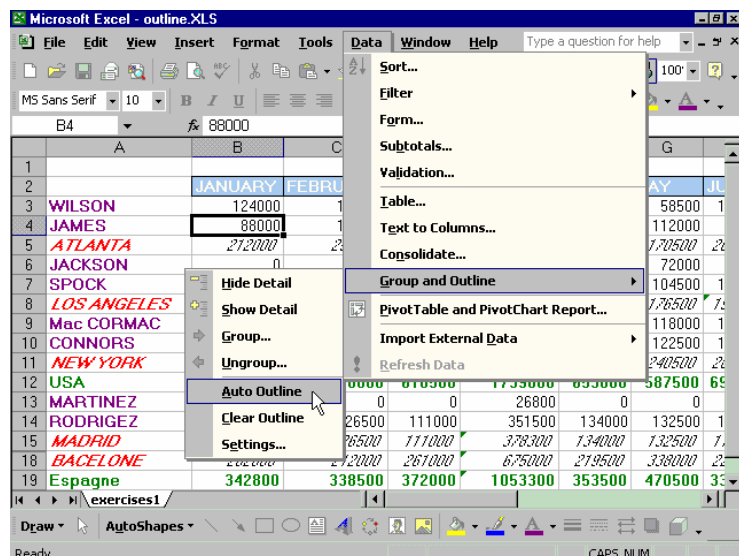
This method is useful when the automatic creation does not recognize the summary rows or columns properly and generates a false outline. Automatic creation: You can create an outline from a calculation sheet previously created.

□ Open the calculation sheet.

□ If the outline should concern only a part of the sheet, select the group of cells to be organized as an outline.

□ Select **Group and Outline** in the **Data** menu. A submenu appears.

□ Select **Auto Outline**. (Figure)



Excel generates an outline on the basis of the formulas in your calculation sheets, to determine the level of the different rows and columns Outline styles: When you generate an outline, particular styles (**RowLevel_x** and **ColLevel_x**) can be used for the formatting of the summary rows and columns. If you want to use the outline styles, you have to let Excel know about it before you start the automatic creation.

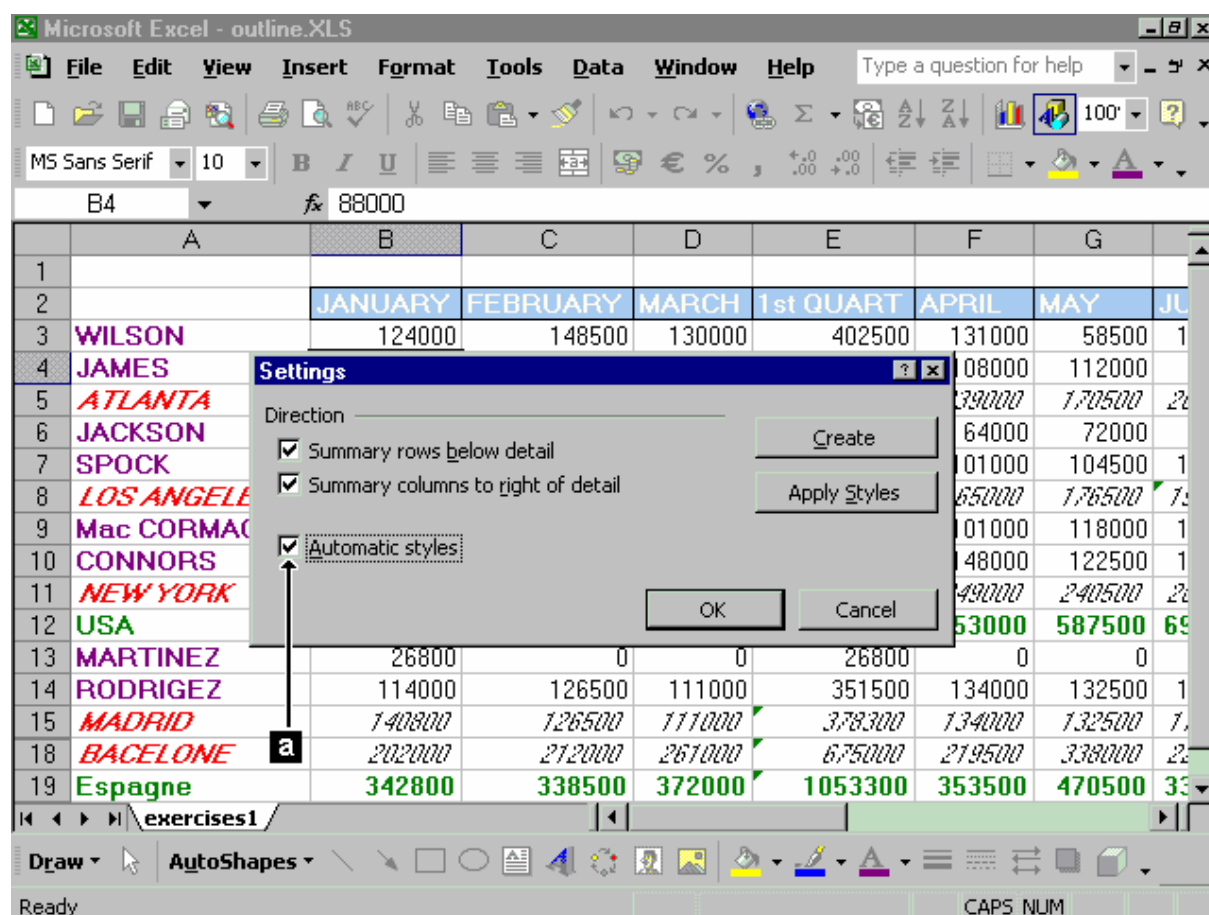
☐ Select **Group and Outline** in the **Data** menu. A submenu appears.

☐ Select **Settings....** A dialog box appears. (Figure)

☐ Mark the box **Automatic styles**. (Figure a)

☐ Confirm with **OK**. or

☐ Select **Create** to generate the outline immediately.



You can modify the structure of an outline by creating groups or ungrouping them.

To create a group:

To create a group of rows (or columns),

☐ Select the concerned rows or columns except the summary row or column. (Figure)

☐ Press simultaneously **Alt** + **Shift** + **→**.

or

☐ Select **Group and Outline** in the **Data** menu and **Group...** in the submenu. (Figure)

Ungroup:



To ungroup a group of rows (or columns),

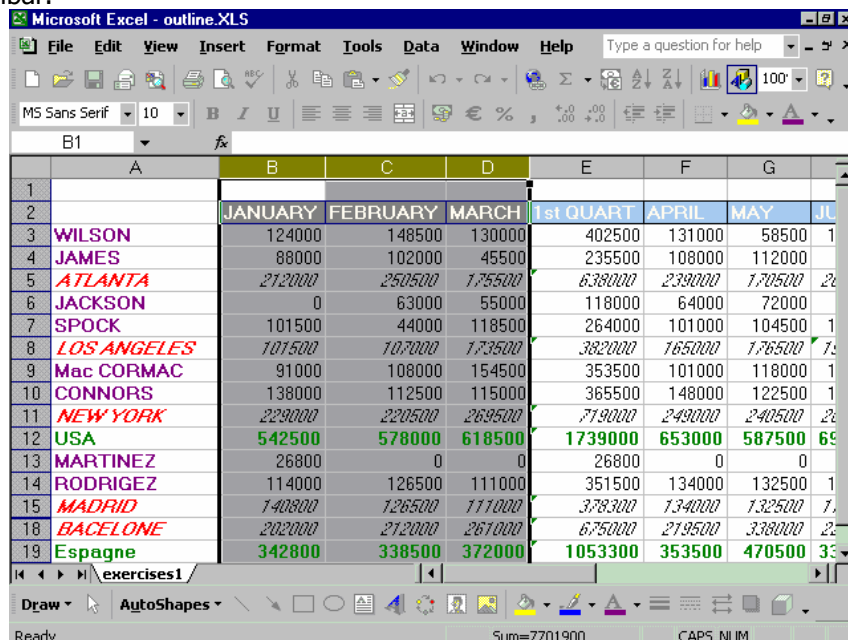
☐ Select the concerned rows or columns.

☐ Press simultaneously **Alt** + **Shift** + **←**.

or

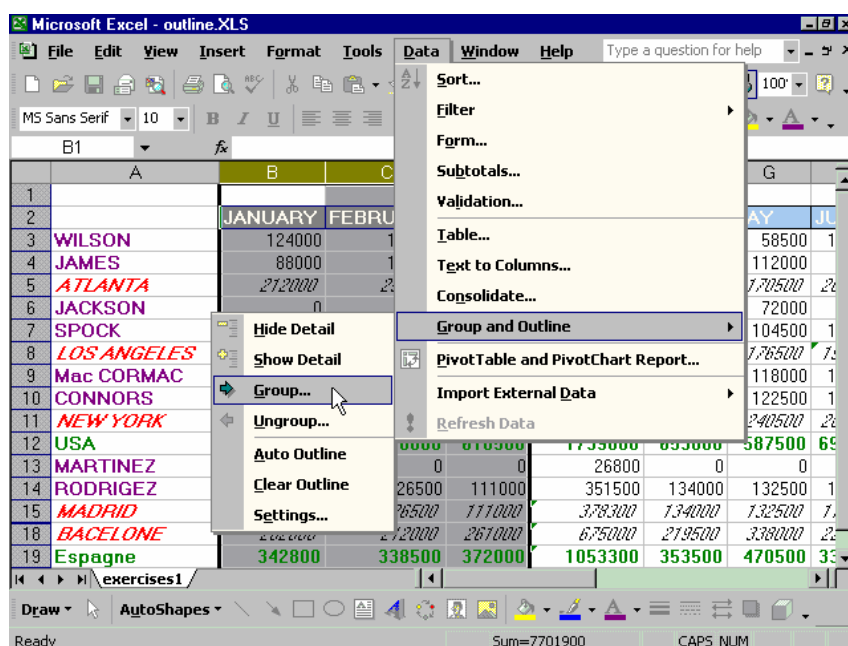
- ☐ Select **Group and Outline** in the **Data** menu and **Ungroup...** in the submenu.

REMARK : If you create or dissociate groups frequently, you can use the tools  and  in the **PivotTable** toolbar.



Microsoft Excel - outline.XLS

	A	B	C	D	E	F	G
1							
2		JANUARY	FEBRUARY	MARCH	1st QUART	APRIL	MAY
3	WILSON	124000	148500	130000	402500	131000	58500
4	JAMES	88000	102000	45500	235500	108000	112000
5	ATLANTA	212000	250500	175500	638000	239000	170500
6	JACKSON	0	63000	55000	118000	64000	72000
7	SPOCK	101500	44000	118500	264000	101000	104500
8	LOS ANGELES	101500	107000	173500	382000	165000	176500
9	Mac CORMAC	91000	108000	154500	353500	101000	118000
10	CONNORS	138000	112500	115000	365500	148000	122500
11	NEW YORK	229000	220500	269500	719000	249000	240500
12	USA	542500	578000	618500	1739000	653000	587500
13	MARTINEZ	26800	0	0	26800	0	0
14	RODRIGEZ	114000	126500	111000	351500	134000	132500
15	MADRID	140800	126500	111000	378300	134000	132500
16	BACELONE	202000	212000	261000	675000	219500	338000
17	Espagne	342800	338500	372000	1053300	353500	470500



Microsoft Excel - outline.XLS

Data menu options:

- Sort...
- Filter
- Form...
- Subtotals...
- Validation...
- Table...
- Text to Columns...
- Consolidate...
- Group and Outline**
 - Group...
 - Ungroup...
 - Auto Outline
 - Clear Outline
 - Settings...
- PivotTable and PivotChart Report...
- Import External Data
 - Refresh Data

To delete an outline,

- ☐ Select **Group and Outline** in the **Data** menu.

A submenu appears.

- ☐ Select **Clear Outline**.

The different outline levels are deleted. If you have used the outline styles, they won't be deleted.


MINIMIZE THE DISPLAY This manipulation enables to visualize only a group structure by hiding the detail rows and columns as well as the summary rows and columns of lower level. (Figure)

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To minimize a group,



- ☐ Click on the symbol  in the summary row or column of the group. (Figure a)

The whole group, except the summary row or column is immediately hidden. The symbol in the row or column becomes: . To minimize the whole sheet to the summary rows or columns of a certain level,




- ☐ Click on the symbol  (or , , etc.) corresponding to the level you like. (Figure b)

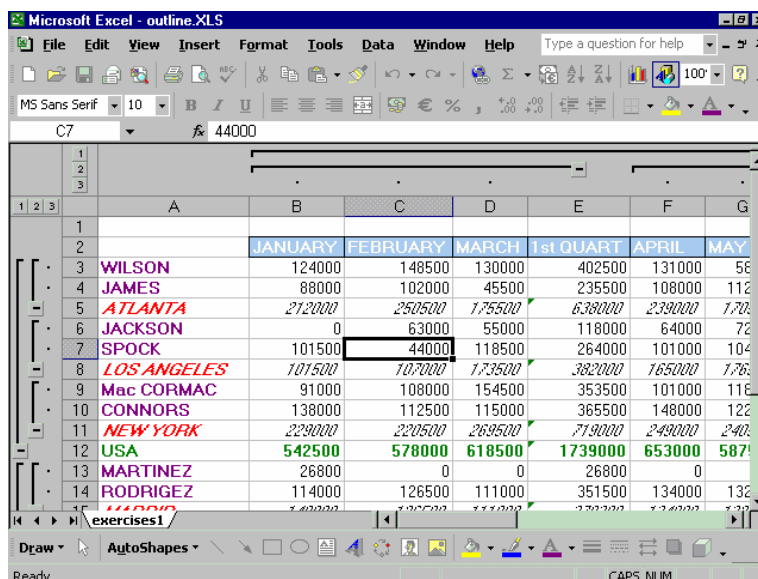
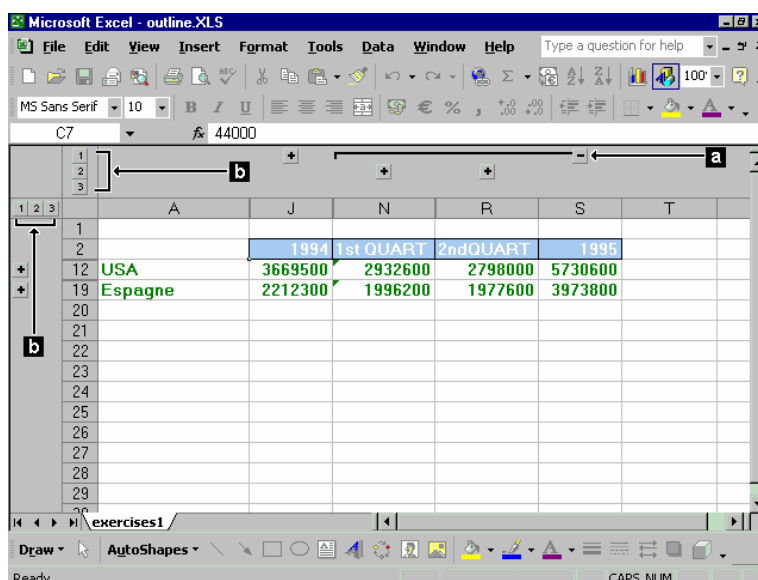
All details rows and columns, as well as summary rows and columns of lower level are hidden automatically.

MAXIMIZE THE DISPLAY This manipulation enables to display the elements of a group previously hidden. To maximize a group,

- ☐ Click on the symbol  in the summary row or column of the group. The whole group is immediately displayed. The symbol becomes: .

To maximize the whole outline,

- ☐ Click on the numbered symbol  (or , , etc.) corresponding to the lowest level of the outline. All the rows or columns of the sheet are immediately displayed again. (Figure)



The Lists

EXCEL offers a simplified database manager system: **the lists**.

You can use the lists to create a customer file, a personnel file, accounting... or any information system containing data of the same type.

A list is the equivalent of a table in a database. It consists of fields (Figure) and records (Figure) which appear respectively in the columns and in the rows of the calculation sheet.

Microsoft Excel - Ex3.xls

File Edit View Insert Format Tools Data Window Help

MS Sans Serif 10 B

D1 LEVEL OF STUDY

	A	B	C	D	E	F
1	NAME	REGION	DATE OF ENTRY	LEVEL OF STUDY	TO	
2	MILES	TEXAS	01/01/90	BACHELOR'S DEGREE	98000	
3	WILLIAMS	NEVADA	11/15/91	HIGH SCHOOL	0	
4	SPOCK	CALIFORNIA	06/12/89	BACHELOR'S DEGREE	124000	
5	JACKSON	NEVADA	06/01/91	LICENCIATE	213000	
6	JORDAN	TEXAS	05/30/90	HIGH SCHOOL	12000	
7	ROBINSON	NEVADA	10/01/90	HIGH SCHOOL	145000	
8	CLAIN	TEXAS	01/01/92	LICENCIATE	86000	Field
9	HANS	NEVADA	01/01/91	BACHELOR'S DEGREE	192500	
10	WILMER	CALIFORNIA	12/15/89	ENGINEER	276000	
11	CONNORS	NEVADA	01/17/92	HIGH SCHOOL	77000	
12	BOND	TEXAS	09/18/91	BACHELOR'S DEGREE	44000	
13	SUMMER	NEVADA	04/03/91	LICENCIATE	144000	
14	ADDAMS	TEXAS	03/01/90	HIGH SCHOOL	101000	
15						
16						
17						

Sheet1 EX3

Draw AutoShapes

Ready CAPS NUM

Microsoft Excel - Ex3.xls

File Edit View Insert Format Tools Data Window Help

MS Sans Serif 10 B

A10 WILMER

	A	B	C	D	E	F
1	NAME	REGION	DATE OF ENTRY	LEVEL OF STUDY	TO	
2	MILES	TEXAS	01/01/90	BACHELOR'S DEGREE	98000	
3	WILLIAMS	NEVADA	11/15/91	HIGH SCHOOL	0	
4	SPOCK	CALIFORNIA	06/12/89	BACHELOR'S DEGREE	124000	
5	JACKSON	NEVADA	06/01/91	LICENCIATE	213000	
6	JORDAN	TEXAS	05/30/90	HIGH SCHOOL	12000	
7	ROBINSON	NEVADA	10/01/90	HIGH SCHOOL	145000	
8	CLAIN	TEXAS	01/01/92	LICENCIATE	86000	
9	HANS	NEVADA	01/01/91	BACHELOR'S DEGREE	192500	
10	WILMER	CALIFORNIA	12/15/89	ENGINEER	276000	
11	CONNORS	NEVADA	01/17/92	HIGH SCHOOL	77000	
12	BOND	TEXAS	09/18/91	BACHELOR'S DEGREE	44000	
13	SUMMER	NEVADA	04/03/91	LICENCIATE	144000	
14	ADDAMS	TEXAS	03/01/90	HIGH SCHOOL	101000	
15						
16						
17						

Sheet1 EX3

Draw AutoShapes

Ready Sum=308857 NUM

The fields:

A field includes the elements of the same type of all listed records.

Example: If you administrate an address file, you will create:

- A field for the recipients' names
- A field for their first names
- A field for the street
- A field for the postcode
- A field for the town

The field is characterized by its name.

Example: ZIP for the field that groups the postcodes.

And by its type of data: alphanumeric (text), numeric, date or time.

The records (cards):

A card includes all information (of different types) referring to a given element.

Example: If you have Mr WILSON James 12 EDEN Street 10000 NEW YORK, as a contact, his card will contain the following data:

WILSON (**Name** field)

James (**First name** field)

12 EDEN Street (**Street** field)

10000 (**PC** field)

NEW YORK (**Town** field)

The List organization of these information will enable you to:

- ☐ to sort according to different criteria
- ☐ to find cards corresponding to one or several conditions
- ☐ to extract information matching with one or several criteria

To create a list,

- ☐ Enter the fields names in the 1st row (this row does not have to be the first row of the sheet), every column has to contain a field.
- ☐ Enter the data of the first record in the second row.
- ☐ If necessary, enter other records in the following rows.
- ☐ Affect a different format to the field names as to the data of the list (font, attributes, borders, etc.) so that Excel can identify them.

To add records to a list,

- ☐ Activate one cell of the list.
- ☐ Select **Form...** in the **Data** menu.

A dialog box appears (Figure). The field names are displayed in column on the left side of the dialog box along with the entry areas where the data of the first record appear.


- ☐ Press  +  or  + .

or

- ☐ Select .


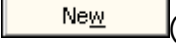


An empty form appears.

- ☐ Enter the data of the first field.

- ☐ Press .

The cursor is positioned in the entry area of the second field.

- ☐ Do the two last operations again for the following fields.

- ☐ Press  or select  (or  + ) to enter another record.

or

- ☐ Select  to get back to the calculation sheet.

REMARK : You can enter records directly in the calculation sheet at the end of the list.

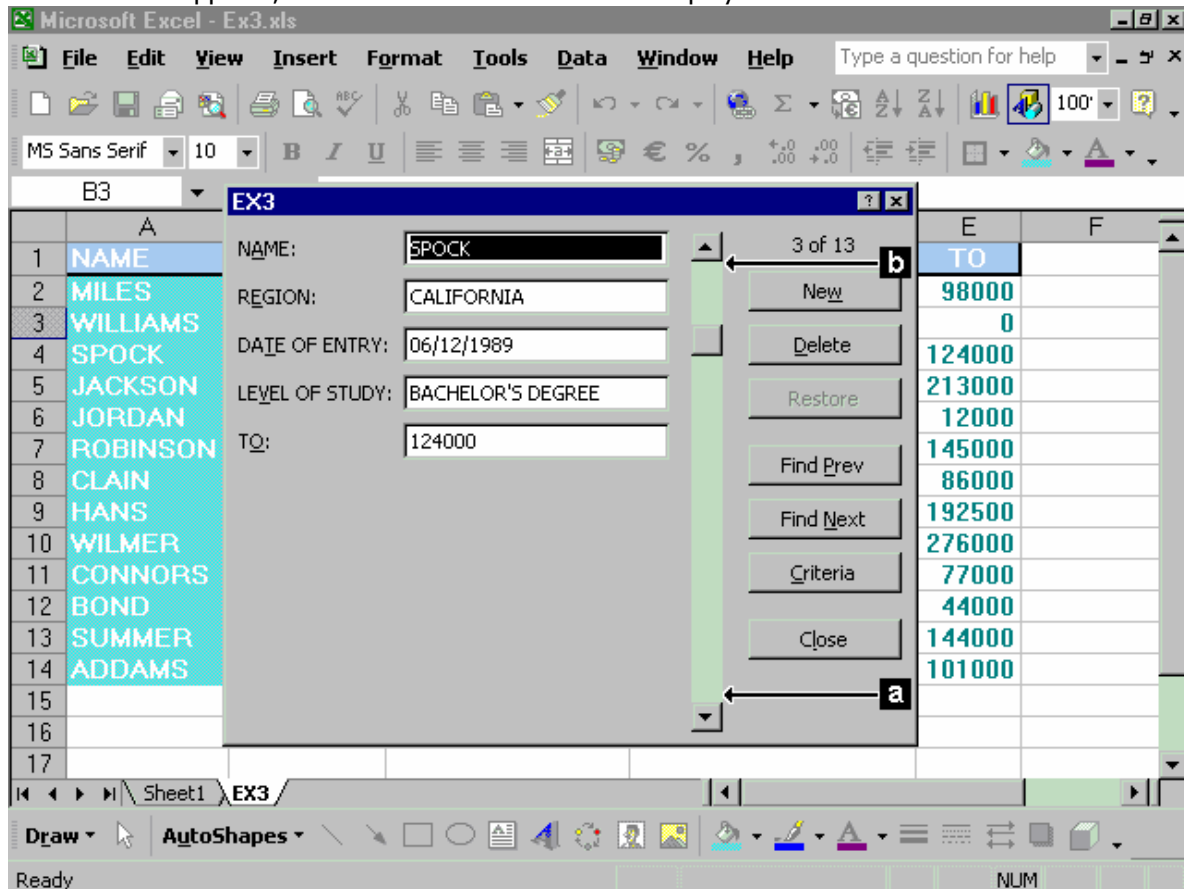
You can organize your list by using the options **Form...** of the **Data** menu.
(Figure)

By using it, you can:

- ☐ Enter records
- ☐ Modify records
- ☐ Delete records

☐ Search

When the form appears, the data of the first record are displayed.



To reach a field:

- ☐ Press until you reach the field you like.
or
- ☐ Press simultaneously and on the underlined letter of the field name.

To reach a new record:

- ☐ Select .
- or
- ☐ Drag the cursor to the bottom of the vertical scroll bar. (Figure a)
- or
- ☐ Press + or + .




To reach the first record:

- ☐ Drag the cursor to the top of the vertical scroll bar. (Figure b)
- or
- ☐ Press + or + .

To reach the following record:

- ☐ Press or .
- or
- ☐ Select .
- or
- ☐ Click on the arrow of the vertical scroll bar.

To reach the previous record:

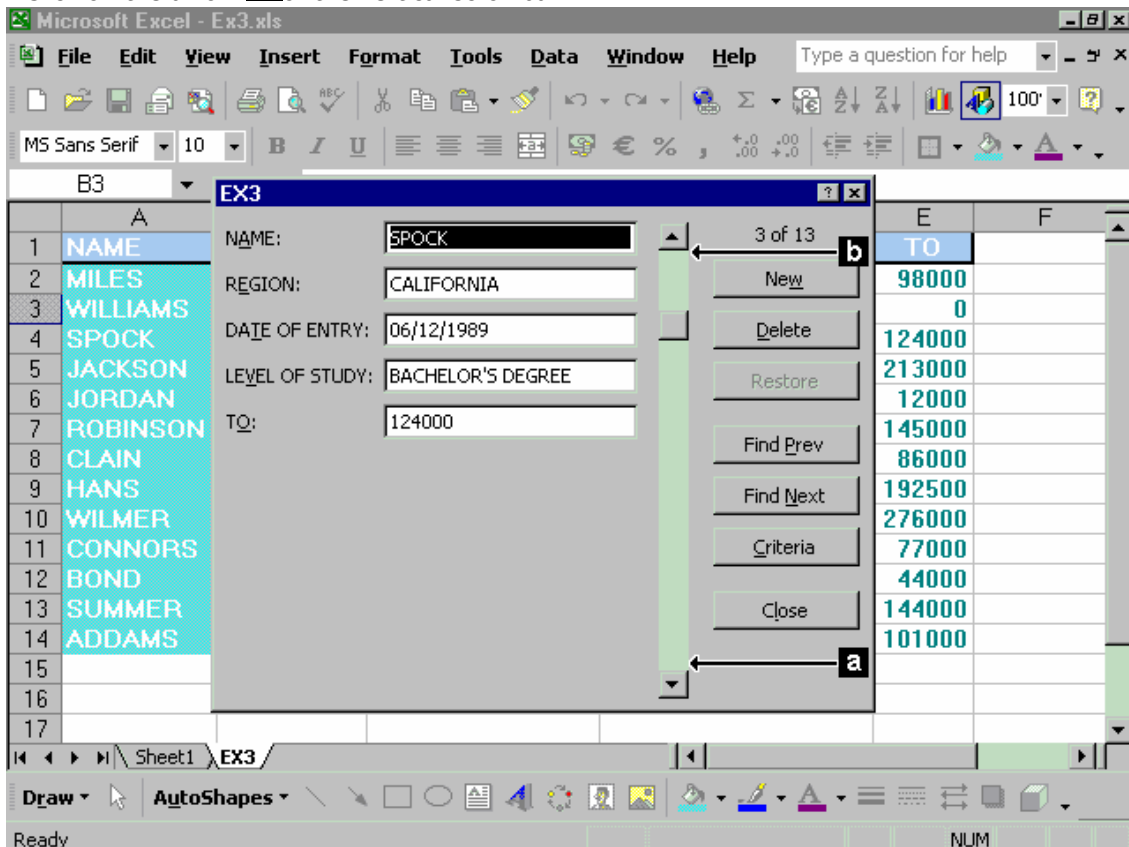
- ☐ Press  or  + .

or

- ☐ Select .

or

- ☐ Click on the arrow  of the vertical scroll bar.




To modify the contents of records, In the calculation sheet:

- ☐ Activate the cell containing the data to be modified.

- ☐ Press  or click in the formula bar.

- ☐ Modify the data. (Figure)

- ☐ Confirm with . or

- ☐ Enter the new value directly in the cell.

By using the form:

- ☐ Select **Form...** in the **Data** menu. A dialog box appears.

- ☐ Activate the record to be modified

- ☐ Position the cursor in the entry area of the field to be modified.


- ☐ Modify the data.

- ☐ Select .

By using the form:

- ☐ Select **Form...** in the **Data** menu. A dialog box appears.

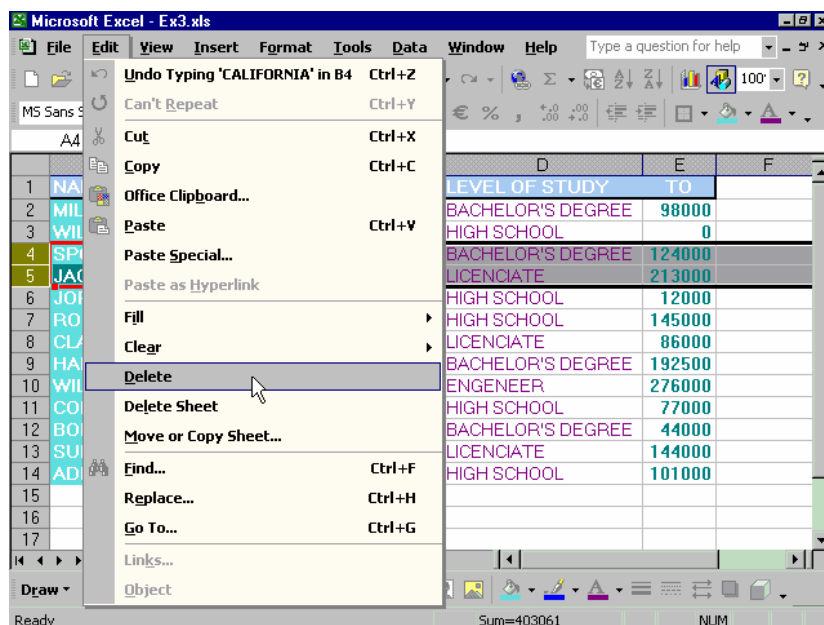
- ☐ Activate the record to be deleted.

- ☐ Select . A warning dialog box appears.

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- ☐ Confirm with OK and select Close to get back to the calculation sheet. In the calculation sheet:
- ☐ Select the cell(s) to be deleted.
- ☐ Select **D**elete... in the **E**dit menu or in the context menu. (Figure)



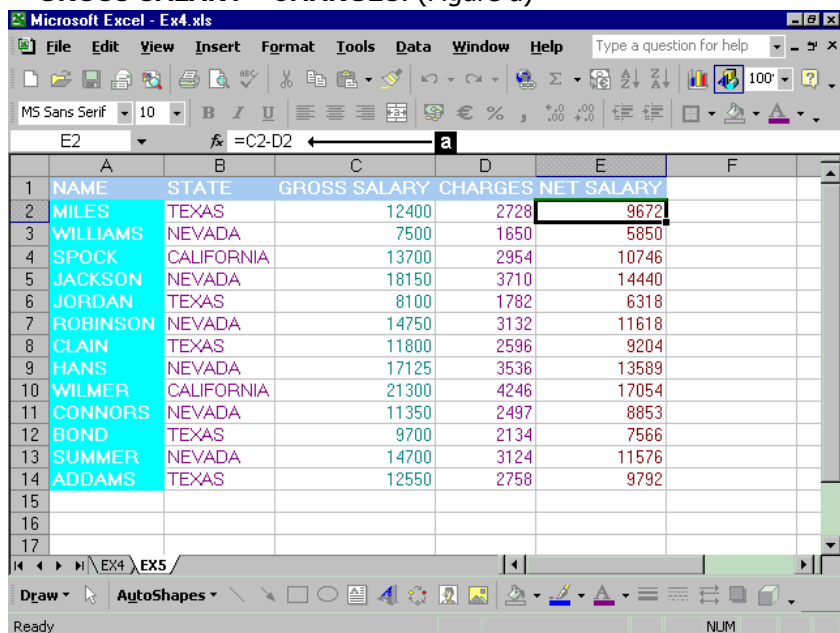
GENERAL

You can create, in the list, fields containing of which the contents should be dependent on the other fields of the list.

Example: In a list "Personnel salary", you can have fields like GROSS SALARY, CHARGES and NET SALARY.

The contents of **NET SALARY** will then depend on the contents of **GROSS SALARY** and **CHARGES** according to the formula:

NET SALARY = GROSS SALARY - CHARGES. (Figure a)





The formulas of the computed fields are the same as those in a spreadsheet. You can use:

arithmetical operators, constants, functions, conditional expressions, etc...

CREATE A COMPUTED FIELD

To define a computed field while creating the list,

- ☐ Enter the field name in the first row.
- ☐ Enter the values of the first row (except those of the computed field) on the next row.
- ☐ Position the cursor in the cell corresponding to the computed field.
- ☐ Press .
- ☐ Enter the formula and confirm with .
- ☐ Copy the formula in the existing records (cells below).
- ☐ Format the column (**Currency** format for example). The value of the computed field will appear formatted in the entry form.

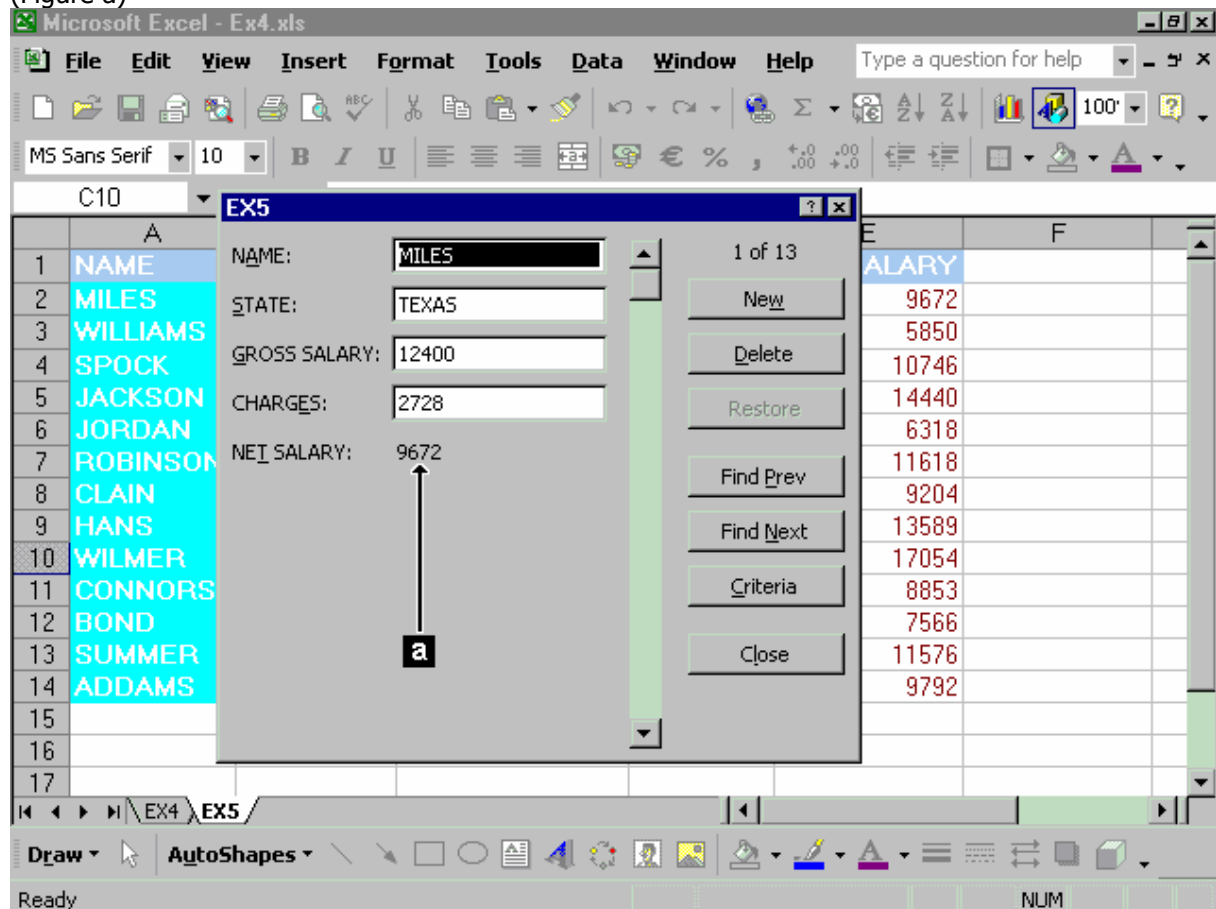
MODIFY A FORMULA

To modify the formula of a computed field,

- ☐ Activate the cell corresponding to the computed field of the first record.
- ☐ Modify the formula.
- ☐ Copy the formula into all the cells of the field of the list.

DISPLAY OF A COMPUTED FIELD IN THE FORM

When the list includes a computed field, this one appears in the form but can not be modified (Figure a)



When you enter a new record or modify an existing record, the formula is automatically updated whenever you activate another record.

Filters

GENERAL

It is often useful to display the whole records of a list meeting one or more criteria.

For example, the list of all the customers of a town or those who haven't placed any order since a particular date, etc. You can use **the filter** to do so.

AUTOMATIC FILTER

The automatic filter enables to define rapidly simple criteria.

To execute an automatic filter,

☐ Activate one cell of the database (of the worksheet).

☐ Select **Filter** in the **Data** menu.

A submenu appears.

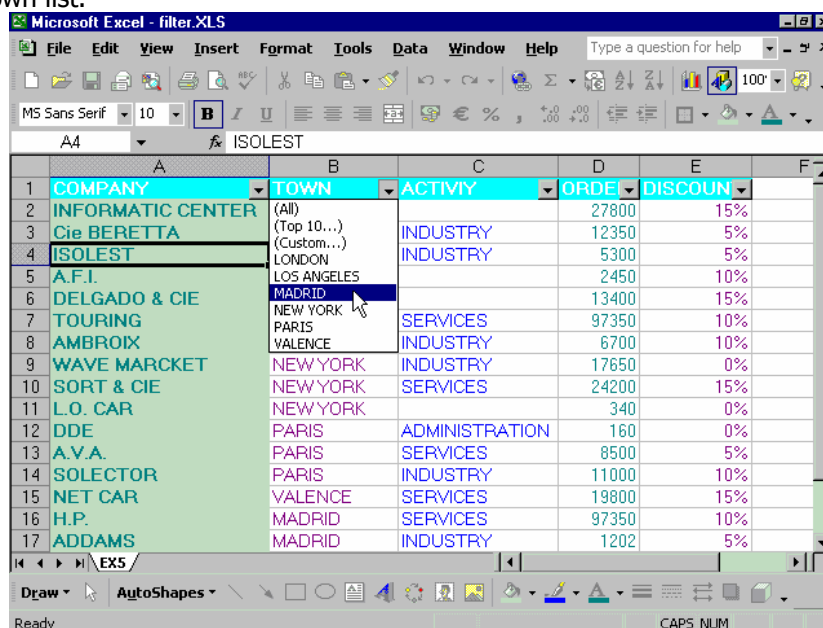
☐ Select **AutoFilter**.

An arrow containing the fields names appears on the right of the cells. Click on this arrow to display a dropdown list.

☐ Activate the dropdown list corresponding to the field on which the filter will be based.

The dropdown list includes all the values used by this field in your list, as well as the options **(All)**, **(Top 10...)**, **(Custom...)**, **(Blanks)** and **(NonBlanks)**.

☐ Select a value in the dropdown list.



Examples: To find the records of the companies based in MADRID.

☐ Activate a cell of the list.

☐ Select **Filter** in the **Data** menu and **AutoFilter** in the submenu.

☐ Activate the dropdown list of the TOWN field.

☐ Select MADRID. (Figure)

To find in the list the records of the companies whose activity is unknown:

☐ Activate a cell of the list.

☐ Select **Filter** in the **Data** menu and **AutoFilter** in the submenu.

☐ Activate the dropdown list of the ACTIVITY field.

☐ Select **(Blanks)**.

REMARK : **(Blanks)** and **(NonBlanks)** are displayed in the dropdown list only if at least one cell of the field is blank.

The search is executed and all records which do not correspond to the criteria are hidden. The

arrow of the dropdown list corresponding to the field on which the filter is based appears in blue, so do the row numbers of the list. A message indicating the number of records found appears in the status bar.

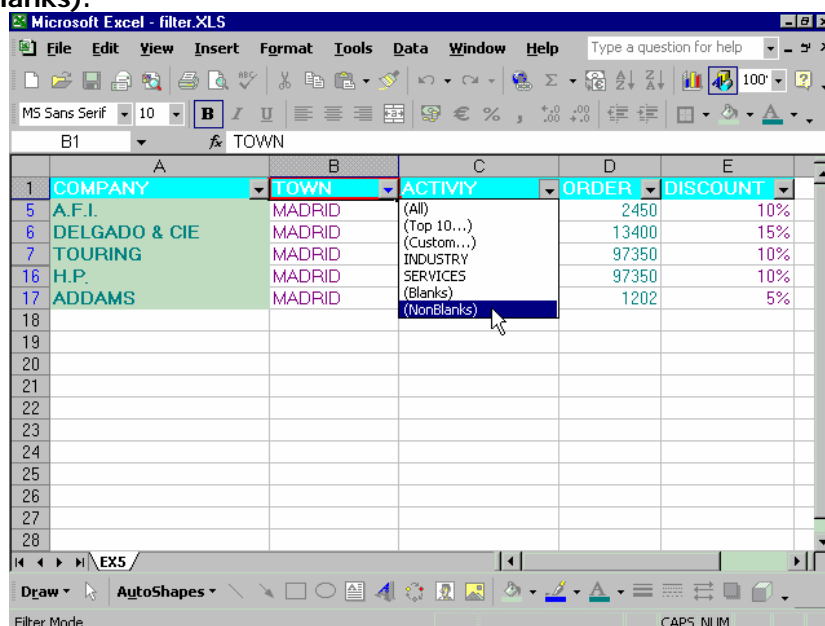
- ☐ If necessary, define another criteria for another field. In this case, only records meeting both criteria will be displayed.

Example: To search in the list the records of the companies based in MADRID and offering SERVICES.

- ☐ Position the cursor in the list.
- ☐ Select **AutoFilter** in the **Filter** submenu of the **Data** menu.
- ☐ Activate the dropdown list of the TOWN field.
- ☐ Select MADRID.
- ☐ Activate the dropdown list of the ACTIVITY field.
- ☐ Select SERVICES.

Example: To search in the list the records of the companies based in MADRID with an unknown activity:

- ☐ Position the cursor in the list.
- ☐ Select **AutoFilter** in the **Filter** submenu in the **Data** menu.
- ☐ Activate the dropdown list of the TOWN field.
- ☐ Select MADRID.
- ☐ Activate the dropdown list of the ACTIVITY field.
- ☐ Select **(NonBlanks)**.



To delete a criteria,

- ☐ Select **(All)** in the dropdown list corresponding to the field of which you want to delete the selection criteria.

To delete all criteria,

- ☐ Select **Filter** in the **Data** menu.
A submenu appears.
- ☐ Select **Show All**.
All the records of the list are displayed again.

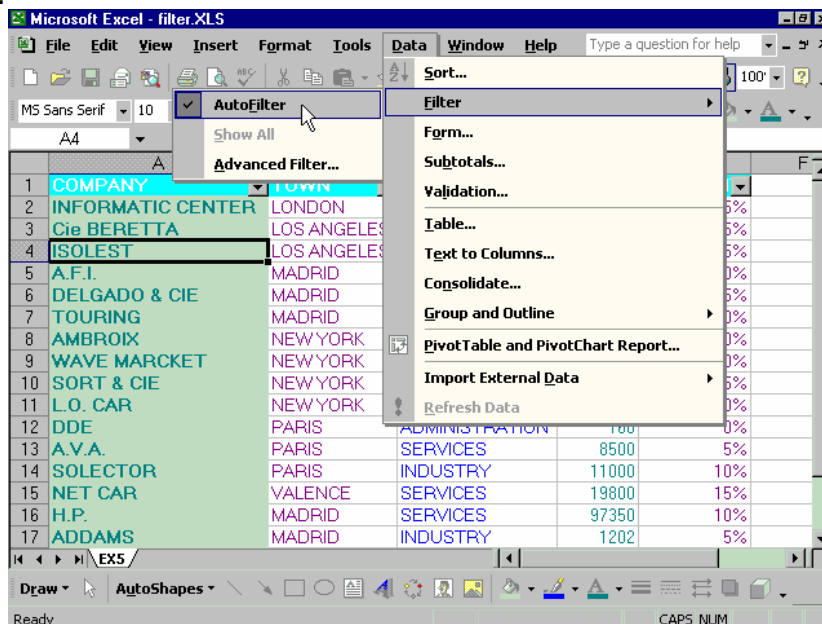
To deactivate the automatic filter,

- ☐ Select **Filter** in the **Data** menu.
- ☐ Deactivate **AutoFilter** in the submenu.

AUTOMATIC CUSTOMIZED FILTER

The use of options provided by the dropdown lists of the automatic filters enable you to determine very quickly and easily the selection criteria of the records. However, the possibilities are still limited. To select records according to more precise criteria, you can use the **customized automatic filter**.

- Activate the automatic filter.



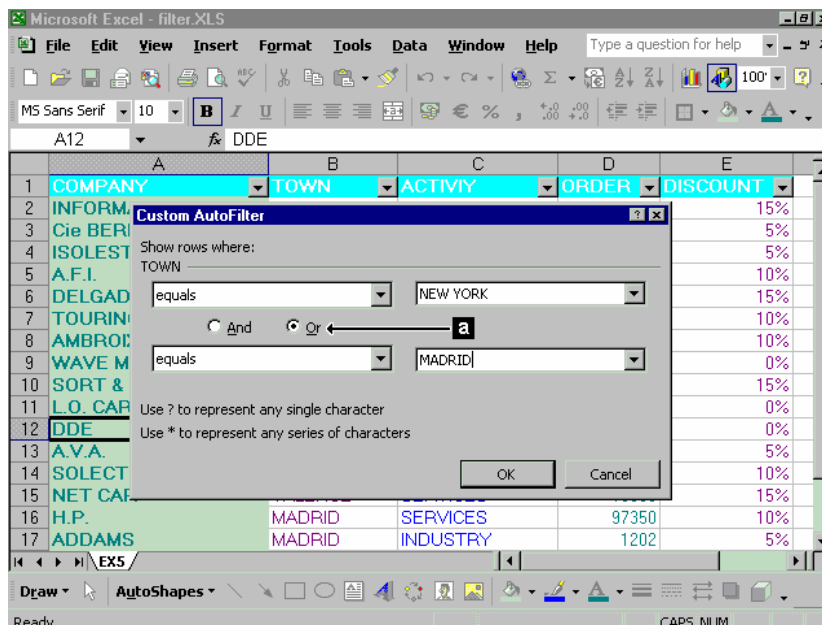
- Select (**Custom...**) in the dropdown list corresponding to the field to which the filter is applied.

A dialog box appears.

- Determine the criteria.

To search in the list, the records of the companies based in NEW YORK or MADRID.
(Figure)


Example:

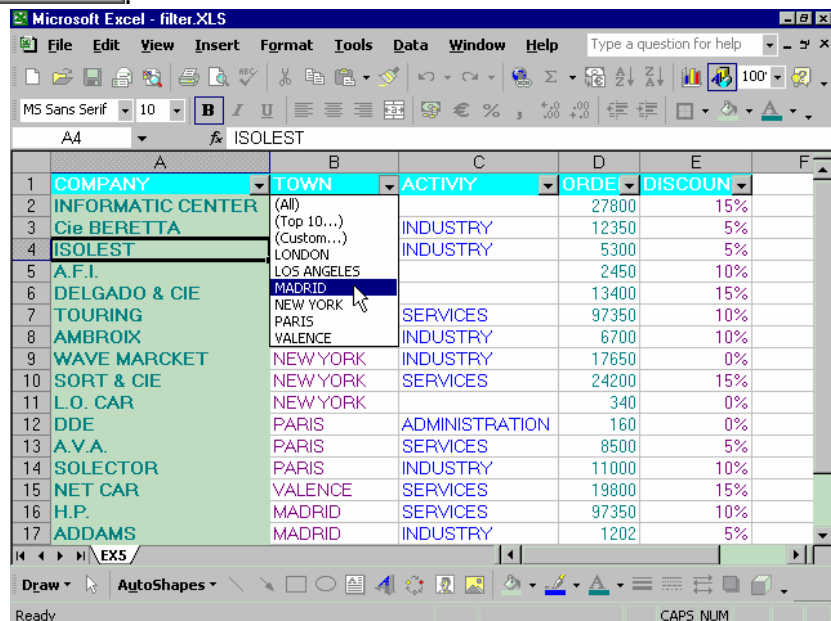


- Activate the dropdown list of the TOWN field.
- Select (**Custom...**).
A dialog box appears.
- In the upper dropdown list, enter NEW YORK or select it in the list.
- Select **Or**. (Figure a)

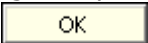
Microsoft EXCEL (Advanced)

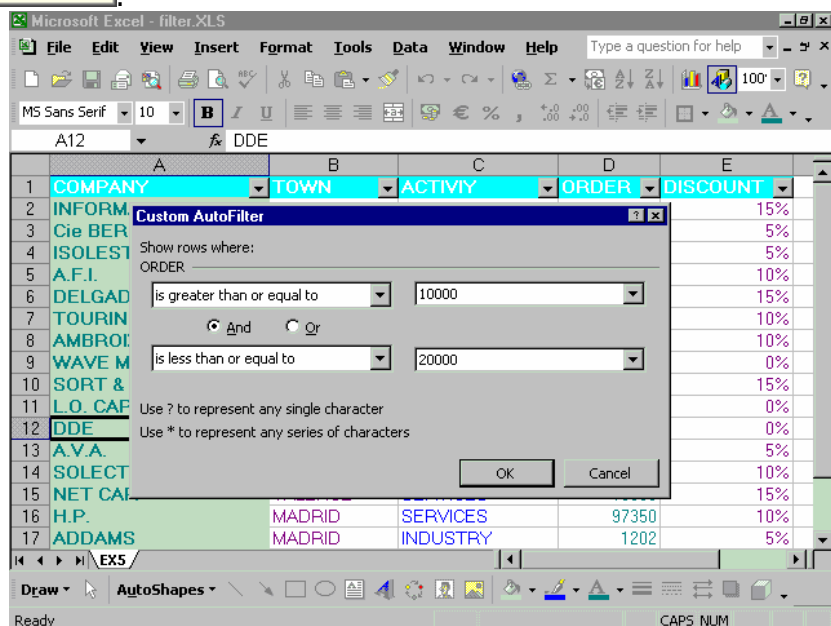
By: <http://emrause.blogspot.com>

- ☐ In the lower left dropdown list , select **equals**.
- ☐ In the lower right dropdown list , enter MADRID or select it in the list.
- ☐ Confirm with .



Example: To search in the list, the records of the companies having ordered between 1000 and 2000 dollars. (Figure)

- ☐ Activate the dropdown list of the ORDER field.
- ☐ Select **(Custom...)**.
 - A dialog box appears.
- ☐ In the upper left dropdown list, select **is greater than or equal to**.
- ☐ In the upper right dropdown list, enter **1000**.
- ☐ Select **And**.
- ☐ In the lower left dropdown list, select **is less than or equal to**.
- ☐ In the lower right dropdown list, enter **2000**.
- ☐ Confirm with .



REMARK : You can also use wildcard such as ? replacing one character or * replacing a group of

characters.

Example: A* searches all words starting with A.

GENERAL

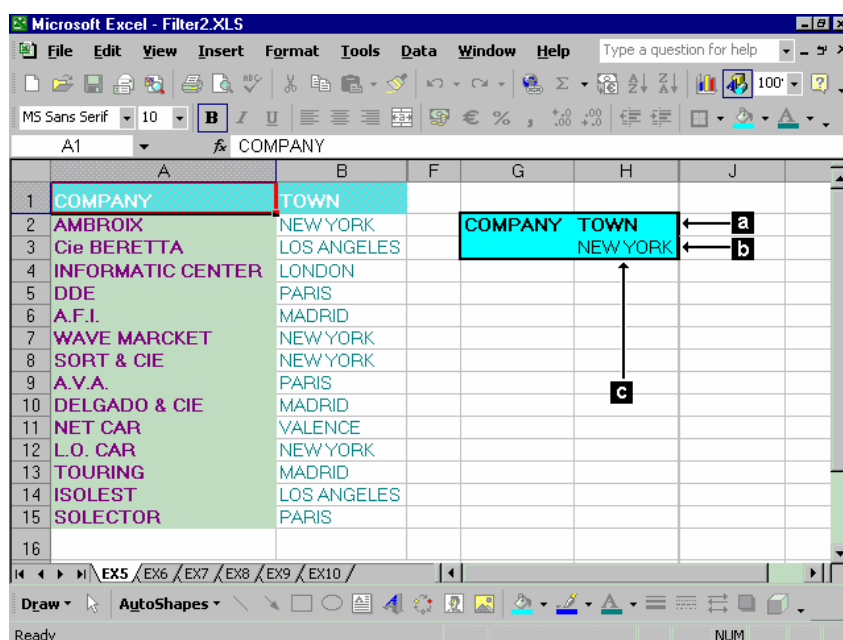
Advanced filter enable to use complex criteria which cannot be defined by using the automatic filter.

When you apply an advanced filter, you can:

- ☐ filter in the list directly (as if using the automatic filter).
- ☐ extract the records meeting the criteria and create a new list with them.

Before using an advanced filter, you have to define a criteria box.

CREATE A CRITERIA BOX



A criteria box consists of:

- ☐ a row in which the fields names are displayed. (Figure a)
- ☐ one or several rows figuring the extraction criteria. (Figure b)
- ☐ Select the fields names of the list.
- ☐ Select **C**opy in the **E**dit menu or click on
- ☐ Activate an empty cell in your spreadsheet (above or on the right hand of the data list) or in another worksheet of the workbook.
- ☐ Select **P**aste in the **E**dit menu or click on or

Criteria have to be entered above the fields they shall be affected to.

No empty row should be displayed in the criteria box.

Single criteria:

Example: To display, in a list, the records of all the companies based in NEW YORK,

- ☐ Activate the cell in the criteria box, immediately below the cell containing the field TOWN.
- ☐ Enter **NEW YORK**. (Figure c)

Multiple criteria with AND operator:

If you want to select the records corresponding to several criteria, you have to define these criteria in the same row.

Example: To display in the list, the records of all the companies based in NEW YORK to which a minimum 10% is discount is granted, (Figure)

	A	B	C	D	E	F	G	H	I
1	COMPANY	TOWN	ACTIVITY	ORDER					
2	AMBROIX	NEW YORK	INDUSTRY	6700					
3	Cie BERETTA	LOS ANGELES	INDUSTRY	12350					
4	INFORMATIC CENTER	LONDON		27800					
5	DDE	PARIS	ADMINISTRATION	160					
6	A.F.I.	MADRID		2450					
7	WAVE MARCKET	NEW YORK	INDUSTRY	17650					
8	SOIT & CIE	NEW YORK	SERVICES	24200					
9	A.V.A.	PARIS	SERVICES	8500					
10	DELGADO & CIE	MADRID		13400					
11	NET CAR	VALENCE	SERVICES	19800					
12	L.O. CAR	NEW YORK		340					
13	TOURING	MADRID	SERVICES	97350					
14	ISOLEST	LOS ANGELES	INDUSTRY	5300					
15	SOLECTOR	PARIS	INDUSTRY	11000					
16									
17									
18									
19									

- ☐ Enter **NEW YORK** in the cell immediately positioned below the field name TOWN.
- ☐ Enter **>=0,1** in the cell immediately below the name DISCOUNT.

If you want to define several criteria in the same field, this field should be displayed twice in the criteria box.

Example To display in the list, the records of the companies having ordered between 1000 and 2000 dollars (Figure),

- ☐ Define a criteria box containing the field ORDER twice.
- ☐ Enter **>1000** in the cell immediately above the first field name ORDER.
- ☐ Enter **<2000** in the cell immediately below the first field name ORDER.

Multiple criteria with OR operator:

If you want to select records corresponding to at least one criteria among several ones, these criteria have to be displayed in distinct rows .

Example 1 To display in the list, the records of the companies based in NEW YORK or based in LOS ANGELES (Figure),

- ☐ Enter **NEW YORK** in the cell immediately below the field name TOWN.
- ☐ Enter **LOS ANGELES** below NEW YORK.

Example 2 To display in the list, the records of the companies based in LONDON or in the country ENGLAND,

- ☐ Enter **LONDON** in the cell immediately below the name TOWN.
- ☐ Go the row below and enter **ENGLAND** below the field name COUNTRY.

Criteria including a "wildcard":

The "wildcard" ? and * are used to replace a character (?) or a group of characters (*) in an alphanumeric data.



Example: To display in the list, the records of the companies situated in a town whose name starts with L,

- ☐ Enter **L*** in the cell below the field name TOWN.

Computed criteria

If the extraction criteria has to refer to a comparison between several fields or to the result of an operation including several fields, this criteria does not have to appear under a field name, but in a particular column, belonging to the criteria box.

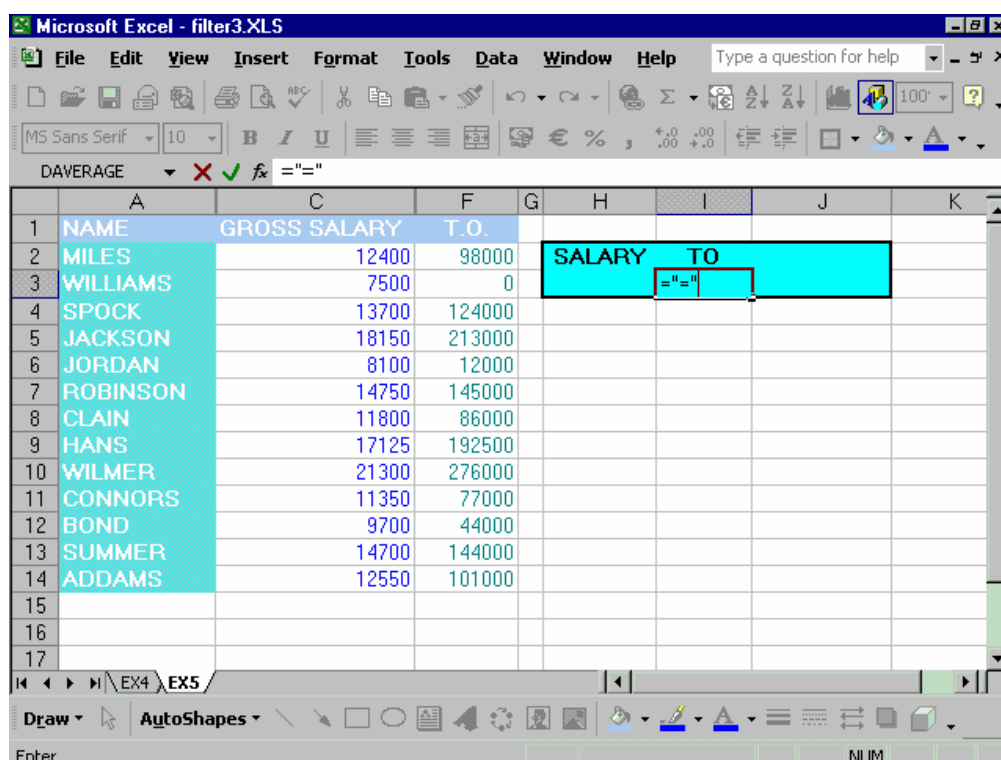
Example: To display in the "Personnel" list, the records of all the salesmen whose turnover is greater than 10 times their salary,

- ☐ In the criteria row, activate the column on the right of the last field.
- ☐ Press .
- ☐ Enter the reference of the cell corresponding to the T.O. field of the first record.
- ☐ Enter **>10***.
- ☐ Enter the reference of the cell corresponding to the field SALARY of the first row.
- ☐ Confirm with .

Empty or filled fields:

Example 1 : To display in the list, the records of all the companies of which the activity is unknown,

- ☐ Enter **"="** in the cell below the field name ACTIVITY. (Figure)



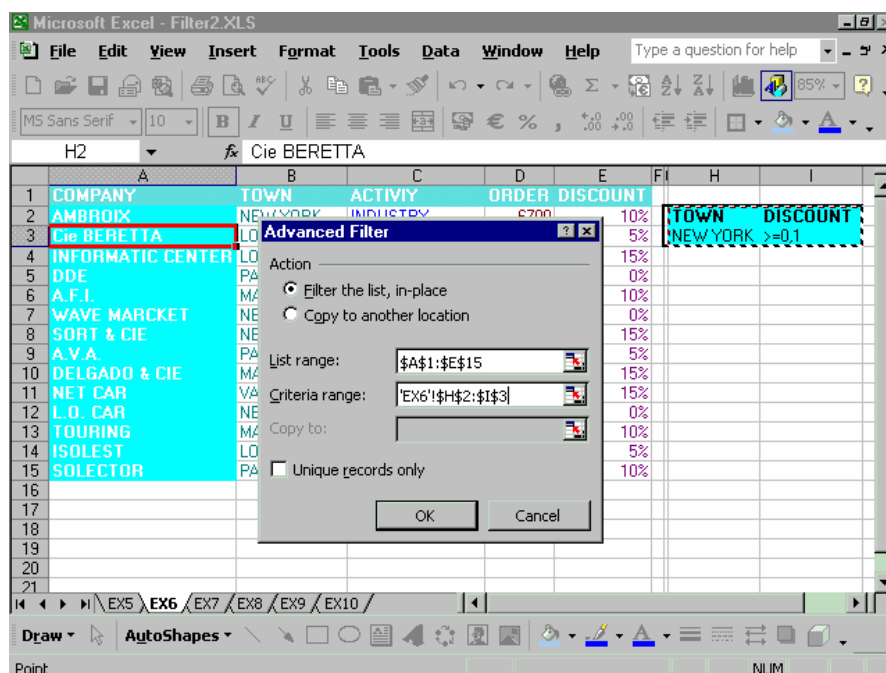
Example 2 : To display in the list, the records of all the companies of which the activity is known,

- ☐ Enter **"** in the cell below the field name ACTIVITY.

EXECUTE FILTER

Once the criteria have been defined, you can execute the filter.

- ☐ Activate one cell of the list.
- ☐ Select **Filter** in the **Data** menu.
A submenu appears.
- ☐ Select **Advanced Filter....** (Figure)
A dialog box appears. (Figure)
- ☐ In the **Action** area, select:
 - ☒ **Filter the list, in-place** to display only the records corresponding to the criteria in the list.
 - or
 - ☒ **Copy to another location** to execute an extraction, namely to create a new list containing only the records corresponding to the criteria.



- ☐ In the **List range**: area, Excel automatically selects your list. If it is not the case, click directly in the calculation sheet and select the list.
 - ☐ Activate **Criteria range**: and click in the calculation list or in the sheet containing the names of the copied fields and select the cells corresponding to the criteria box.
Your selection has to contain a row for the fields names and as many rows as defined criteria. **Do not include any blank row in the selection.**
If you have chosen to make an extraction,
 - ☐ Activate the **Copy to**: area and click in the calculation sheet and activate the cell in which the new list will be displayed.
 - ☐ Mark the box **Unique records only** if you do not want several identical rows to be displayed in the filtered list.
 - ☐ Confirm with .
- If you have chosen **Filter the list, in-place** the records which do not correspond to the criteria are hidden. To display all the records again:
- ☐ Select **Filter** in the **Data** menu.
 - ☐ Select **Show All** in the submenu.

Database Functions

GENERAL

The database functions **Database** enable to execute statistical calculations on the records of the list.

These calculations are automatically updated when you make change in the list or in the criteria box.

Syntax:

All **Database** functions use the same syntax:


Function_name(Database;Field;Criteria)

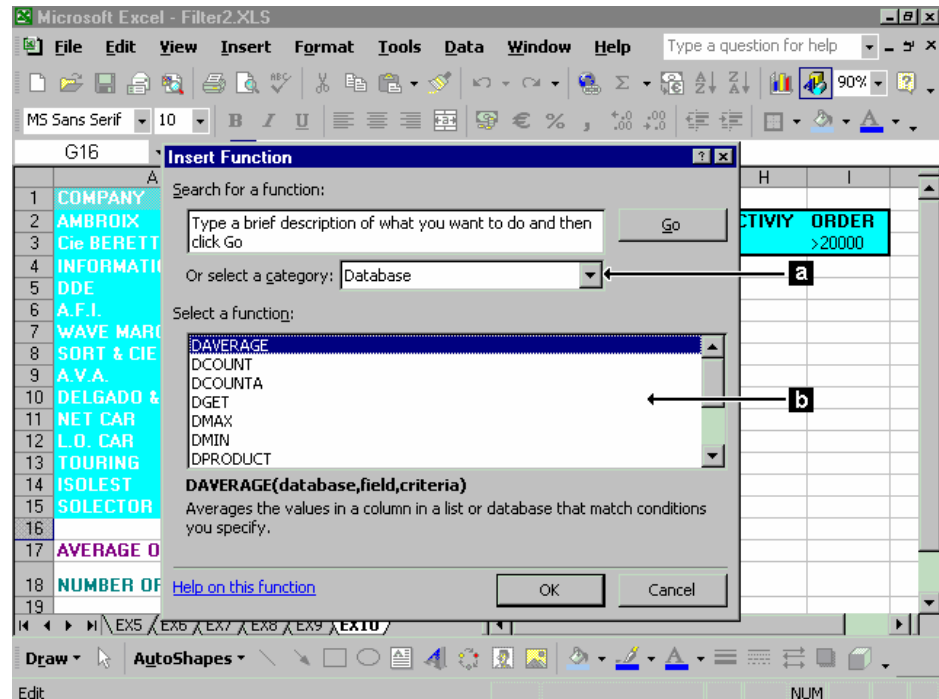
where **Database** stands for the whole lists, **Criteria** the group of cells representing the criteria box and **Field** the column of the list on which the statistical calculation should be executed.


ENTER A DATABASE FUNCTION

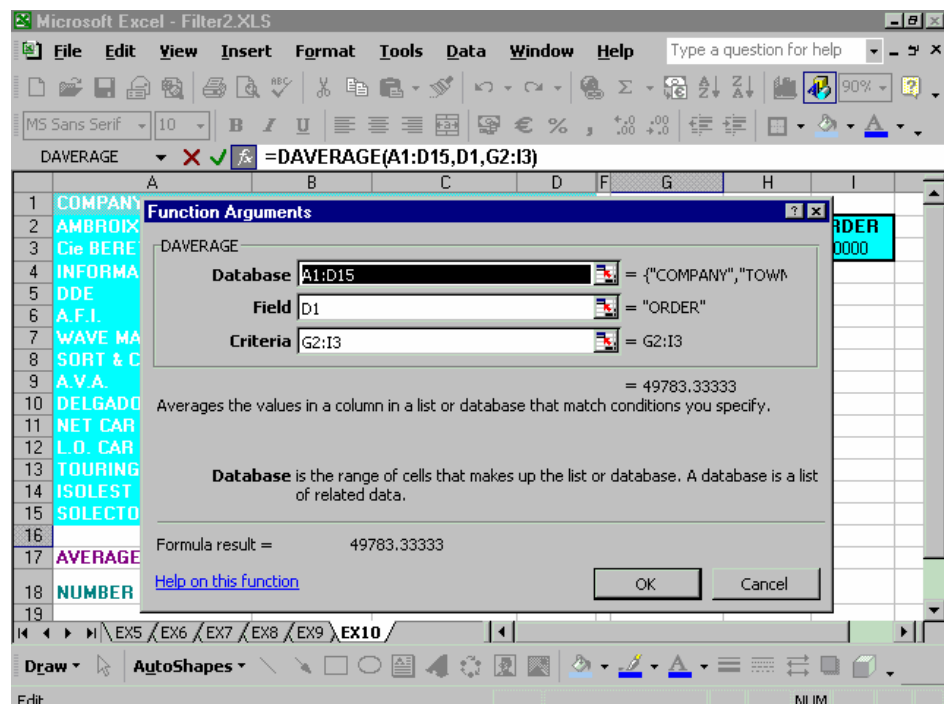
- ☐ Activate the cell where the function should be entered.
- ☐ Select **Function...** in the **Insert** menu.


or

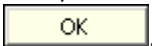
- ☐ Click on  in the formula bar.
A dialog box appears. (Figure)
- ☐ Select **Database** (Figure a) in the dropdown list or select the category in the **Or select a category:** area. (Figure b)



- ☐ Select the function in the list **Select a function:**.
- ☐ Select , a new dialog box appears. (Figure)



- ☐ Activate the **Database** area and click directly in the calculation sheet or use the button  and select the list you like.

- ☐ Activate the **Field** area and click in the calculation sheet on the name of the field on which the calculation should be executed.
- ☐ Activate the **Criteria** area and click in the calculation sheet and select the criteria box (see chapter **advanced filters**).
If there is no criteria box for this list, the **Criteria** area of the dialog box has to be filled anyway. In this case, select two empty cells of the same column.
- ☐ Select .

REMARK : The calculation takes into account the whole records meeting the criteria. To execute a statistic on all the records of the list, leave an empty row in the criteria box.

If you know the syntax of the database function, you can directly enter it in the cell without using the corresponding dialog box.

THE DIFFERENT FUNCTIONS

DSTDEV

Calculates the standard deviation of a population sample.

DSTDEVP

Calculates the standard deviation of an entire population.

DGET

This function returns the **field** value if only one record corresponds to the criteria. Otherwise, it returns the error value **#NUMBER!**.

DMAX

Calculates the highest value.

DMIN

Calculates the lowest value.

DAVERAGE

Calculates the average of the data of records corresponding to the criteria.

DCOUNT

Calculates the number of records meeting the criteria.

DCOUNTA

Calculates the number of records meeting the criteria which **field** is not empty.

DPRODUCT

Multiplies the values of the **field** of the record meeting the criteria.

DSUM

Sums up the values of the **field** of the record meeting the criteria.

DVAR

Calculates the variation of a population sample.

DVARP

Calculates the variation of an entire population.

AUTOMATIC SUBTOTALS

GENERAL

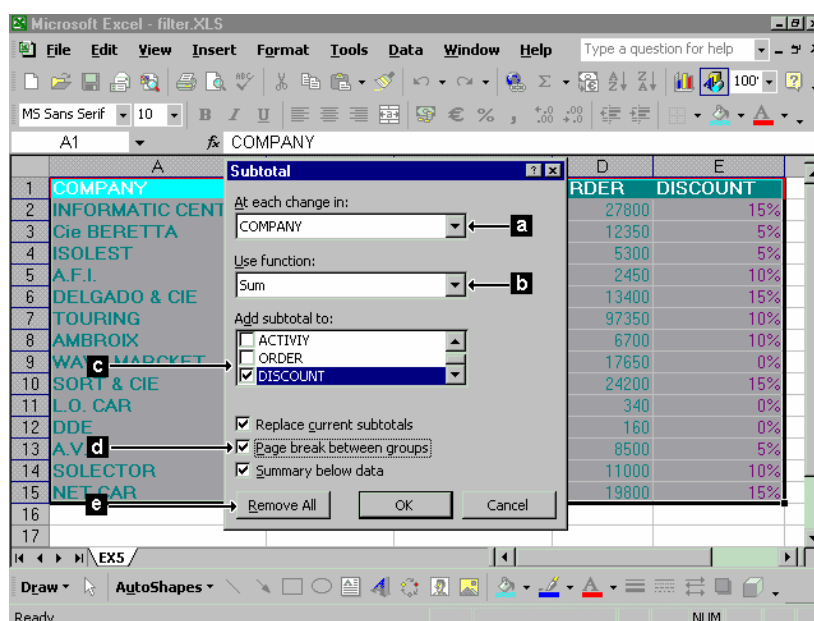
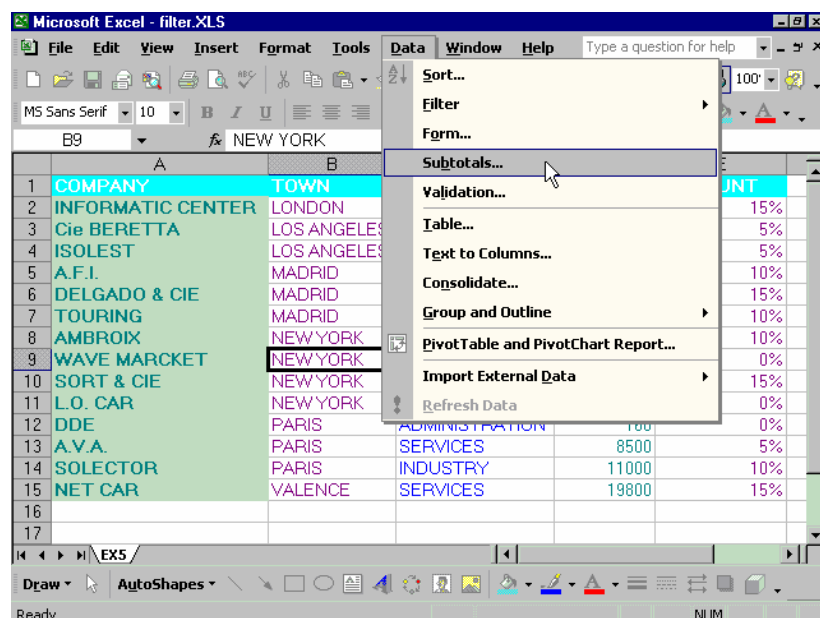
By using automatic subtotals, you can split up data groups in your list and insert statistical functions. You can insert subtotals in a list sorted before, or you can sort a list including subtotals. When you

ask subtotals to be inserted, Excel automatically creates an outline which makes the manipulation of the list easier. **CREATE** Before inserting subtotals, you have to sort the list by using the field on which the grouping should be executed as a sort key.

☐ Activate a cell of the list.

☐ Select **Subtotals...** in the **Data** menu. (Figure)

A dialog box appears. (Figure)



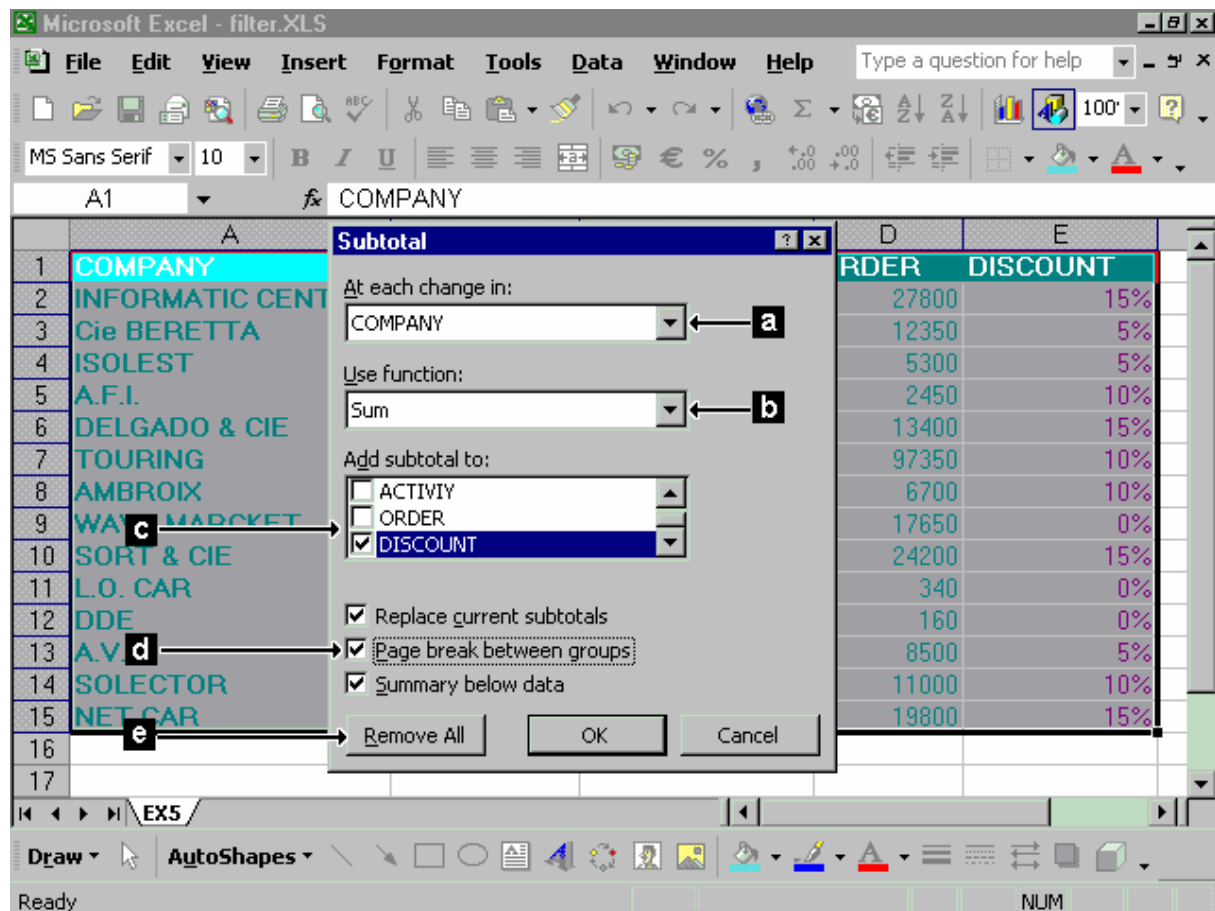
☐ In the dropdown list **At each change in:**, select the field to be subtotaled. (Figure a)

☐ In the list **Use function:**, select one of the 11 functions. (Figure b)

☐ In the **Add subtotal to:** area, mark the boxes corresponding to the fields for which you want to display the subtotals. (Figure c)

☐ If there are already subtotals, mark the box **Replace current subtotals** to delete the previous functions and replace them by the new ones, or unmark the box to add the new functions to the existing ones.

☐ Mark the box **Page break between groups** to print every group on a separate page. (Figure d)



- ☐ Mark the box **Summary below data** to display the subtotals below each group or unmark it to display the subtotals above the data groups.
- ☐ Confirm with **OK**. DELETE To delete subtotals,
- ☐ Activate a cell of the list.
- ☐ Select **Subtotals...** in the **Data** menu. A dialog box appears.
- ☐ Select **Remove All**. (Figure e)

Pivot Tables

Pivot tables are data analysis tools.

On the basis of a list, you can perform statistics sorted by categories by using pivot tables. Pivot tables are updated automatically when the list they depend on is modified.

A pivot table does not modify your list but uses its elements to build a new worksheet.

Example: You have created a list of marketing follow-up including the following fields:

NAME (Name of the salesrep)
 REGION (Regional sales office the salesrep belongs to)
 YEAR OF ENTRY
 LEVEL OF STUDY
 T.O. (Turnover)

To analyse the sales activity of the different regions, you want to create:

- a table showing the turnover (T.O.) classified by region and by education. (Figure)
- a table showing the average turnover (T.O.) by region and by year of entry. (Figure)
- a table showing the number of salesrep whose T.O. is higher than a certain amount, classified by education level.

You can get all these elements very quickly by using pivot tables.

Microsoft Excel - pivotTable.XLS

Sum of T.O.	LEVEL OF STUDY						
REGION	BACHELOR'S DEGREE	ENGINEER	HIGH SCHOOL	LICENCIATE	Total		
CALIFORNIA	124000	276000			400000		
MICHIGAN	124000	276000	101000		501000		
MISSISSIPPI				443000	443000		
MISSOURI	142000		12000		154000		
NEVADA	192500		222000	357000	771500		
OHIO			434000		434000		
TEXAS	334500		113000	86000	533500		
Total	917000	552000	882000	886000	3237000		

Microsoft Excel - pivotTable.XLS

Average of T.O.	YEAR OF ENTRY											
REGION	1989	1989	1990	1990	1990	1990	1991	1991	1991	1991	1991	1991
CALIFORNIA	124000	276000										
MICHIGAN	124000	276000	101000									
MISSISSIPPI							144000	213000				
MISSOURI			98000		12000					44000		
NEVADA						145000	192500	144000	213000			
OHIO						145000	212000					
TEXAS			98000	101000	12000		192500			44000		
Total	124000	276000	98000	101000	12000	145000	199000	144000	213000	44000		0

Excel can create a pivot table on the basis of data from various sources, especially out of external applications.

We will, however focus on pivot tables using data out of Excel sheets organized as a list, exclusively.

To create a pivot table,

☐ Open the sheet containing the list with which the pivot table should be created.

☐ Activate a cell of the list.

☐ Select **PivotTable and PivotChart Report...** in the **Data** menu.

The wizard **PivotTable and PivotChart Wizard** starts.

It consists of several dialog boxes which helps you step by step for the creation of pivot table.

A button bar is displayed at the bottom of each dialog box during all the creation procedure.

☐ Select:

Cancel
< Back

to interrupt the creation procedure.

to get back to the previous step.

Microsoft EXCEL (Advanced)

By: <http://emrause.blogspot.com>

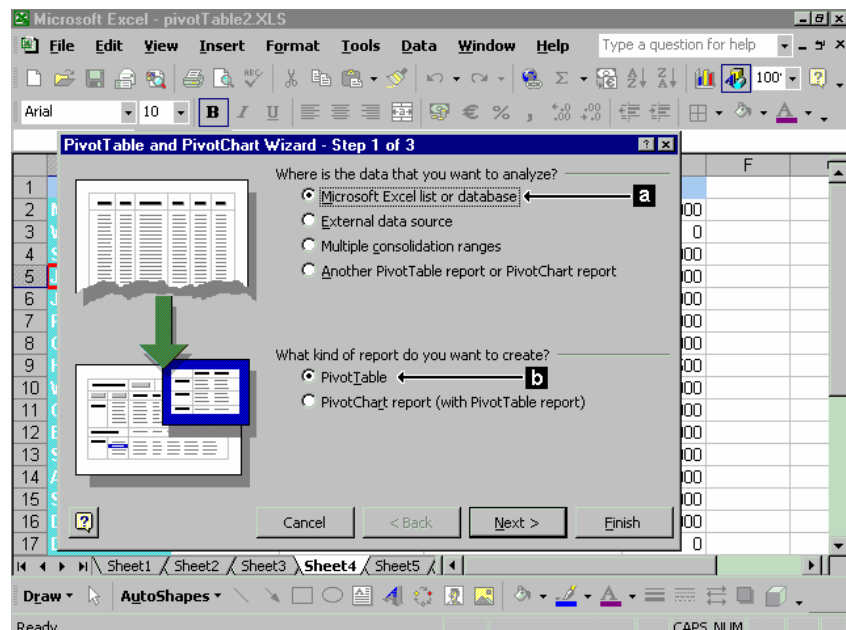
Next >

Finish

to confirm the current step and go to the next one.

to start the table conception.

Step n° 1 (Figure)



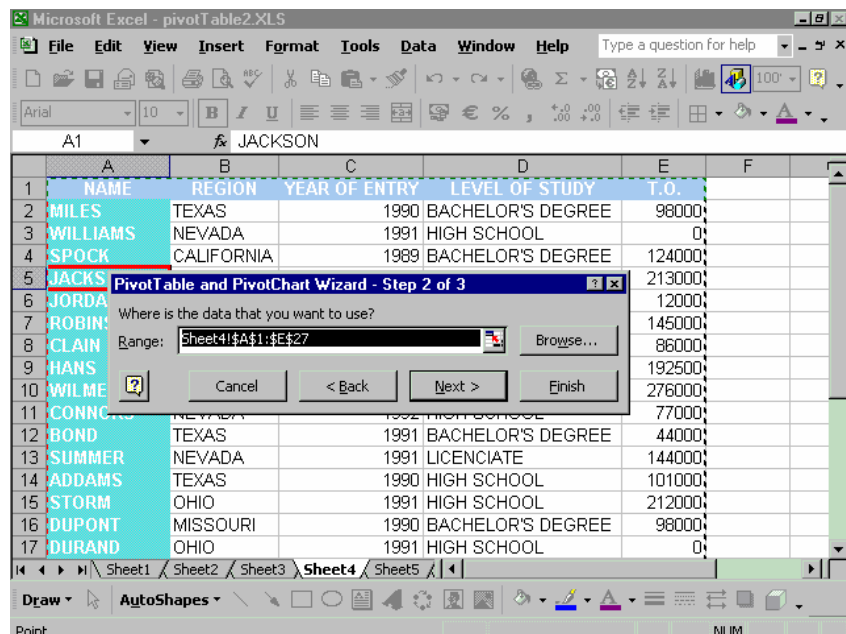
☐ Select Microsoft Excel list or database. (Figure a)

☐ Make sure that PivotTable is marked. (Figure b)

☐ Select Next >.

You can also create a pivot table by using external data but we will only deal with Excel data.

Step n° 2 (Figure)

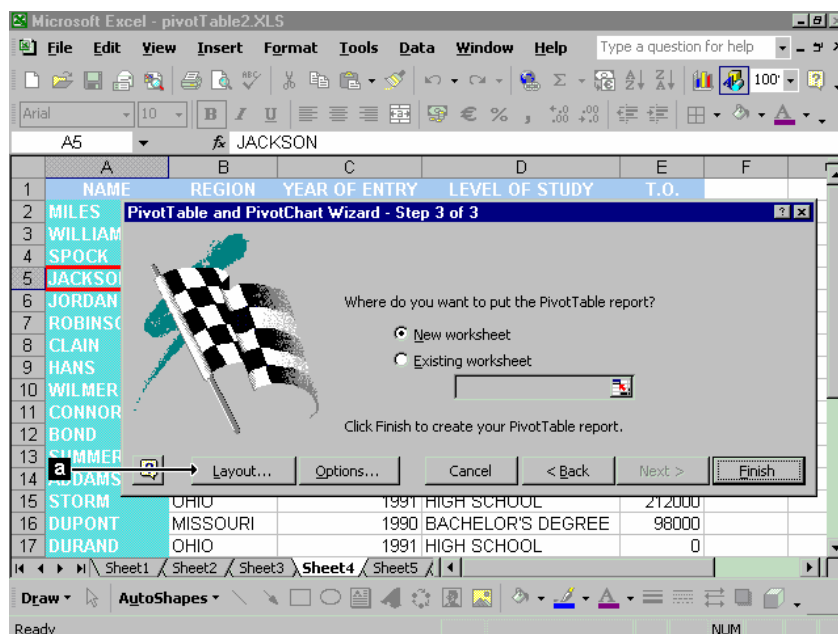


Excel automatically detects the list and displays the references of the cell range.

☐ If necessary, modify them by clicking directly in the calculation sheet to select the concerned cells.

☐ Select Next >.

Step n°3 (Figure)



- In the **Where do you want to put the PivotTable report?** area, select the location of the pivot table. It can be an area of the calculation sheet from which the data are extracted, another sheet of the same workbook or another workbook.

By default, Excel uses a new sheet of the same worksheet.

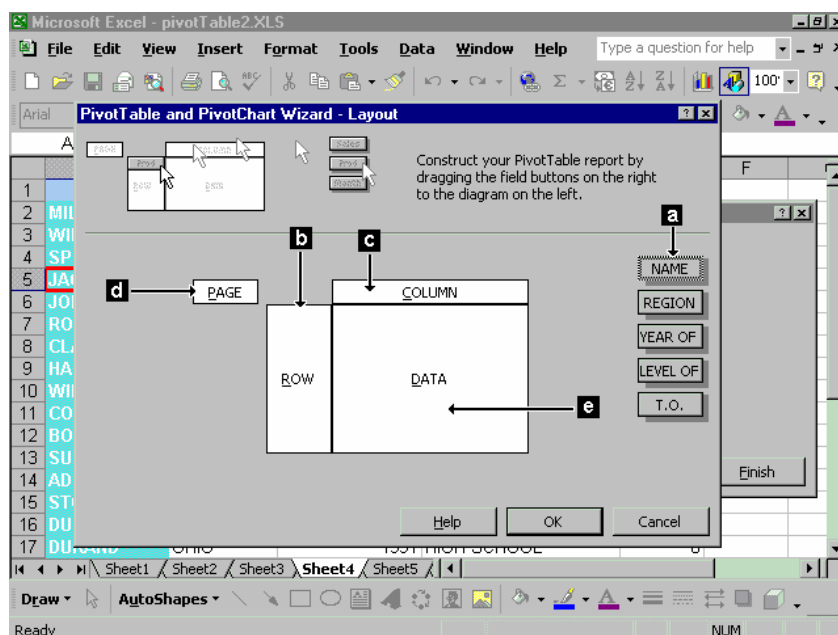
Define the parameters of the pivot table:

- Click on **Layout...**. (Figure a)

A next dialog box appears. (Figure)

Each field of the list appears as a button on the right side of the dialog box. On the left, an illustration represents the future pivot table.

To define row categories,



- Click on the button of the concerned field. (Figure a)
- Drag it to the **ROW** area. (Figure b)

- ☐ Repeat the operation for every field you want to use as a row category.

To define column category,

- ☐ Click on the button of the concerned field and drag it to the **COLUMN** area. (Figure c)
- ☐ Repeat the operation for all other fields you want to use as column category.

To define page category (optional),

- ☐ Click on the button of the concerned field and drag it to the **PAGE** area. (Figure d)
If you use the **PAGE** area, the pivot table will display the data of one element at the same time of the selected field.

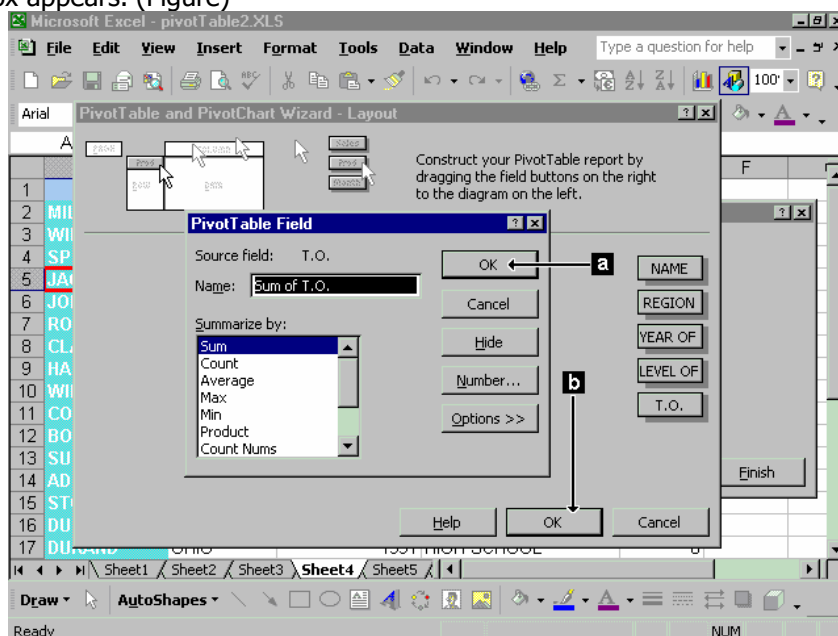
To define the data fields,

- ☐ Click on the button of the concerned field and drag it to the **DATA** area. (Figure e)
By default, the wizard will suggest the sum of all values of the concerned records for numeric fields or the number of records for the alphanumeric fields.

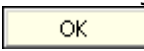
If you want to use another function (average, maximum, etc.),

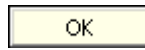
- ☐ Double-click on the button of the field in the **DATA** area.

A new dialog box appears. (Figure)

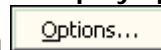
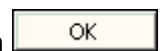



- ☐ In the list **Summarize by**:, select a function.

- ☐ Confirm with . (Figure a)

- ☐ Confirm with . (Figure b)

To define the display options:

- ☐ Click on .
- ☐ Select the display options and confirm with .
- ☐ Select .

Excel creates and displays the pivot table (Figure). The **PivotTable** toolbar appears along with a window **PivotTable Field List** if the active cell is in the pivot table. According to the complexity of the data to be operated and the number of records, the calculation step lasts more or less long.

REGION	LEVEL OF STUDY	YEAR OF ENTRY	Total
BACHELOR'S DEGREE	ENGINEER	1989	248000
BACHELOR'S DEGREE	ENGINEER	1989	552000
BACHELOR'S DEGREE	ENGINEER	1990	196000
BACHELOR'S DEGREE	ENGINEER	1990	202000
BACHELOR'S DEGREE	ENGINEER	1990	24000
BACHELOR'S DEGREE	ENGINEER	1990	290000
BACHELOR'S DEGREE	ENGINEER	1991	385000
BACHELOR'S DEGREE	ENGINEER	1991	212000
BACHELOR'S DEGREE	ENGINEER	1991	288000
BACHELOR'S DEGREE	ENGINEER	1991	426000
BACHELOR'S DEGREE	ENGINEER	1991	88000
BACHELOR'S DEGREE	ENGINEER	1991	0
BACHELOR'S DEGREE	ENGINEER	1991	172000

a Page field

Only the data corresponding to an element selected in the dropdown list are displayed in the pivot table.

b Field button

A field is the summary of information issued of the data source. Dragging a field button to a new area of the pivot table will be enough to organize the data differently.

c Element

An element is a subcategory of a field. Every element is displayed as a text box by row or by column, or in the list of the page field.

d Data of an element

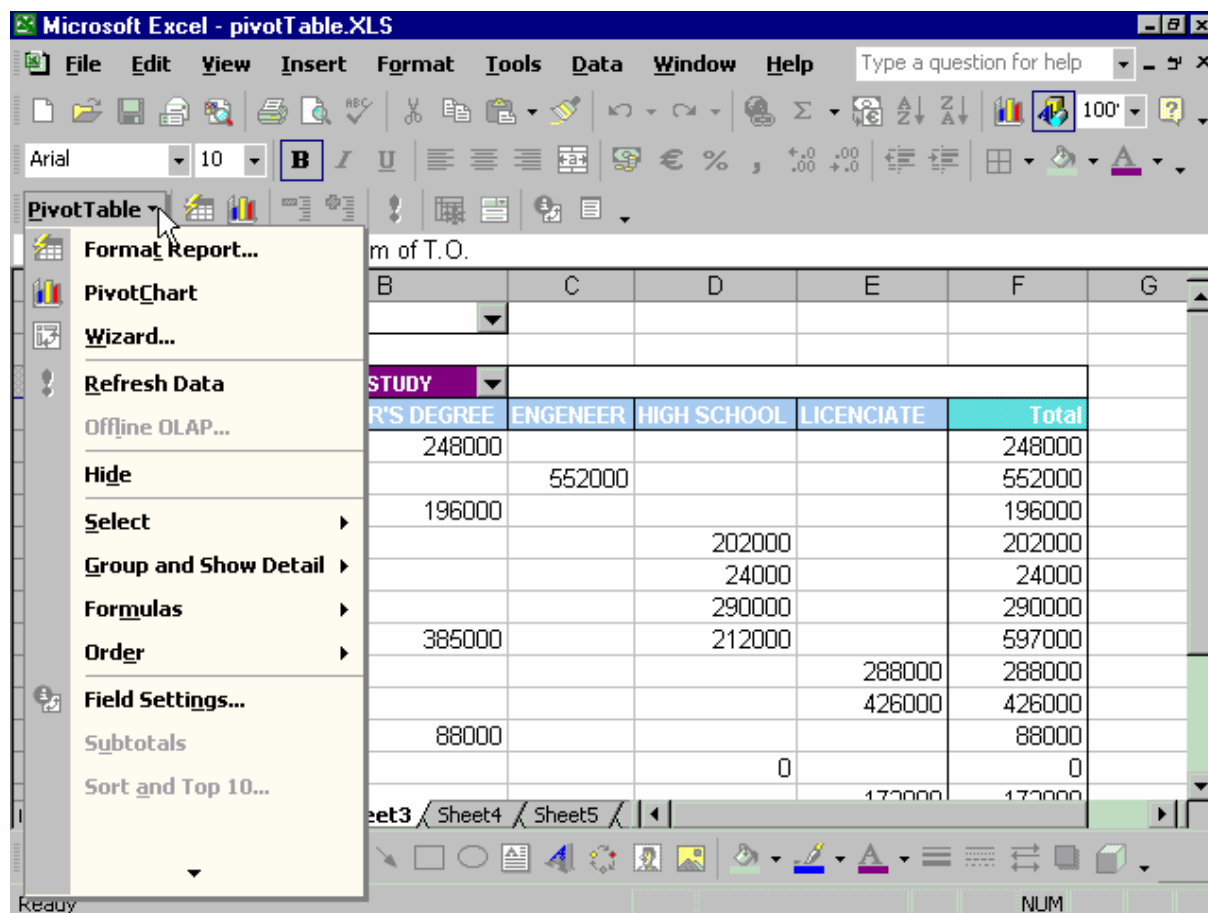
The data of an element form the detail by row or by column of a field element.

e Summary data

They represent a summary of the data by using the functions SUM, AVERAGE, COUNT... or your own calculations.

When you create a pivot table, a new toolbar appears. It consists of the following buttons:

PivotTable	Pivot table menu. (Figure)
	Displays a dialog box containing automatic formats for the pivot table.
	Creates a pivot chart.
	Hides the detail rows or columns.
	Displays the details rows or columns.
	Executes the updating of the pivot table.
	Includes the hidden elements in the subtotals.
	Activates / deactivates the original display of the data.
	Displays the Pivot table Field dialog box. Its content depends on the active cell.
	Displays / hides the fields list. (Figure)



To modify the properties of the pivot table,

- ☐ Position the active cell in the pivot table.

By using the wizard:

- ☐ Click on **PivotTable** in the toolbar and select **Wizard...**
- or
- ☐ Select **PivotTable and PivotChart Report...** in the **Data** menu.


The wizard **PivotTable and PivotChart Wizard** starts.

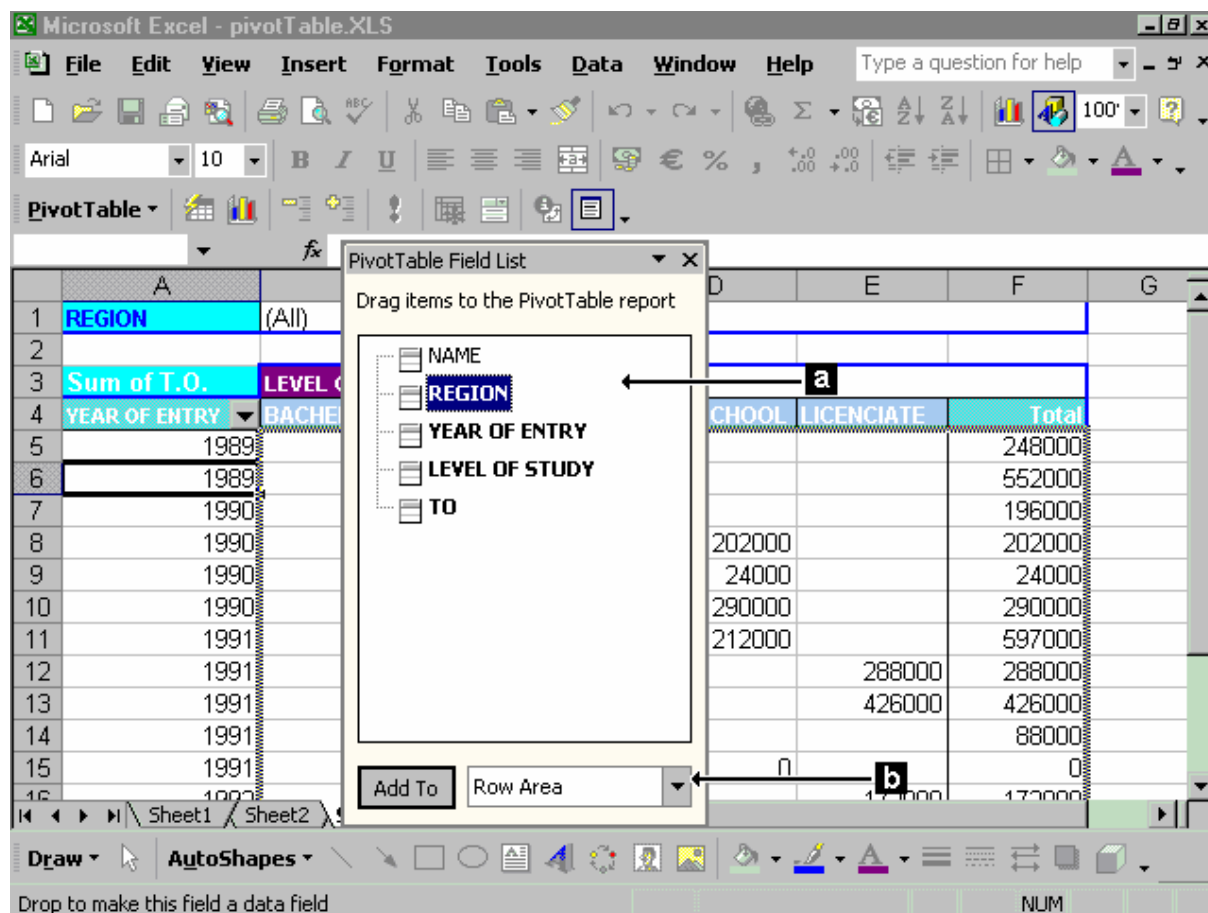
- ☐ Use the same procedure as for the creation.

By using the PivotTable Field List window:

This window enables to add a field in the pivot table without using the wizard.

To do so,

- ☐ Click on  to display the window if not already displayed.
- ☐ Click on one cell of the pivot table to display the window **PivotTable Field List** if not already the case.
- ☐ Drag the button corresponding to the field toward the pivot table in the area that you like (column, row, data page).
- or
- ☐ Click on the button corresponding to the field to be added in the window. (Figure a)
- ☐ In the dropdown list, select the area to which you want to add the field. (Figure b)
- ☐ Click on **Add To**.

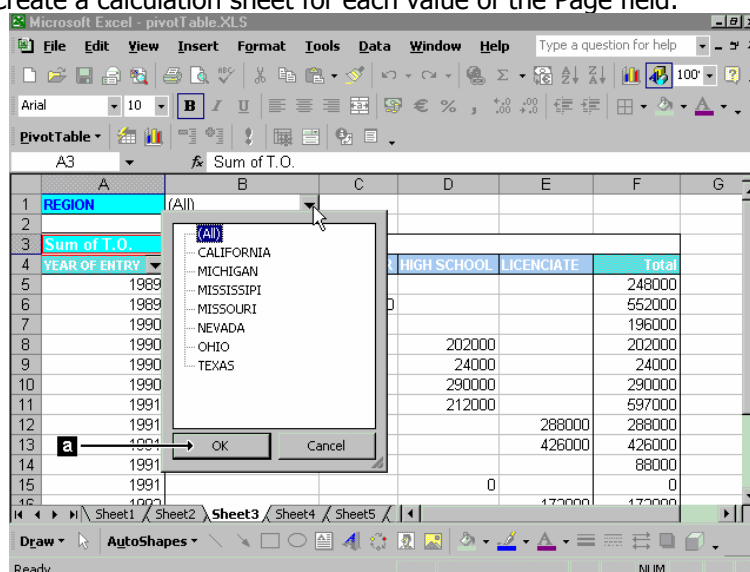


When you define a Page field, a dropdown list appears at the top of the pivot table, on the right of the Page field.

☐ To limit the calculations of the pivot table to the data corresponding to a value, select the value in this list. (Figure) or

☐ Select **(All)** to take the whole list into account.

☐ Click on **OK**. (Figure a) Create a calculation sheet for each value of the Page field:

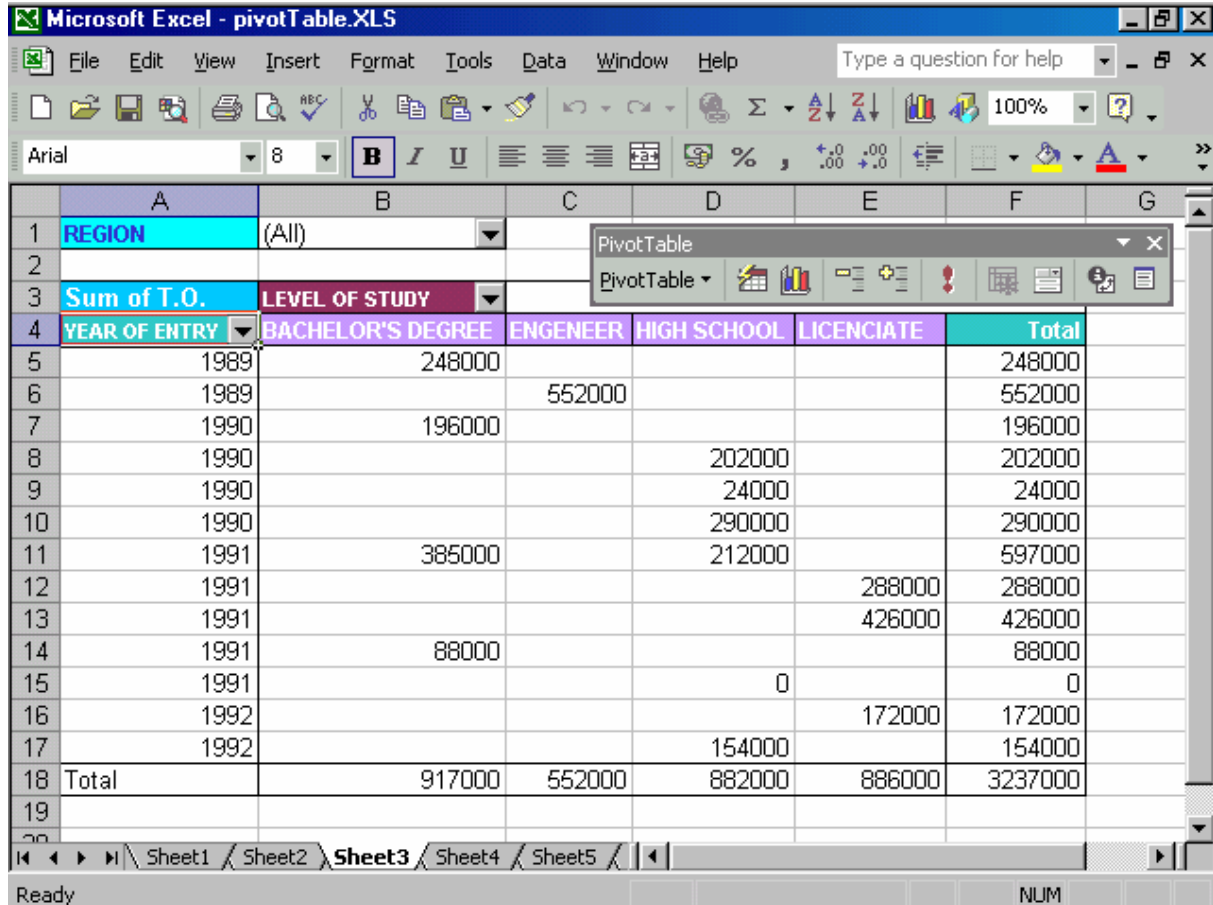


☐ Select **(All)** in the dropdown list of the Page field.

☐ Click on **PivotTable** in the PivotTable toolbar and select **Show Pages...** in the list.

☐ In the dialog box, select the concerned field and confirm with .

EXCEL generates a pivot table for each calculation sheet including only the data of an element of the Page field. Each sheet has the name of the element.



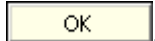
REGION	(All)					
Sum of T.O.	LEVEL OF STUDY					
YEAR OF ENTRY	BACHELOR'S DEGREE	ENGINEER	HIGH SCHOOL	LICENCIATE	Total	
1989	248000				248000	
1989		552000			552000	
1990	196000				196000	
1990			202000		202000	
1990			24000		24000	
1990			290000		290000	
1991	385000		212000		597000	
1991				288000	288000	
1991				426000	426000	
1991	88000				88000	
1991			0		0	
1992				172000	172000	
1992			154000		154000	
Total	917000	552000	882000	886000	3237000	

A pivot table represents the values by categories. You can find at the intersection of a row category and a column category, either the number of concerned records, either a calculation on the values of these records but the details of the concerned records are not displayed.

To know, by the combination of categories, the list of the records:

☐ Double-click on the cell corresponding to the concerned categories.

☐ Select in the dialog box, the field of which the detail is to be displayed and confirm with

.

The pivot charts

The pivot charts enable you to represent a pivot table in the shape of a chart. Create a pivot chart from the list mode:

☐ Position the active cell in the list from which the pivot chart should be created.

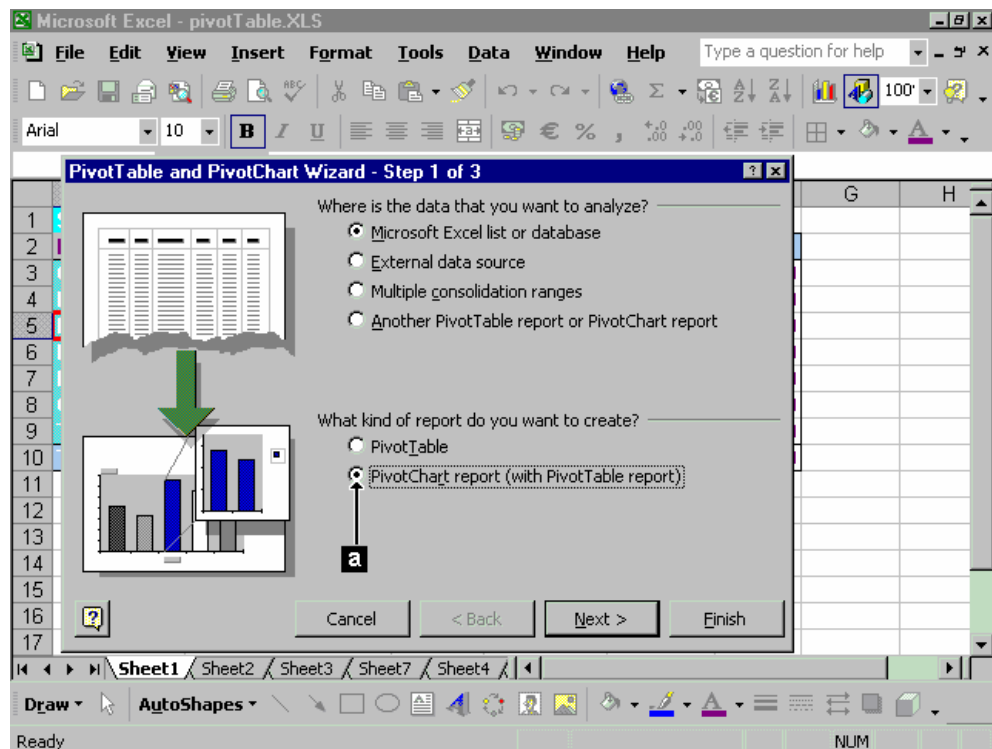
☐ Select **PivotTable and PivotChart Report...** in the **Data** menu.

The wizard **PivotTable and PivotChart Wizard** starts.

☐ In the **What kind of report do you want to create?** area, select **PivotChart report (with PivotTable report)**. (Figure a)

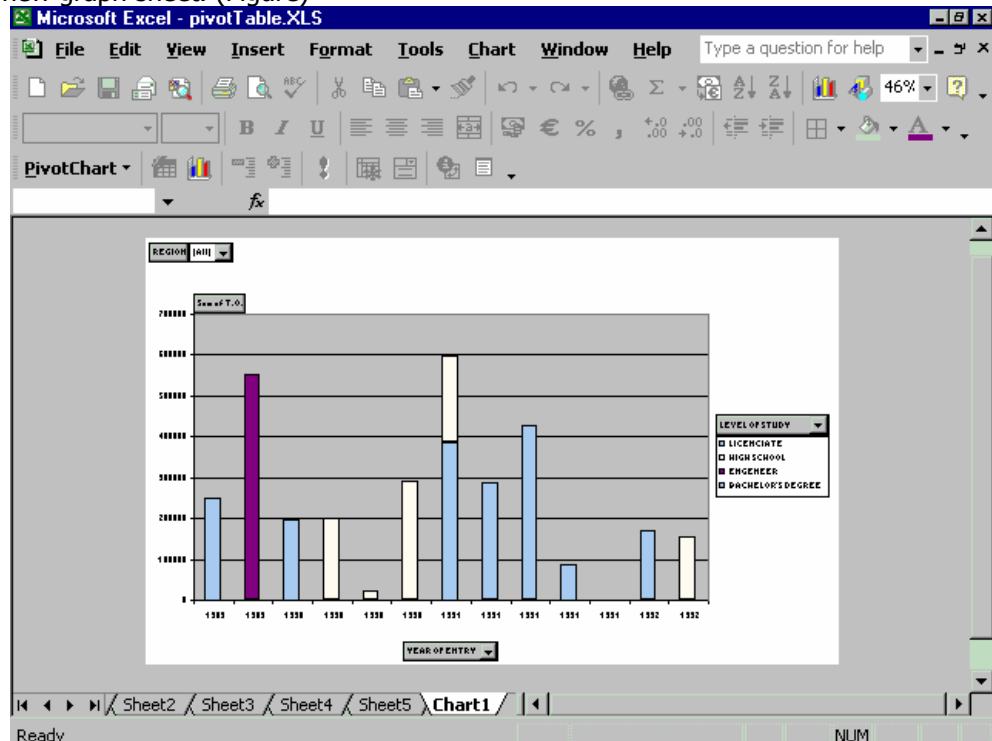
☐ Use the same procedure as for the creation of a pivot table. Create a pivot chart from a pivot table:

☐ Activate the sheet containing the pivot table.



□ Click on  in the **PivotTable** toolbar.

Excel generates a new graph sheet. (Figure)



The pivot table and chart are dependent on each other. Indeed, if you modify the chart, the table is modified accordingly and vice versa. Modify the display of a pivot chart:
You can modify a pivot chart as any other Excel chart.

☐ Use the menus **Format** et **Chart** to define the different properties of the graph (colour, size, form, title, chart type, ...).

Data tables

Data tables enable to make simulations on the result of a formula.

A data table consists of a table indicating the result of a formula according to the value of a parameter (single entry table) or 2 parameters (double entry table).

To create a data table, you have to define:

- ☐ A formula.
- ☐ A list of values (in row or in column) to be used as formula parameters.

Example:

You are looking for a salary method for a group of salesmen.

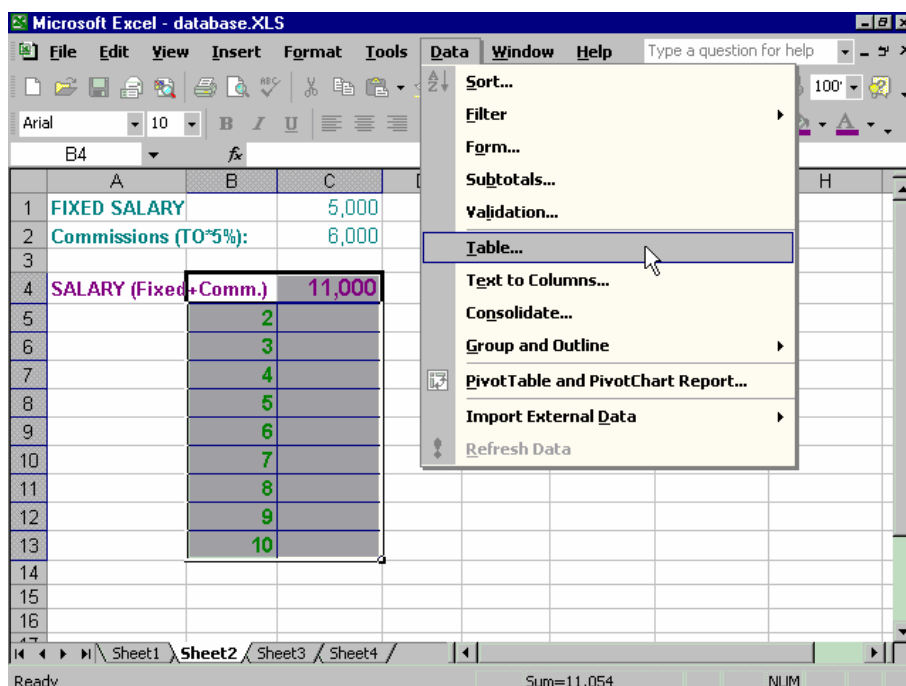
This salary has to consist of a fix part and a percentage of commissions on the sales.

Before defining the percentage, you want it to vary and observe its influence on the total amount of the salary.

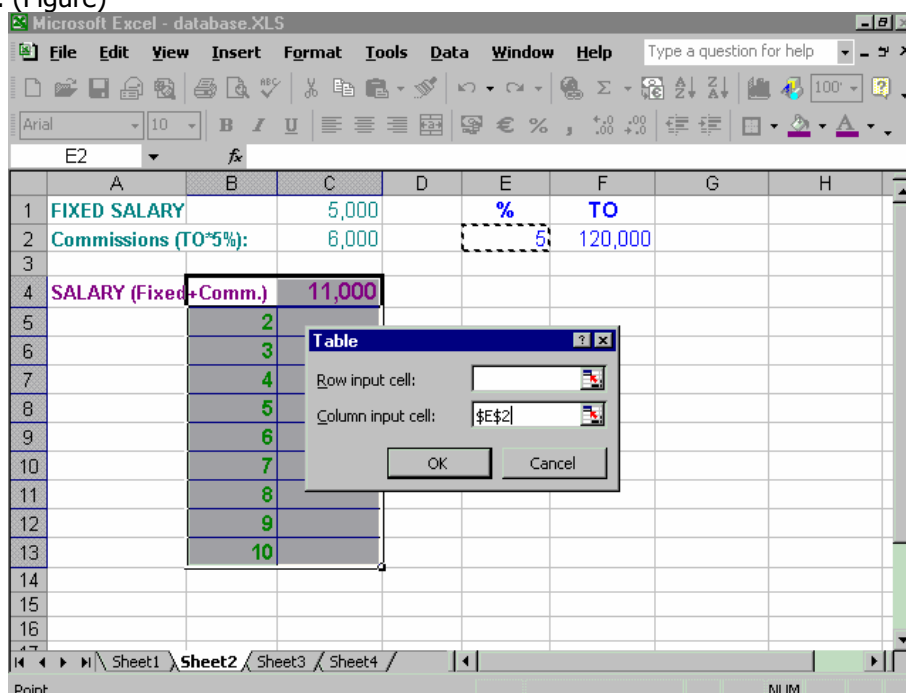
To do so, you can use a single entry table. (Figure)

	A	B	C	D	E	F	G	H
1	FIXED SALARY		5,000		%	TO		
2	Commissions (TO*5%):		6,000		5	120,000		
3								
4	SALARY (Fixed+Comm.)		11,000					
5		2	7,400					
6		3	8,600					
7		4	9,800					
8		5	11,000					
9		6	12,200					
10		7	13,400					
11		8	14,600					
12		9	15,800					
13		10	17,000					
14								
15								
16								

- ☐ Define the formula by taking a example value for the percentage of the commission.
In our example, the salary (C4) correspond to the sum of the fix part (C1) and commissions (C2), which are calculated following the formula: T.O. (F2) X RATE(E2) / 100.
- ☐ In the cells below the salary, enter a list of values corresponding to the possible commission percentages.
- ☐ Select a group of cells containing the formula (C4) and the list of the values to be substituted to the percentage taken as an example. In our example, the range B4:C13.
- ☐ Select **Table...** in the **Data** menu. (Figure)



A dialog box appears. (Figure)



- ☐ Activate the **C**olumn **i**nterface: area.
 - ☐ Click in the calculation sheet on the value taken as an example for the percentages (E2).
 - ☐ Confirm with .
- Beneath every percentage of the list, a value corresponding to the result of the formula by using the respective percentage is shown.

Tables with single entry by rows:

In our example, the entry values are shown by column.

We could also have shown them by row.

In this case, we would have used the **R**ow **i**nterface: area of the **T**able dialog box.

Double entry tables use the same principle as the single entry tables. However, they enable you to

vary 2 parameters of one formula.

Example:

You are looking for a salary method for a group of salesmen consisting of a fix part and a commission calculated on the basis of 5% of sales.

You want to visualize the obtained salary depending on two parameters:

- ☐ The amount of the fix salary.
- ☐ The amount of sales.

To do so, you can use a double entry table. (Figure)

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File Edit View Insert Format Tools Data Window Help

Type a question for help

Arial 11

C2 =F2*0.05

	A	B	C	D	E	F	G
1	FIXED SALARY		7,000				
2	Commissions (TO*5%):		5,000		TO	100,000	
3							
4	SALARY (Fixed+Comm.)		12,000	5,000	6,000	7,000	8,000
5			60,000	8,000	9,000	10,000	11,000
6			70,000	8,500	9,500	10,500	11,500
7			80,000	9,000	10,000	11,000	12,000
8			90,000	9,500	10,500	11,500	12,500
9			100,000	10,000	11,000	12,000	13,000
10			110,000	10,500	11,500	12,500	13,500
11			120,000	11,000	12,000	13,000	14,000
12			130,000	11,500	12,500	13,500	14,500
13			140,000	12,000	13,000	14,000	15,000
14			150,000	12,500	13,500	14,500	15,500
15			160,000	13,000	14,000	15,000	16,000
16			170,000	13,500	14,500	15,500	16,500
17			180,000	14,000	15,000	16,000	17,000
18							

Ready NUM

☐ Define the formula by taking example values for the fix amount and the amount of sales (T.O.).

In our example, the salary (C4) corresponds to the sum of the Fix (C1) and commissions (C2) (Figure), which are calculated according to the formula: T.O. (F2) X 5%.

Microsoft Excel - database.XLS

File Edit View Insert Format Tools Data Window Help

Type a question for help

Arial 10

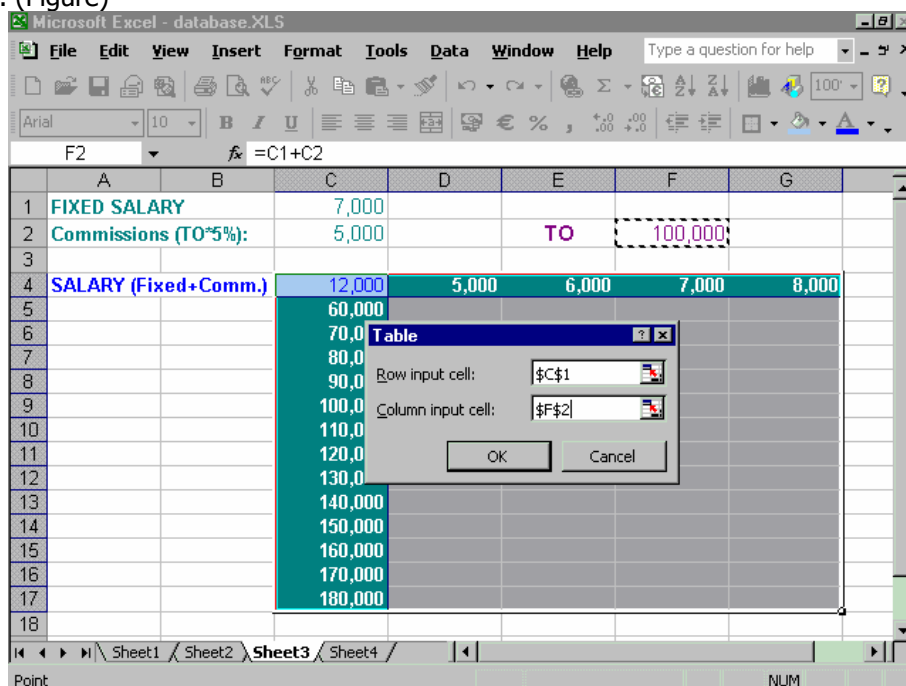
C4 =C1+C2

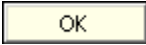
	A	B	C	D	E	F	G
1	FIXED SALARY		7,000				
2	Commissions (TO*5%):		5,000		TO	100,000	
3							
4	SALARY (Fixed+Comm.)		12,000	5,000	6,000	7,000	8,000
5			60,000				
6			70,000				
7			80,000				
8			90,000				
9			100,000				
10			110,000				
11			120,000				
12			130,000				
13			140,000				
14			150,000				
15			160,000				
16			170,000				
17			180,000				
18							

Ready NUM

☐ In the cells below the salary, enter a list of values corresponding to the different possible sales amounts.


- ☐ In the cells on the right of the salary, enter a list of values corresponding to the possible fix amounts of the salary.
- ☐ Select a group of cells containing the formula (C4) and the list of the entered values. In our example, the range C4:G17.
- ☐ Select **Table...** in the **Data** menu.
A dialog box appears. (Figure)



- ☐ Activate the **Row input cell:** area.
- ☐ Click in the calculation sheet on the value taken as an example for the fix amount (C1).
- ☐ Activate the **Column input cell:** area.
- ☐ Click in the calculation sheet on the value taken for example for the amount of the turnover T.O. (F2). (Figure)
- ☐ Click on .
A list of values is displayed.

At the intersection of every value entered by row (fix amount) and the values entered by column (sales amount.), you can see the result of the formula (salary) corresponding to these two parameters.

You can not delete the answer values of a data table one by one. They all have to be deleted in a single operation.

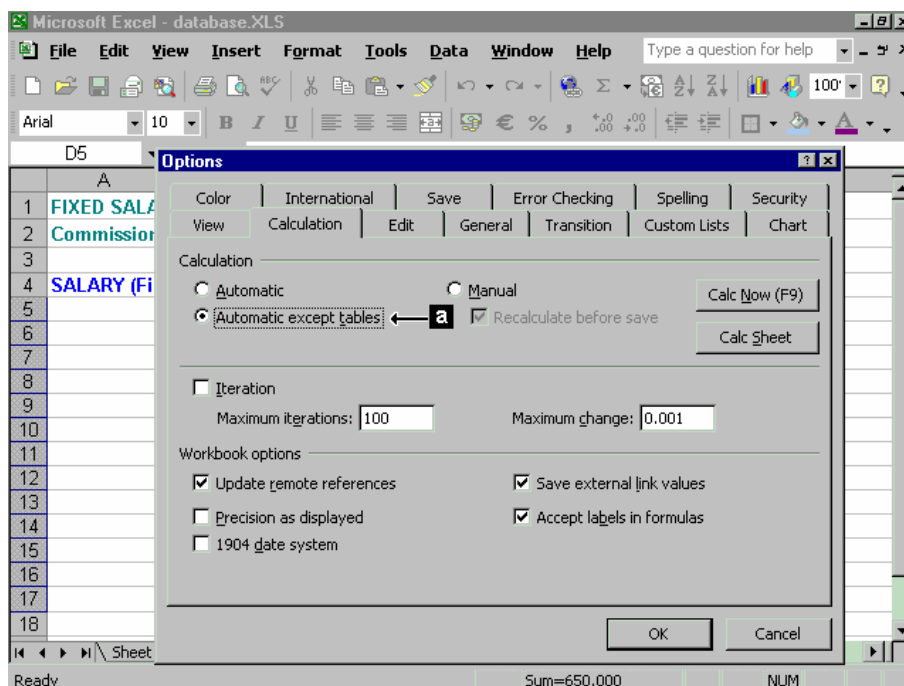
- ☐ Select all the cells corresponding to the answer values of the data table. (Figure)
- ☐ Press .

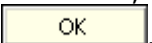
A table with single or double entry is automatically updated. If you modify one entry value, the corresponding answer values are re-evaluated consequently. However, this systematic recalculation of the whole table after every modification in the calculation sheet can take quite long time when the tables are huge.


To deactivate the automatic recalculation of the tables,

- ☐ Select **Options...** in the **Tools** menu.

A dialog box appears.



- ☐ Activate the card **Calculation**. (Figure)
- ☐ In the **Calculation** area, select **Automatic except tables**. (Figure a)
- ☐ Confirm with .

The automatic recalculation is deactivated. However, the table will be recalculated whenever you press .


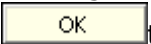
The Goal Seek

GENERAL

The Goal seek command enables to find out the component of a formula which result you know. Excel successively tests several values for the variable component of the formula until it finds the appropriated result.

USE

Define the different elements of the formula by using any value for the variable element of the formula

- ☐ Select **Goal Seek...** in the **Tools** menu, a dialog box appears.
 - ☐ Activate the a **Set cell:** area.
 - ☐ Click in the calculation sheet on the cell corresponding to the result of the formula.
 - ☐ Activate the **To value:** area.
 - ☐ Select the value you like as the result of the formula.
 - ☐ Activate the **By changing cell:** area.
 - ☐ Click on the cell corresponding to the variable element of the formula. This cell has to contain a value or be empty but can not contain a formula.
 - ☐ Confirm with .
 - Excel is looking for the goal value and displays the **Goal Seek Status** dialog box.
 - ☐ Select  to accept the result.
- or

- ☐ Select **Cancel** to restore the original values.

Example: A quote has been damaged and you can not read the price per unit of the first item.

- ☐ Rebuild the quote by using the known values and by recreating the formulas without taking care of their result. (Figure)

QUOTATION				
	QTY	Unit price	Amount excluding taxes	
Peanuts	9		0.00	
Cashewnuts	24	32.50	780.00	
Pistachio-nuts	17	48.10	817.70	
Pizza	29	8.30	240.70	
Sausage	41	24.50	1004.50	
Saucisson	20	28.90	578.00	
Blood-sausage	49	17.00	833.00	
TOTAL EXCLIDING TAXE			4253.90	
Amount of VAT			876.30	
TOTAL TAXE INCLUDED			5130.20	

- ☐ Display the **Goal Seek** dialog box. (Figure)
- ☐ In **Set cell:**, enter the address of the total amount of the quote. (E13)
- ☐ In **To value:**, enter the total amount. (5300)
- ☐ In **By changing cell:**, enter the value of the missing price per unit. (D4)
- ☐ Confirm with **OK**.

Excel finds out the missing value nearly immediately.

QUOTATION				
	QTY	Unit price	Amount excluding taxes	
Peanuts	9		0.00	
Cashewnuts	24	32.50	780.00	
Pistachio-nuts	17	48.10	817.70	
Pizza	29	8.30	240.70	
Sausage	41	24.50	1004.50	
Saucisson	20	28.90	578.00	
Blood-sausage	49	17.00	833.00	
TOTAL EXCLIDING TAXE			4253.90	
Amount of VAT			876.30	
TOTAL TAXE INCLUDED			5130.20	

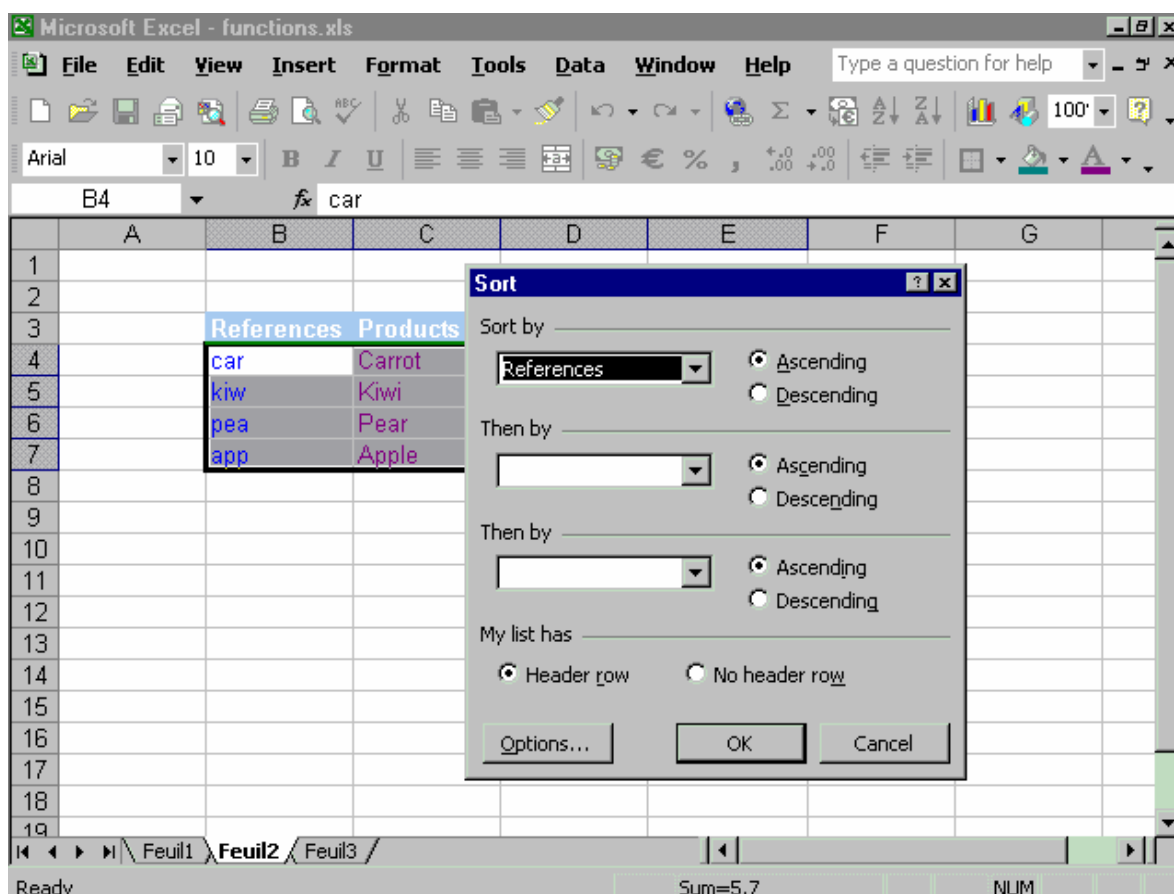
VLOOKUP function

The VLOOKUP function enables you to find an information in a table. This table is organized in rows, each row contains information about an element. The VLOOKUP function searches vertically in the 1st column of the table the data entered by the user and returns the contents, situated in the same row, of the selected row as an argument in the VLOOKUP function.

The table containing the information to be found has to be organized in rows. Each row represents a "record", it contains data relative to one element. The 1st cell of each row (the 1st column) contains the code of the row. It can be a numeric, alphanumeric or logical (true, false) code. The only constraint of this search table is that it should be sorted by ascending order of the first column. The table can be on another worksheet or in another workbook.

Build the search table:

- ☐ Replace the cells of the table, while keeping in mind that the 1st cell of each first row contains the code of the row.
- ☐ Sort the table in ascending order on the 1st column of the table (The first column does not have to be the A column of the calculation sheet). (Figure)



To name the table:

To simplify the writing of the VLOOKUP function, it is recommended to name the search table.

- ☐ Select the table containing all the information, excepted the 1st row if it contains the column headings.
- ☐ Click in the **Name Box** area on the left of the formula bar and enter the name you like for the table search. (You can also use the menu **Insert/Name/Define...**)

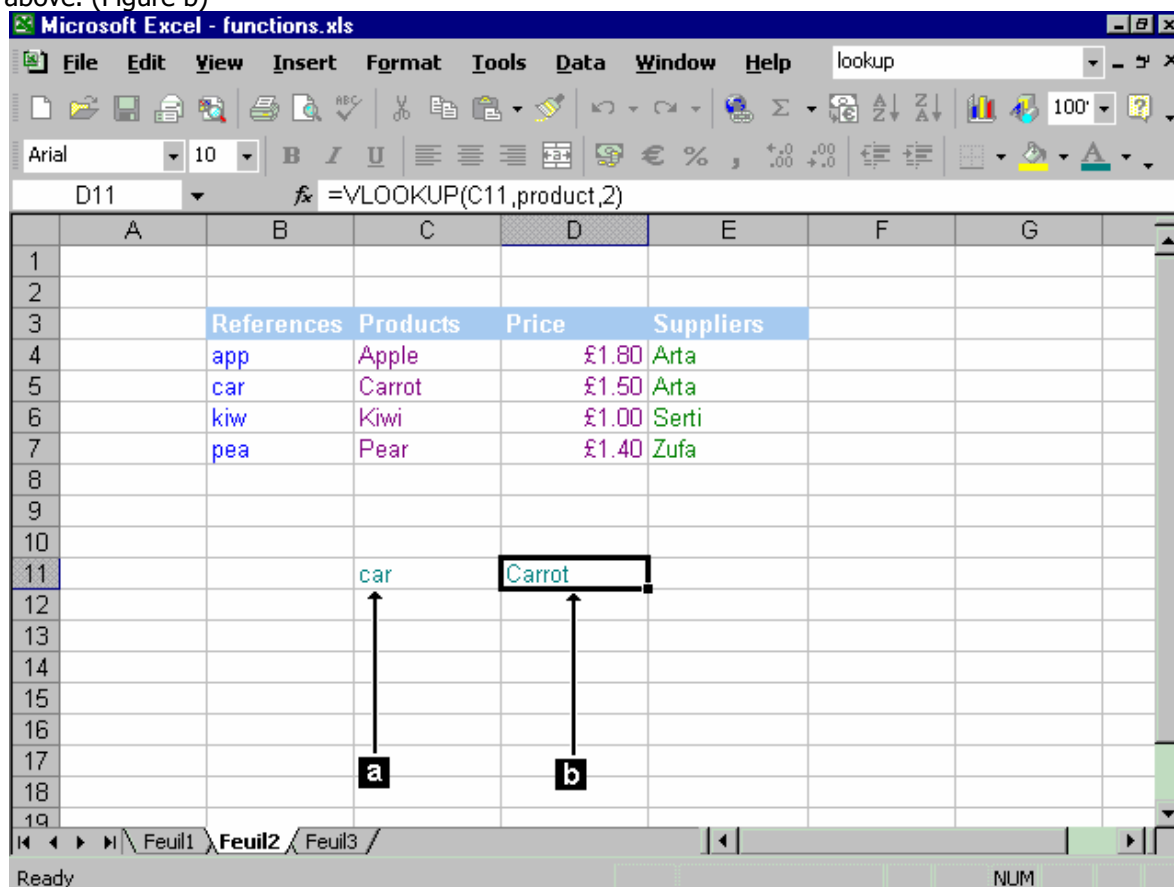
The syntax of the VLOOKUP function is:

=VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

- where:
- **lookup_value** is the address of the cell containing the data to be founded.
 - **Table_array** is the name of the table or its references (data range). Excel compares the argument **Lookup_value** with the values of the 1st column of this table.
 - **Col_index_num** is the number n° of the column of **Table_array** containing the information to be displayed.

☐ Enter in a cell (of the same sheet, of another sheet or another workbook) the data to be searched. (Figure a)

☐ In another cell, enter the VLOOKUP function while paying attention to the 3 arguments mentioned above. (Figure b)



The function immediately returns the information situated in the column specified as the 3rd argument.

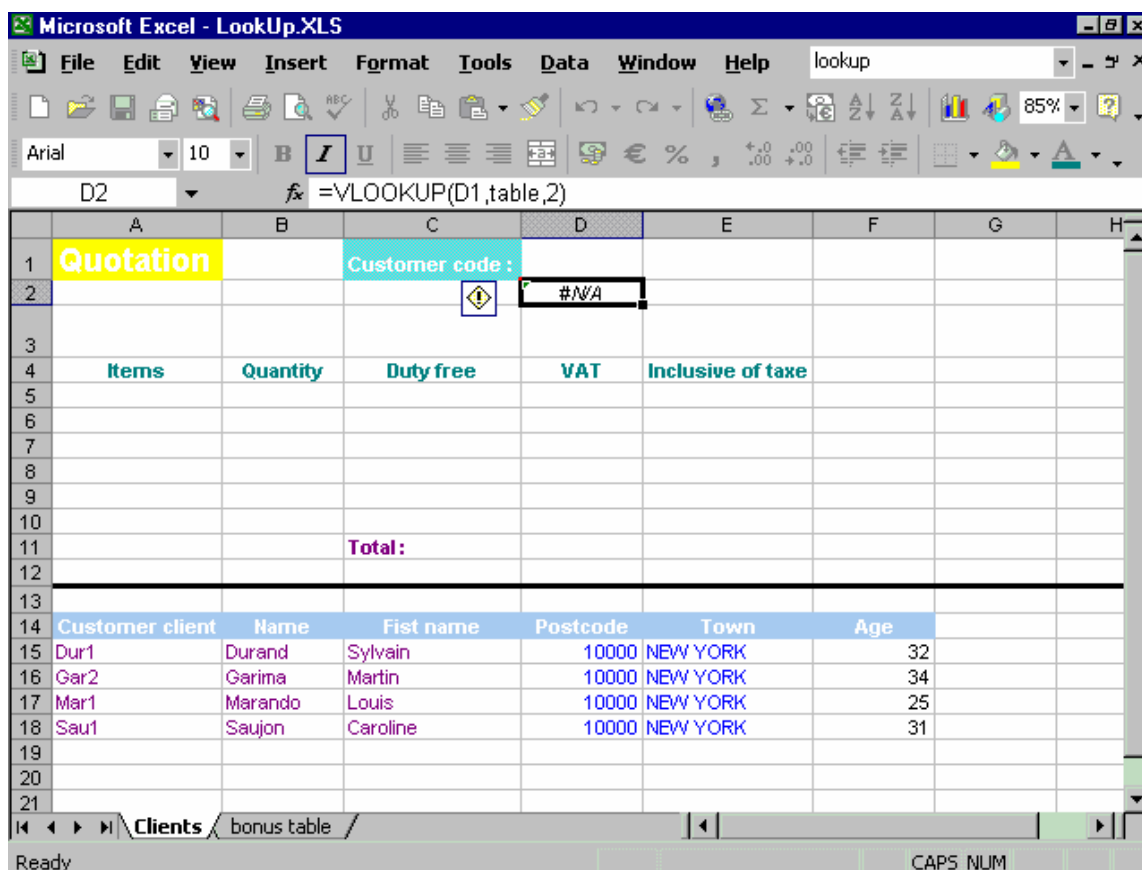
If the searched value is bigger than the last value of the 1st column of the table, the function returns the contents of the last row.




The function returns #N/A if the searched value is smaller than the 1st value of the 1st column or if the cell to be searched is empty.

Example:

To make its quotes, a transport company has created a search table containing on each row the information about customers, the 1st column containing the customers codes.

☐ Fill the table situated between the rows A14 and F18 as in *Figure*.



- ☐ Select the range of cells **A15:F18**.
- ☐ Click in the **Name Box** area on the left of the formula bar.
- ☐ Enter **Table** as a name and press .
- ☐ Position the active cell in **D2**.
- ☐ Enter the following instruction: **=VLOOKUP(D1 ;table ;2)**.
- ☐ Press  to confirm.
- The function returns **#N/A** because **D1** is empty. (Figure)
- ☐ Position the cursor in **D1**, enter **gar2** and press  to confirm.
- The VLOOKUP function is searching **gar2** in the 1st column of **table** and displays the contents of the second cell of the same row.

HLOOKUP function

The HLOOKUP function can be used in the same way as the VLOOKUP function but HLOOKUP searches the data horizontally on the 1st row of the search table.

The function is organized in columns, the 1st row represents the code of each column.

The syntax of the HLOOKUP function is:

= HLOOKUP(lookup_value,table_array,row_index_num,range_lookup)

- where:
- **Lookup_value** is the address containing the data to be found.
 - **Table_array** is the name of the table or its references (data range). Excel compares the argument **Lookup_value** with the values of the 1st row of this table.
 - **Row_index_num** is the n° of the column of **Table_array** containing the information to be displayed.

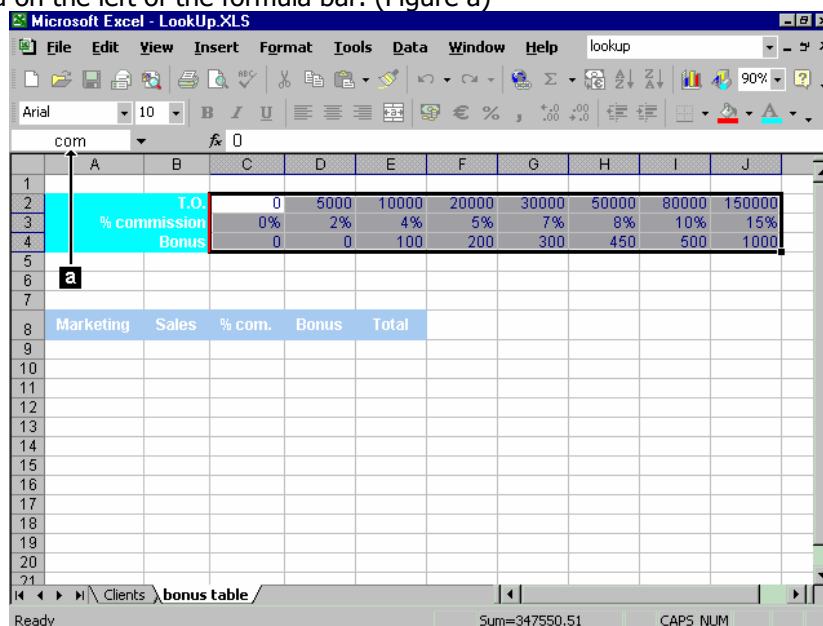
Example:

A sales director applies for each sales, a commission percentage as well as a bonus for the salesman. This percentage and the bonus are defined according to turnover sections T.O. The sales director decides to create a table containing on the 1st row the different sections of the turnover T.O, and on the following rows the commission percentages along with a bonus granted according to the amount of the turnover T.O.

☐ Enter on worksheet, the table situated between the cells B2 and J4 of Figure.

☐ Select the range C2:J4.

☐ Click in the **Name Box** area on the left of the formula bar. (Figure a)



☐ Enter **com** and press to confirm.

☐ In C9, enter =IF(\$B9=0;"";HLOOKUP(\$B9;com;2)) and confirm.

☐ Copy cell C9 in D9 and modify the formula to get =IF(\$B9=0;"";HLOOKUP(\$B9;com;3))

☐ Select the range C9:E9 and copy it to 17 by using the copy handle.

☐ Fill the B column as shown in Figure 2.

If the value to be searched is between 2 values of the table, the HLOOKUP function (or VLOOKUP) returns the data corresponding to the beginning of the section.

Example: If the value to be searched is 25000, the % of the commission is 5%.

The consolidation enables to create summary tables from source tables situated on the same sheet or on different sheets or workbooks. There are 2 consolidation methods:

☐ **The consolidation by category** The summary table is created from source tables having the same column, and/or row headings, but organized in a different order and with a different number of columns and rows.

☐ **The consolidation by position** The consolidation is executed by using source tables of which the information have the same position. This method does not take the column and row heading into account.

Pivot tables can also be used to consolidate.

CONSOLIDATE


To generate the consolidation,

☐ Create first the source tables on the same sheet or on different sheet or workbooks. (Figure)



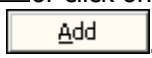
TOWN	LOUISE	MARTIN	CAROL	MARC	SYLVAIN	TOTAL
New York	1000	465	425	12	12	1902
Los Angeles						
Ohio	132	454	410	520	500	1516
Miami	410	145	352	145		1052
Washington	56	45	45	124		270
Mississippi	456	89	145	412		1102
Total	2054	1198	470	1213	512	5842

- ☐ If you want to execute a consolidation by category, make sure that the column and row headings are the same (the way rows and columns as well as their number are organized is not important).
- ☐ Activate the sheet where the summary table should be generated.
- ☐ Position the active cell in the left upper corner of the table that you will generate.
- ☐ Make sure there is no outline; in this case you have to delete it.
- ☐ Make sure to have enough empty rows and columns to create the summary table. If it is not the case, Excel will replace these cells.
- ☐ Select **Consolidate...** in the **Data** menu.
A dialog box appears.
- ☐ In the dropdown list **Function:**, select the function you want to use to make the synthesis of the consolidated values (sum, average, etc.).

For each source table to be added to the consolidation:

- ☐ Click on  on the right of **Reference:**.
- ☐ If the source table is situated in another sheet or in another workbook, activate them.
- ☐ Select the source area while including the column and row headings if you want a consolidation by category. (Figure)

TOWN	LOUISE	MARTIN	CAROL	MARC	SYLVAIN	TOTAL
New York	1000	465	425	12	12	1902
Los Angeles	132	454	410	520	500	1516
Ohio	410	145	352	145		1052
Miami	56	45	45	124		270
Washington	456	89	145	412		1102
Total	2054	1198	1377	1213		5842

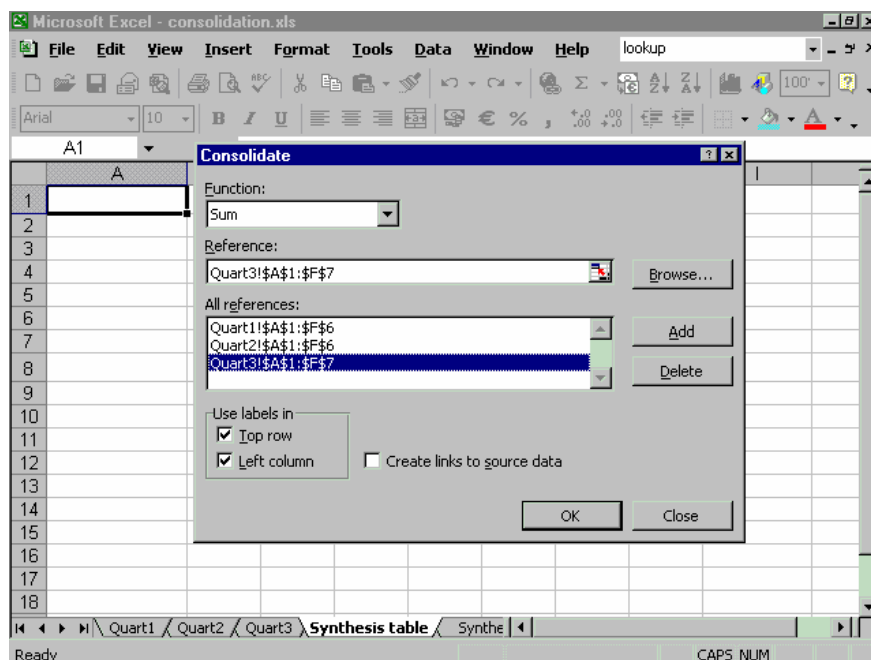
- ☐ Press  or click on  on the right of the reference area. (Figure a)
- ☐ Click on .
- ☐ Use the same procedure for the other source areas to be added.

For a consolidation by position:

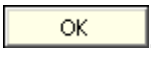
- ☐ Deactivate **T**op row and **L**eft column in the **Use labels in** options frame.

For a consolidation by category:

- ☐ Activate **T**op row and **L**eft column in the options **Use labels in** frame. (Figure)



To link the summary with the source tables:

- ☐ Activate **C**reate links to **s**ource data.
- ☐ Confirm with .

If you have linked the table with the sources, Excel automatically generates an outline enabling you to display or hide the detail of each row.

Update a consolidation table linked to the sources:

Update the values,

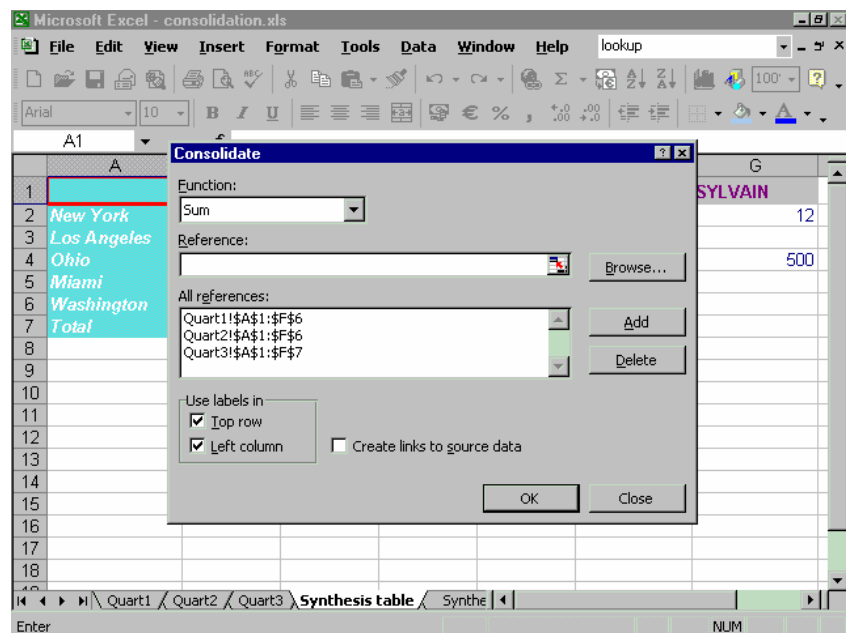
If you modify only the values of the source tables, the update is automatic

Update the table (if columns or rows have been added or deleted in the sources)

If you add or delete columns or rows in the sources table, you have to update the summary table. Excel does not automatically updates the references of the source areas in the **Consolidate** dialog box.

Then you have to redefine the references of each modified source before you can generate a consolidation update. Make sure to delete the outline before.

- ☐ Select **G**roup and **O**utline in the **D**ata menu and **C**lear **O**utline. (Figure)



- ☐ Position the active cell in the left upper corner of the summary table.
- ☐ Select **Consolidate...** in the **Data** menu.
A dialog box appears.
- ☐ Use the same procedure as for the creation of an unlinked table.

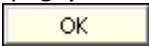
Update an unlinked consolidation table:

Update the values

If you modify the value of a table, you have to update the consolidation table.

- ☐ Activate the sheet containing the summary table.
- ☐ Position the active cell in the left upper corner of the table.
- ☐ Select **Consolidate...** in the **Data** menu.

A dialog box appears. The whole parameters defined during the last consolidation are kept in the dialog box. (Figure)

- ☐ If necessary, add or modify the source areas (see next page).
- ☐ If necessary, modify the parameters and confirm with  to generate the consolidation again.


TOWN	Quart1	Quart2	Quart3	TOTAL
New York	1000	420	465	2322
Los Angeles	132	454	410	1516
Ohio	410	451	145	1503
Miami	56	320	45	590
Washington	456	200	89	1302
Total	2054	1391	1198	7233

The former data are replaced by the new ones.

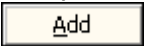

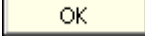
Update the table (if columns or rows have been added or deleted in the sources)

If you add or delete columns or rows in the sources table, you have to update the summary table. Excel does not automatically updates the references of the source areas in the **Consolidate** dialog box.




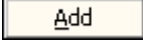
Then you have to redefine the references of each modified source before you can generate a consolidation update. Make sure to delete the outline before..

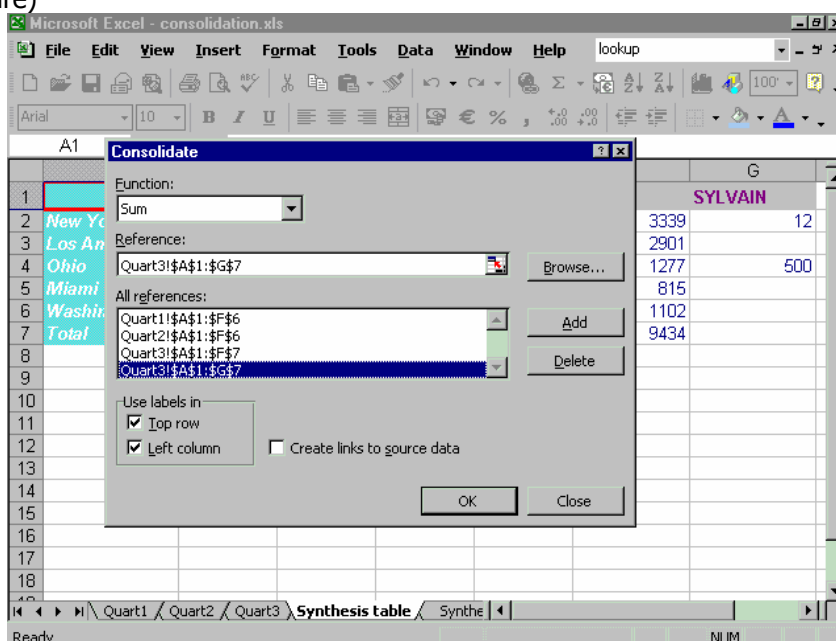
- ☐ Position the active cell in the left upper corner of the summary table.
- ☐ Reach the **Consolidate** dialog box.
- ☐ In the list **All references**:, click on the source of which the references are to be redefined.
- ☐ Click on  on the left of the **Reference** text box: and use the same procedure as for a creation. (Figure)

Or

- ☐ Modify directly its coordinates in the text box **Reference**..
- ☐ Click on .
- The new references are added to the list, the former ones are still valid. (Figure)
- ☐ Click on the former references and click on  to delete them.
- ☐ If necessary, modify the parameters of the dialog box.
- ☐ Click on  to generate the consolidation.

Add a source area:

- ☐ Position the cursor on the left upper corner of the summary table.
- ☐ Select **Consolidate...** in the **Data** menu.
- A dialog box appears.
- ☐ Click on  on the right of the reference **Reference**:area.
- ☐ Activate the sheet or the workbook containing the source data.
- ☐ Select the source area while including the column and row headings if you want to execute a consolidation by category.
- ☐ Press  or click on .
- ☐ Click on . (Figure)



- ☐ If necessary, add another source area by using the same procedure.

☐ Modify the parameters of the dialog box if you like (function, link,...).

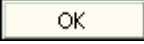
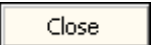
☐ Confirm with  to generate the summary table.

Delete a source area:

☐ Reach the **Consolidate** dialog box after activating the upper left cell of the summary table.

☐ In the list **All references**:
click on the source data to be deleted.
(Figure a)

☐ Click on . (Figure b)

☐ If necessary, modify the parameters of the dialog box and click on  to generate the consolidation, otherwise click on .

Additional notes: