



MS-OFFICE 2016 - EXCEL

English version

Managing data

Organize, sort & filter, subtotals, pivot tables and charts ...

Introduction to Power Bi Add-ins

Power Query Power Pivot Power View (version Pro Plus only)

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ORGANIZING DATA

.....

.....

IMPORTANT

If your worksheet contains a list of records that is not recognized as a *list* by Excel, many tools to manage your data will not be available or only partially.

Consequently, this section presents the rules you must follow to make sure Excel correctly detects your *list* and also some useful tools to organize your data.

1 Criteria for a *list* of records

Here after the beginning of such a list :

	А	В	С	D	Е	F	G	Н
1	Number	Inv. Date	Customer Nr.	Qty	Price/Piece	Amount	Salesman	Product
2	100	15.déc.16	12	1	100.50	100.50	BRUNO	EAO
3	101	19.déc.16	6	3	120.60	361.80	BRIAN	EAO
4	102	12.janv.17	3	2	111.00	222.00	JOHN	Office
5	103	04.févr.17	5	4	111.95	447.80	BRUNO	EAO
6	104	25.févr.17	6	1	88.50	88.50	PETER	Language
7	405	OE 47	7	2	77 10	464.00		

A header row with *column labels*. It is not compulsory but usually the header row has a specific format.

Each row is a *record* Each column represents a *criteria field*

The list can contain *empty cells* but should never contain *empty rows or columns*.

If a given column must remain empty, here after a hint : type an x or any other character into the cell containing the *column label*. That way Excel will not consider that the column is empty (even though the rest of the cells below are indeed empty !). And if you do not want to see the character you have typed, make it « disappear » by applying to it the color for the cell fill.

Should you select before sorting, filtering ... ?

Make sure that the active cell is located inside the table and the Excel will detect it automatically. If Excel – exceptionally – fails to properly detect the table or if you must perform a partial sort or filter – this should be rare – then you may select the required range of cells.

2 Converting from text to columns

External data bases – sometimes not Microsoft programs – usually include an export command to Excel. Most of the time this is full satisfactory but it can happen at times that the result is not a real *list or Excel table*.

The data exportation ends into one column as the following screen capture shows it :

5 Second-hand cars

- 6 Trademark;Type;Color;Year;KM;Price
- 7 Peugeot;106;White;2002;10000;14500
- 8 Opel;Omega;Black;2003;60000;23000 9 Renault;Clio;Green;2005;120000;10200
- 10 BMW;Z3;Dark Blue;2000;8000;39000
- 11 Mercedes;SLK;Yellow;2004;30000;45000

It is therefore necessary to CONVERT this into a list of records

DATA Tab – DATA TOOLS Group – TEXT TO COLUMNS Button



Follow the Wizard instructions

Convert Text to Columns Wizard - Step 1 of 3	?	×			
The Text Wizard has determined that your data is Delimited. If this is correct, choose Next, or choose the data type that best describes you Original data type	r data.				
Choose the file type that best describes your data:					
Preview of selected data:					
<pre>2 Trademark;Type;Color;Year;KM;Price 3 Audi;A3;Violet;2015;55000;25000 4 BMW;Z3;Dark Blue;2016;8000;39000 5 BMW;M3;Black;2007;10000;85000 6 Chrysler;Neon;Blue;2012;26000;34000</pre>		^			
Cancel < Back <u>N</u> ext >	<u> </u>	nish			

Delimited

The separation corresponds to a character. Check carefully

Fixed width

There is no character to make the field separation. You set a fixed number of characters beyond which a new column will be created.

Convert Text to Columns Wizard -	Step 2 of 3	?	×
This screen lets you set the delimite in the preview below.	rs your data contains. You ca	n see how your text is af	fected
Delimiters	secutive delimiters as one r:	column. There is n	n its own into an additional othing you can do at this ve to manage the problem
Data preview Trademark Type Color Audi A3 Violet BMW Z3 Dark Blue BMW M3 Black Chrysler Neon Blue	Year KM Price 2015 55000 25000 2016 8000 39000 2007 10000 85000 2012 26000 34000	Jean De Johanna Dupo: Pierre Duda: François Dufo: Charles Dupo:	n ur
	Cancel < <u>B</u> ack	<u>N</u> ext > <u>F</u> in	ish
Check the delimiter symbol			
Convert Text to Columns Wizard	- Step 3 of 3	?	×
This screen lets you select each co Column data format <u>G</u> eneral <u>T</u> ext <u>D</u> ate: DMY Do not <u>i</u> mport column (skip)	'General' converts numer to dates, and all remaining	ric values to numbers, d	late values
Destination: =\$C\$2			F.S.
Data preview General GenerGeneral Trademark Type Color	GenerGeneraGeneral Year KM Price		
Audi A3 Violet	2015 55000 25000 2016 8000 39000 2007 10000 85000 2012 26000 34000		>
[Cancel < <u>B</u> ack	Next >	<u>F</u> inish
Column data format	Each column can be f data it contains (text of		g to the nature of the

Do not import columnThis means that the selected column will be totally omitted with
« separating » or distributing the data.DestinationCaution : by default Excel suggest the first cell of the column to
distribute, which will lead to overwriting it. If you leave it, Excel
will prompt you to confirm. Change the destination cell – only on

the active worksheet – to insert the distribution somewhere else.

Here below the result :

Trademar	Туре	Color	Year	KM	Price
Audi	A3	Violet	2015	55000	25000
BMW	Z3	Dark Blue	2016	8000	39000
BMW	M3	Black	2007	10000	85000
Chrysler	Neon	Blue	2012	26000	34000
Fiat	Punto	Red	2014	48000	18000
Ford	Fiesta	Grey	2012	42000	8500
Ford	К	Grey	2016	9000	15000
Marcadac	CL K	Crow	2010	500	60000

3 Transposing data

Sometimes data could be used but they spread out in the wrong direction ...

	-											
14	January	16										
15	February	17										
16	March	45										
17	April	23										
18	May	12										
19	June	29										
20	July	12										
21	August	56										
22	September	89										
23	October	35										
24	November	63										
25	December	14	au I	ieu de	:							
	January Feb	ruary M	larch	April	May	June	July A	August	September	October	November	December
	16	17	45	23	12	29	12	56	89	35	63	14

To solve the problem you must TRANSPOSE your data

- Select the data
- COPY (CTRL + C or any other method)
- Select the cell from which the transpose must start
- HOME Tab CLIPBOARD Group PASTE Button PASTE SPECIAL Option

Paste Special	? ×
Paste	
	○ All using Source t <u>h</u> eme
O <u>F</u> ormulas	All except borders
◯ <u>V</u> alues	Column widths
○ Forma <u>t</u> s	Formulas and number formats
O <u>C</u> omments	Values and number formats
🔿 Validatio <u>n</u>	 All merging conditional formats
Operation	
None	O <u>M</u> ultiply
○ A <u>d</u> d	O D <u>i</u> vide
○ <u>Subtract</u>	
Skip <u>b</u> lanks	Transpos <u>e</u>
Paste <u>L</u> ink	OK Cancel

4 Text functions such as TRIM

In French : SUPPRESPACE

Syntax : TRIM(text)

It can sometimes happens that when you export data to Excel, the result columns all start with a space character.

You may opt for a global replace of the space by nothing but the command will also remove spaces between words ...

The TRIM function can be an interesting solution as it removes spaces before or after a string of characters but not between words.

	А	В	С	
			Retrieving the results through	
1	Name	Using the TRIM function	a copy - paste as values	
2	Charles Van Deer	Charles Van Deer	Charles Van Deer	
3	Jack The Ripper	Jack The Ripper	Jack The Ripper	
4	Frida Evans	Frida Evans	Frida Evans	
5	Luke Skywalker	Luke Skywalker	Luke Skywalker	

Important : you cannot delete the columns and only keep the result column without first go through a copy-paste as values

Other text functions can be handy, especially when you are working with massive data ...

LOWER - UPPER : to manage the case PROPER : first letter of each word in capital, the rest normal LEN : total number of characters in the cell

5 The CONCATENATE function

In French CONCATENER.

Syntax : CONCATENATE(text1 ;[text 2] ...)

But also =Ref_cell&Ref_cell The & sign is called a concatenation operator

This function is used to "merge" the contents of two or more cells.

Important to mention : when you merge the contents of cells, you should always add the *space*. The space sign must always be placed between quotes.

Example :

	А	В	С	D	E
1	First name	Last Name	Age		
2	Charles	Bloom	37		
3	John	Bonnet	36		
4	Edna	Evans	35		
5	Peter	Ford	38		
6	Mike	Olaf	40		
7	Franck	Siny	29		
8	Luke	Skinner	42		
9	Keith	Smith	31		
10					
11	Full name	Age			
12	Charles Bloom				
13	John Bonnet	35			
14	Edna Evans	31	_	A2&" "&B2	
15	Peter Ford	29	-	or	
16	Mike Olaf	37	=CONCA	TENATE(A2;"	"-B2)
17	Franck Siny	38	CONCA		,52/
18	Luke Skinner	40			
19	Keith Smith	42			

Important : you cannot delete the columns and only keep the result column without first go through a copy-paste as values

Since 2013 : note that some CONCATENATE and other text functions can now be replaced by the new FLASH FILL (DATA Tab) feature :

Type in the first cell the required result

	А	В	С
1	FirstName	LastName	Name
2	John	Evans	John Evans
3	Peter	O'Neil	
4	Luke	Smith	
5	Mark	Greenaway	

Select the cell – FLASHFILL and the column
is automatically completed

	•	•		
	А	В	С	
1	FirstName	LastName	Name	
2	John	Evans	John Evans	
3	Peter	O'Neil	Peter O'Neil	ĺ
4	Luke	Smith	Luke Smith	
5	Mark	Greenaway	Mark Greenaway	

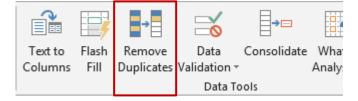
6 Tracking duplicates

When a table is built through pasting various ranges of cells (coming from external sources for instance), it is frequent that some records appear twice.

2 possibilities :

- **Display** duplicate values through a conditional format (simply select DUPLICATE VALUES)
- **O** Delete directly :

DATA Tab – DATA TOOLS Group – REMOVE DUPLICATES Button :



A dialog box will let you select the columns where duplicates should be tracked down:

Here below an example :

1	A	В	С	D	F		G	Н			
1	Number	Inv. Date	Customer Nr.	Qty	Price/Piece	Am	ount	Salesman	Product		
2	100	15.déc.16	12	1	100.50	10	0.50	BRUNO	EAO		
3	101	19.déc.16	6	3	120.60	36	51.80	BRIAN	EAO		
4	101	19.déc.16	6	3	120.60	36	61.80	BRIAN	EAO		
5	103	0/ fóvr 17	5	Λ	111 95	1/	7.80	BRUNO	EAO		
6	Remove [Duplicates			?	×	4.60	BRUNO	EAO		
7		BRIAN	EAO								
8	To delete duplicate values, select one or more columns that contain duplicates. 9.75 BRUNO EA										
9			9.20	JOHANNA	EAO						
10	§≣ Se	lect <u>A</u> ll 🔡 📗	0.00	JOHN	Games						
11							D.00	JOHANNA	Langages		
12	Columns					^	B.50	PETER	Languages		
13		ber					4.75	PETER	Languages		
14	Inv. D	ate					6.50	JOHN	Languages		
15		mer Nr.					B.50	BRIAN	Languages		
16	Qty						B.80	BRUNO	Languages		
17		Diece					D.00	JOHN	Languages		
18						~	2.30	BRUNO	Languages		
19	IMI AMOU	m					2.00	JOHN	Office		
20					ок с	ancel	3.90	BRUNO	Office		
21							D.60	PETER	Office		

Leave every column checked to track full duplicates

Caution if you decide to uncheck columns : in the above screen capture, leave only the column SALESMAN and the list will be reduced to the first occurrence of each salesman, 5 rows altogether as there are 5 salesmen in this list.

Note : the advanced filter (see corresponding chapter) provides an *extraction without duplicates* and this can also be an interesting alternative.

7 Consolidation

Large data to be turned into a list can also be generated by consolidation.

7.1 Simple using a 3D reference

The cells reference (their "address" such as B4, C18 ...) must be identical and the sheets to consolidate must be consecutive.

	A	В	С	D	E
1			_		
2	Deading 1 a pag				
3	Readind ! a das	SILL			
4	meaning i a pae				
5	• •		-		
6					
7	Top sales – Harry Potter				
8					
9	Title	January	February	March	Total Qtr1
10	Harry Potter and the Sorcerer's Stone	60	100	92	252
11	Harry Potter and the Chamber of Secrets	70	89	46	205
12	Harry Potter and the Prisoner of Azkaban	80	69	95	244
13	Harry Potter and the Goblet of Fire	83	40	98	221
14	Harry Potter and the Order of the Phoenix	80	98	85	263
14 15		80 65	98 79	85 89	263 233
15 16	Harry Potter and the Order of the Phoenix				
15 16 17	Harry Potter and the Order of the Phoenix Harry Potter and the Half-Blood Prince	65	79	89	233
15 16	Harry Potter and the Order of the Phoenix Harry Potter and the Half-Blood Prince	65	79	89	233

Tables on Qtr1, Qtr2, Qtr3 et Qtr2 are strictly identical in term of location, structure, even color. The last table on the Year-total sheet is empty.

• Activate the sheet Year-total

7	Top sales – Harry Potter	
8		
9	Title	Total
10	Harry Potter and the Sorcerer's Stone	
11	Harry Potter and the Chamber of Secrets	
12	Harry Potter and the Prisoner of Azkaban	
13	Harry Potter and the Goblet of Fire	
14	Harry Potter and the Order of the Phoenix	
15	Harry Potter and the Half-Blood Prince	
16	Harry Potter and the Deathly Hallows	

- Click in the cell where the first result is required here on B11.
- Click on the SUM button (HOME Tab EDITING Group)
- Activate the first sheet and click on the first cell that will be added (here E10)
- SHIFT + click on the *tab* of the last sheet to be consolidated.
- ENTER

Here below the formula on the consolidation sheet (Year-total) :

• Drag the autofill handle to fill in the table

.

7.2 Consolidation using DATA - CONSOLIDATE

Advantage : you may consolidate tables that are not strictly identical and the consolidated results can be linked to their source cells through the outline view mode.

Here below a screen capture showing a workbook with three sheets that have been consolidated into a fourth one :

	А		В	С	D	Е	F		G	A -	4	А	В	С	D	E		F	
1	~			v	0	-			-	- 1									
	Switzerl	and	OTD 4	070.2	070.2				-	2	En	gland	QTR 1	QTR 2	2 QTR	3			
_		anu	QTR 1	QTR 2	QTR 3					3	Arvi	ine	130	160) 19	0			
	Beaujolais		220	170	190					4	Bea	ujolais	70	70) 10	0			
	Bordeaux		30	60 140	70 160					5	Bor	deaux	70	100) 13	0			
	Bourgogne		120	140	160					6	Bou	irgogne	100	130) 16	0			
6										- 7									Ŧ
	< >	Wine-Sv	vitzerland	Wine-Eng	🕂 :	4			Þ			▶ Wine-E	ngland V	/in 🕂				Þ	
REA	DY 🔠				•		— H	+	100%	R	EADY	1			•		+	100%	
	А		в	С	D		E	F		▲ 1	2	A	в с	0)	Е	F		-
1																_			
2		Ge	rmany	01	R1 Q	TR 2	QTR 3	QTR 4					Sample of	what you r	need to cre	ate			
3			ijolais	Q1	80	90	100	110			1		QTR 1	QTR 2	QTR	2	QTR 4		
	-		eaux		160	170	180	190		- 17		Arvine	QIRT	130	160	5 190			
5	1		gogne		130	140	150	160			8			370	330	390		110	
4 5 6	_		npagne		120	30	40	50		++++++	1	2 Bordeaux		260	330	380		190	
7		ona	npugno							+	1			350	410	470		160	
8										÷	1			120	30	40		50	L
9										-	1								Ŧ
	< →	Wine-Er	igland Wi	n 🕂	E 4				Þ		4	▶ Wine-E	ngland V	/in 🕂	÷ •			Þ	
REA	DY 🔠				=			+	100%	R	EADY	1			🙂		-+	100%	

 Activate the "corner" cell of the future consolidation, in the destination sheet or workbook (here the cell A1 on CONSOLIDATION-EXAMPLE (that would be empty of course).
 DATA table DATA TOOLS Cream CONSOLIDATE Butter

 DATA tab – DATA TOOLS Group – CONSOLIDATE Butto 	on.
---	-----

Consolidate		?	×
<u>F</u> unction:			
Sum 🗸			
<u>R</u> eference:			
	6	<u>B</u> rows	e
All r <u>e</u> ferences:			
'Wine-England'!\$A\$3:\$D\$74		<u>A</u> do	ł
'Wine-Germany'!\$B\$3:\$F\$7 'Wine-Switzerland'!\$A\$3:\$D\$6		<u>D</u> ele	te
Use labels in			
✓ <u>I</u> op row			
□ Left column			
ОК		Clos	e

Function	The consolidation = adding several sheets, subtracting them or multiplying their data ?					
Reference	In order to collect the required data, make sure the cursor is placed in this box. Then you activate the first sheet and select the range of cells. Finally you click on the ADD button.					
	Note : if the data includes labels in line or columns, it is necessary to include them in the selection.					
	<u>Using a name instead of a range of cells:</u> Sheet inside current workbook : type the name Sheet of another workbook : activate the workbook and the required sheet and then type the name					
Use labels in	Check the boxes corresponding to the required labels. They will be displayed in the consolidated result.					
Link to source data	The consolidation will be in the outline form. A link will exist between the source sheet (or file) and the client sheet (or file).					
	Caution : if the option is not activated the result will be a simple consolidation inserted at the active cell.					
BROWSE Button	To consolidate ranges of cells located in external workbooks. But caution, these files will not be opened. You can manually type in the range of cells or better its name (provided you know the address or the name). <i>Caution : do not use HOME or any arrow in this box as this selects cells in the current sheet.</i>					
COMMENT	S					
• The collected references remain in DATA - CONSOLIDATE in case you wish to run the consolidation again or change its settings. This is important if you need to modify the data source. If you change the figures, the update is automatic. If the reference areas are the same but you have changed some labels, you can simply run the consolidation function again. If the changes are important, it is advisable to run a new consolidation.						
• <u>To remove the out</u>	tline					

DATA Tab – OUTLINE Group – Drop-down list of the UNGROUP Button – CLEAR OUTLINE Option. All rows and columns will be displayed. Caution : no undo for this operation.

• <u>Selecting the visible cells only (on a collapsed outline)</u> : (to create a chart for example) Collapse outline to required levels and select the area.

HOME Tab – EDITING Group – Drop-down list of the FIND & SELECT Button – GO TO SPECIAL Option – In the dialog box : VISIBLE CELLS ONLY.

You can also add this button : to the Quick Access toolbar. Caution, scroll down the list to the "s" section (for Select visible cells).

8 Outline mode

The Outline mode will help you to structure data *manually* (by creating groups of rows or columns when they belong to a same *level*) or automatically (the subtotals command automatically generates an outline).

8.1 Generalities

The Outline mode is a powerful tool to hierarchize, navigate or structure a worksheet containing large amount of data.

When?

When you need to hide rows or columns in order to improve the « readability » of the worksheet. You may group rows or columns that are rarely read or modified. This is far more comfortable than *hiding* them.

If there is a hierarchy in the data - that is if some data can be grouped under one topic and several topics can also be grouped together etc... then an outline can be created.

Several functionalities automatically create an outline : subtotals added to a list of records, when you consolidate data and set that the source data be linked to the consolidated result ...

Automatic Excel analyzes the formulas, if they are the result of others and groups them.

Manual There are no formulas and you indicate the hierarchy yourself.

8.2 Creating

DATA Tab – OUTLINE Group



8.2.1 Automatically

Automatic because formulas or functions are applied to rows or columns and Excel can automatically detect the required hierarchy.

Drop-down menu of the GROUP Button - AUTOMATIC	
OUTLINE	

->- + -	
Group	Ungroup Subto
0 8 <u>G</u>	roup
A	uto Outline

Example :

	4										
	2		·			— – r				-	-
	3										
1 2 3	1	A	В	С	D	E	F	G	Н		J
						Total				Total	Total
	1		janv.17	févr.17	mars.17	Qtr 1	avr.17	mai.17	juin.17	Qtr 2	Semester
Γ.											
	2	Sales	150000	200000	250000	600000	300000	350000	400000	1050000	1650000
- ·	3	Fixed Costs	30000	30000	30000	90000	30000	30000	30000	90000	180000
- ·	4	Variable Costs	30000	40000	50000	120000	60000	70000	80000	210000	330000
	5	Total Costs	60000	70000	80000	210000	90000	100000	110000	300000	510000
			00000			- 210000	50000	100000	110000	500000	510000
—	6	Result	90000	130000	170000	390000	210000	250000	290000	750000	1140000
	7										

If there is no specific selection, the outline is generated automatically for the existing data (Excel groups rows **and** columns).

If specific lines are selected, the outline can be restricted to those lines.

8.2.2 <u>Manually</u>

- Select the rows or columns to group and that represent the lowest level
- Click on the top part of the GROUP button and then choose the GROUP ...option

12		A	A B	
	1	Selling dpts : person in charge Geneva		Lausanne
	2	Food	John Buck	Peter Sailers
	3	Daily fresh goods	Amanda Tucky	Bill Smith
	4	Long keeping goods	Jane Evelon	Edna Evans
Ŀ	5	Housing	Charles Robinon	Jack Payne
	6	Clothes	David Gould	John Hassey
	_	Mens'	I surent Weher	Raniamin Campa

- Do the same for the other levels.
- If you select cells rather than rows, Excel will ask you whether the operation will affect rows or columns.

It is not possible to select discontinuous rows or columns to group even if they belong to the same level.

8.3 Expanding/Collapsing	levels	3		
1 2	+	to expand a level.	or	+∃ Show Detail
Click on the required number to collapse or expand as needed.	-	to collapse a level	or	- Hide Detail

8.4 Viewing or hiding the outline symbols

If the outline includes many levels, the outline panes at the top right and left of the Excel window can considerably reduce the editing area. Without removing the outline you may simply hide the expand/collapse buttons (momentarily of course)

 FILE – OPTIONS - ADVANCED Category – DISPLAY OPTIONS FOR THIS WORKSHEET Topic – SHOW OUTLINE SYMBOLS IF AN OUTLINE IS APPLIED Option.

8.5 Ungrouping a level

- Make sure not to ungroup a collapsed level. The operation is successful but the rows or columns remain hidden.
- Select the rows/columns to ungroup.
- Click on the lower part of the UNGROUP button or drop-down menu of the button and click on the UNGROUP ... option.

8.6 Removing the outline

- No prior selection is required but we advise you to check that no level is collapsed.
- Drop-down menu of the UNGROUP button and click on the CLEAR OUTLINE option

8.7 The outline options

The dialog box launcher of the OUTLINE Group	Settings	?	×
	Direction Summary rows below detail		
	Summary columns to <u>r</u> ight of detail		
	Automatic styles		
	<u>C</u> reate Apply <u>S</u> tyles OK	Cano	el

Automatic styles Excel applies preset cell styles called RowLevel_1, ColLevel_1 (for instance italic) to all synthesis rows/columns. Select outline (totally or partially – expanded or collapsed) and then click on the APPLY STYLES button.

You will certainly find these styles a bit « light », compared to the new 2007 cell formats and \dots and no UNDO \dots

Summary rows/columns below	If you uncheck these options, the <i>direction</i> is reversed as show in the following screen	-	4	Sa
detail	capture :	Ľ.	5 6	Fix Va
Create	To create an automatic outline	•	7	Tot

8.8 Collapsing levels and restricting the selection to the visible cells only

<u>Aim</u>: avoid selecting the hidden (or invisible) rows/columns in order to copy and pate only the collapsed outline, apply a format or create a chart from the outline.

- Collapse to the required levels and select
- Restrict the select to those levels only through :.
- HOME Tab Drop-down menu of the FIND & SELECT Button GO TO SPECIAL Option –VISIBLE CELLS ONLY Option.
- Then you can perform the needed operation :

Format

COPY-PASTE : it will be values only

Chart

Notes for charts

Freezing the selection to the visible cells only makes sure that the chart will remain unchanged even when the outline levels are expanded. But if the chart still becomes smaller or bigger when modifying the height/width of the worksheet rows/columns, you also need to free the object from the underlying cells:

To free the chart :

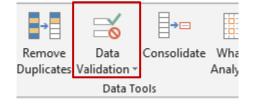
Double-click on the chart outside border – FORMAT Tab – SIZE Group – Dialog box launcher – PROPERTIES Tab – Turn on DON'T MOVE OR SIZE WITH CELLS.

9 Get typing help using data validation

9.1 The purpose of this option and how to set the cell restrictions

It is possible to set data restrictions to one or more cells. When the user types the data, a warning message might either inform him of the set restriction or prevent any invalid entry. This command is often used when creating forms but can at times be used with lists.

DATA Tab - DATA TOOLS Group – DATA VALIDATION Button



rop-down list		V 0	→ =	2
		ita	Consolidat	
	Valida		alidation	Analysis
			Invalid Dat	
		-	/alidation (
	- * -	<u> </u>		
ETTINGS Tab				
Data Validation	?	>	<	Possibilities :
				· ·
Settings Input Message Error Alert				Any value
Settings Input Message Error Alert Validation criteria			-	Any value Whole number
			-	Any value
Validation criteria			-	Any value Whole number Decimal List Date
Validation criteria Allow:			-	Any value Whole number Decimal List Date Time Text length
Validation criteria <u>A</u> llow: Whole number v Ignore <u>b</u> lank				Any value Whole number Decimal List Date Time
Validation criteria <u>A</u> llow: Whole number v Ignore <u>b</u> lank <u>D</u> ata:			-	Any value Whole number Decimal List Date Time Text length
Validation criteria <u>A</u> llow: Whole number v Ignore <u>b</u> lank <u>D</u> ata: between v			-	Any value Whole number Decimal List Date Time Text length
Validation criteria <u>A</u> llow: Whole number V Ignore <u>b</u> lank <u>D</u> ata: between V <u>M</u> inimum:				Any value Whole number Decimal List Date Time Text length

An interesting choice : List

It is possible to create a list of entries to limit typing. Choose the option LIST from the drop-down list and indicate below the corresponding range of cells. (the data must be on the same sheet if you wish to select cells directly (=**\$K\$2:\$K\$27** for ex.) but you may indicate an external sheet provided the corresponding range of cells has been named (**=depts.** for ex.))

You may also type the list items manually (with the list separator). Drawback : you need to type manually. Advantage : there is not "external" list.

Another interesting choice : Decimal

Choose *Decimal* from the drop-down list and set that the number of decimals must be *comprised between 0 and 2* if you wish to limit the data entering to numbers with no or maximum 2 decimals.

INPUT MESSAGE Tab

Data Valida	ition			?	×
Settings	Input Message	Error Alert			
<mark>∕∕</mark> Show	input message whe	en cell is sele	cted		
When cel	l is selected, show t	this input me	ssage:		
<u>T</u> itle:					
Restrict					
	ist type a whole nu	mber betwee	en 0 and 100		~
					× .
<u>C</u> lear All			OK	Ca	ncel

Input Message : set for a large range of cells, it can finally become very irritating. Possible solution : set the message for the first cell(s) only.

ERROR ALERT Tab

If the user tries to enter invalid data, a message of stop, warning or information can appear.

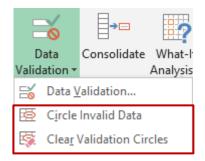
Data Validation				?	×	Style:	
Settings Inpu		rror Alert I data is ent	ered			Stop Stop Warning Information	
When user ente	rs invalid data,	show this e	rror alert:				
Style:		<u>T</u> itle:					
Stop	\sim	Info					
		Error mess	age:				
E	8	Sorry. No whole nu 100. Than	other data tha imber between iks	in a 0 and	< >		
<u>C</u> lear All			ОК	Can	cel		
Information	Info						×
		Sorry. No o	ther data thar	a whol Cance		er between 0 and 100. Than <u>H</u> elp	ks
Get typing he	elp using da	ta validat	tion				Pa

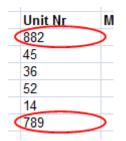
Warning	Info	×
		Sorry. No other data than a whole number between 0 and 100. Thanks Continue? <u>Y</u> es <u>No</u> Cancel <u>H</u> elp
Stop	Info	×
	8	Sorry. No other data than a whole number between 0 and 100. Thanks Retry Cancel Help

If the message is not a stop message, the user can ignore the information or the alert, and type what he wants.

- In fact the protection against unwanted data is not secured 100% and it is better to take this functionality as a simple *help to enter data*. Indeed, if you wish to by pass the validation restriction, a simple COPY-PASTE will work ...
- 9.3 Viewing the cells containing invalid data (because the warning message has been ignored)

Drop-down menu of the DATA VALIDATION Button –CIRCLE INVALID DATA Option





Removing the circles : the last option of the drop-down list : CLEAR VALIDATION DATA

10 Hints and tips to select, move, type ... into a very long list of records

10.1 Extending a selection

Click on the start cell or range of cells of the future selection Point the top, side ... border (according to the direction you need) SHIFT + Double-click

The selection is extended to the first empty cell You may then carry on double-clicking or resize the selection by using keyboard keys such as SHIFT + arrow for instance).

10.2 Filling a range of cells with data or a formula

Typing

Select the range of cells Type the data or the formula Validate with CTRL + ENTER

Recopying a text or a formula

Point the copy handle



Double-click

(copying is extended until the last filled cell of the column located right next to it (on the left or on the right)

10.3 Copy-paste using the mouse but with no overwriting

Select the row(s) / column(s) SHIFT + drag the selection border = moving + inserting CTRL + SHIFT + drag the selection border = copy + inserting

10.4 Naming a cell to navigate faster

Click in the name box and type the required name

If you copy the cell, you also copy the name.

VAT	:	\times	\checkmark	f_{x}
		в		с
1				

Go to the named cell :

Get the same drop-down list and click onto the name

Managing the names : FORMULAS Tab

B3	
VAT	
_	

TOOLS TO MANAGE DATA

.....

1 Adding new records

You may type manually new records at the end of the list. But you can also use a form dialog box, which provides a nice alternative when there are hundreds or thousands of rows ...

The command is not on the Ribbon, its button has to be added to the Quick Access Toolbar.

- Click on the toolbar chevron (right end) and select MORE COMMANDS
- Choose to display ALL COMMANDS
- The command to be added is the following :



It will generate the following dialog box :

	A	В	С	D	
1	Numbe 🝷	Inv. Da 🔻	Customer N 🔻	Qt -	Prie
2	100	15.déc.16	12	1	
3	101	19.déc.16	6	3	
4	Auto-filte	er		? ×	
5		-			
6	Number:	100	A	1 of 24	
7				Maur	
8	_ <u>I</u> nv. Date:	15.12.2016		Ne <u>w</u>	
9	Cu <u>s</u> tomer	Nr.: 12		Delete	
10				_	
11	<u>Q</u> ty:	1	_	Restore	
12	Price/Piece	e: 100.5			
13				Find <u>P</u> rev	
14	<u>A</u> mount:	100.50			
15	 Salesman: 	BRUNO		Find <u>N</u> ext	
16				<u>C</u> riteria	
17	Pr <u>o</u> duct:	EAO		<u>e</u> ncena	
18				Close	
19				C <u>l</u> ose	
20					
21			~		
22	110	73.000.17	/	1 21 1	

The buttons are quite clear. Interesting to mention :

NEW

To add a record. It will be automatically added as the last entry at the bottom of the list

CRITERIA

The form fields are all emptied. Type what you are searching and press the ENTER key

The dialog box will show the matching record

2 Sorting

HOME Tab- EDITING Group - SORT & FILTER Button	AZ				
	Sort	& Find	38 b		
	Filter	🔻 Sele	ct≖		
	₽↓	<u>S</u> ort Si	malle	st to Large	st
	Ă↑	S <u>o</u> rt La	arges	t to Smalle	st
	¥۲	C <u>u</u> sto	m So	rt	
	T	<u>F</u> ilter			
	×	<u>C</u> lear			
	Y _C	Reapp	ly		

The label depends on the nature of the data in the column

Sort A to $Z \rightarrow$ Text Sort Smallest to Largest \rightarrow Numbers Sort Oldest to Newest \rightarrow Dates

The rest of the functionality commands as well as others related to it, are located on the DATA Tab, the SORT & FILTER / DATA TOOLS / OUTLINE groups.

2.1 Important rules about sorting

Sorting is impossible

Sorting is not possible if the table contains merged cells. But it is a little bit tricky as Excel allows you to set custom sorting keys but when you perform the sort, a warning message will be displayed telling you it is not possible.

If the active cell is not inside the cell, the following warning message will be displayed : *the command could not be completed by using the range specified.* ...

Header row or not ?

Usually tables have header rows but it is not compulsory. However, sorting si more difficult as Excel will display the column fields as *Column A*, *Column B*, *Column C* instead of *LastName, FirstName, Address* for instance.

Default sorting order

Numbers – punctuation signs – text (no difference between small letters and caps) – logical values – error values – empty cells.

2.2 Standard sorting

The AZ and ZA commands from the drop-down menu of the SORT & FILTER button.

2.3 Custom sorting

CUSTOM SORT

Sort						?	\times
* <u>A</u> ↓ <u>A</u> dd	Level X Delete Level	Copy Level	▲ ▼ <u>O</u> ption	ıs	🗹 My da	ta has	<u>h</u> eaders
Column		Sort On		Order			
Sort by	Salesman 🗸	Values	~	A to Z			\sim
					OK	6-	n col
					OK	Ca	ncel

* Sort On - Values : the word Values means data as opposed to cell color, icon. It does not refer to numbers.

Multi-level sort

• You can add up to a maximum of 64 keys

Multi-level sort will give you the possibility to sort first by *Number of years in the company,* then by *Department,* then by *Name ...*

Selecting a level	Click between two levels. It will be more comfortable
ADD LEVEL Button	An empty key is added after the selected level
DELETE LEVEL Button	The selected level is deleted. No confirmation message
COPY LEVEL Button	The selected level is copied after the current one
Arrows	To change the keys order

- Performing a multi-level sorting does not force you to work with the custom sort dialog box. You may also perform simple sorts, in sequence by using the AZ / ZA commands or buttons but remember to go from the lowest level to the highest level.
- Sorting keys remain active in the above dialog box, provided you do not add a new record at the end of the list (in the middle : it is OK).

Special criteria: cell color and icon

• Here after an example of sorting on fill color:

Column		S	ort On		Order		
Sort by	Amount	v C	Cell Color	~	No Cell Color 🔻	On Top	¥
					No Cell Color		

When working with colors (fill or font), order does not mean that you can sort first on a color, then on another one ... In this latter case, simply apply successive sorts.

You can sort on the cell icon – coming from a conditional format applied to the column :

Column	Sort On	Order	
Sort by Years in the company	V Cell Icon	✓ X ✓ On	Тор 🗸
		🗙 ! 🖌	

Click on the OPTIONS *button* for additional settings : CASE SENSITIVE and ORIENTATION (sort direction).

Sorting on custom lists

What to do when you need to sort on a column containing *text dates* (months typed as standard text for instance) ? By default Excel will apply an A to Z sort and the result will be : *April, August, December, February* ... Here below the solution :

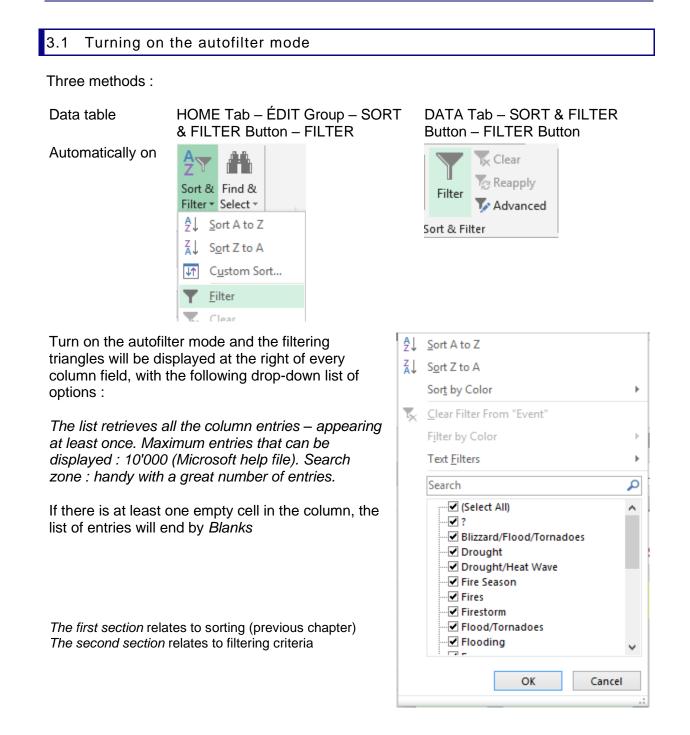
Column		Sort On		Order		
Sortby	AUDIT month	Values		A to Z A to Z Z to A Custom List.		•
Custom	n Lists			?	×	
Mono Jan, F Janua Lun., Lundi janv, f	m <u>l</u> ists:	List <u>e</u> ntries:	^	<u>A</u> dd Delet		
Pre	ess Enter to separate list ent	ries.	~			
			OK	Car	ncel	

Select the list that corresponds to the characters used in the column (Caution : Excel does not understand abbreviations).

These lists are the standard Excel custom lists that you certainly regularly use to create series : (from one given element : click and drag using the autofill handle and Excel automatically creates the corresponding series).

These lists can also be checked, modified, created ... through : FILE – OPTIONS – ADVANCED Category - GENERAL Section – EDIT CUSTOM LISTS Button.

3 Standard filtering



3.2 Simple filter : by value, format or special criteria

3.2.1 Filtering by value - 1, 2, 3 ... criteria

- Check/Uncheck the criteria in the drop-down list
- If you wish to check on just a selection of specific criteria, first turn off all of them (*Select All*) and then turn on the required criteria.
- New 2010 : the SEARCH box can help you search a specific criteria:

Text <u>F</u> ilters	►
Drought	×
 ✓ (Select All Search Results) ✓ Add current selection to filter ✓ Drought ✓ Drought/Heat Wave 	

The list is automatically filtered while you are typing. Finally you simply click on the OK button.

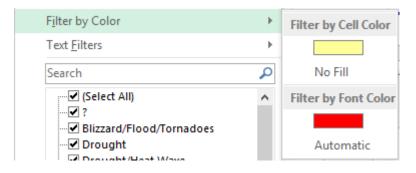
When a criteria has been set, the color and the drawing on the triangle change. When you point the triangle a tooltip displays the criteria :

'е –	Event	Location	•	Cost - in \$ Billion 💌		
980	Drought/Heat Wave	E		40 40		
	Drought/Heat Wave	Event:				
	Drought/Heat Wave	Equals "Drought" or Equals "Drought/Heat Wave"				
Clea	Clearing the filter : click on the triangle			Sor <u>t</u> by Color		
		5	Clear Filter From "Event			
				Filter by Color		

3.2.2 Filtering by fill color, font or icon

When the column contains filling colors, special font colors or icon from conditional formats, the filter drop-down list includes the corresponding options.

For example : our department has applied a yellow filling to the natural disasters we have managed, we can now filter « our » disasters :



<u>Clearing the filter</u> : tick off the filter by cell color

Text <u>F</u> ilters	►	\checkmark	
(Select All)	^	_	No Fill

It is not possible to *combine* formats filters

3.2.3 <u>Number or text or date filters</u>

The option is automatically labeled according to the data in the column

Number filters

Text filters

Date filters

<u>E</u> quals	<u>E</u> quals	Equals
Does <u>N</u> ot Equal	Does <u>N</u> ot Equal	Before
<u>G</u> reater Than	Begins W <u>i</u> th	After
Greater Than <u>O</u> r Equal To	Ends Wi <u>t</u> h	Between
Less Than	Cont <u>a</u> ins	
Less Than Or Egual To	Does Not Contain	Tomorrow
Between	Custom Filter	T <u>o</u> day
<u>T</u> op 10	Custom <u>F</u> irterin	Yester <u>d</u> ay
<u>A</u> bove Average		Next Wee <u>k</u>
Bel <u>o</u> w Average		This Week
Custom <u>F</u> ilter		

Make your choice. If necessary a dialog box will be displayed to type the criteria. Options linked to dates often provide a date navigator. The dialog box is the one displayed by the CUSTOM FILTER option :

Custom AutoFilter	?	×	Caution with the "spoken" logic and
Show rows where: Event			the pure mathematical logic !
	Draught		
equals V	Drought	\sim	If you are asked to filter disasters of the following types : <i>Drought</i> and
<u>○ And</u> <u>O</u> r			Drought/Heat Wave, verbally the person
equals 🗸	Drought/Heat Wave	\sim	will say AND but the real logical link is OR
Use ? to represent any single character			!
Use * to represent any series of charact	ers		
	OK Ca	ncel	

<u>Clearing the filter</u> : as for a standard filter (CLEAR FILTER FROM ...)

3.2.4 Filtering using the right click on a given cell

- The autofilter need not be active
- Right click the cell

	Filt <u>e</u> r	F	-	Cl <u>e</u> ar Filter
*	S <u>o</u> rt	F	T _C	<u>R</u> eapply
	Insert Co <u>m</u> ment			Filter by Selected Cell's <u>V</u> alue
e- 0-	<u>F</u> ormat Cells			Filter by Selected Cell's Color
	Pic <u>k</u> From Drop-down List			Filter by Selected Cell's <u>F</u> ont Color
	Define N <u>a</u> me			Filter by Selected Cell's Icon

• Select the required filter command

• The autofilter mode is automatically turned on

<u>Clearing the filter</u> : as for a standard filter (CLEAR FILTER FROM ...)

3.2.5 Filter criteria working on more than one column

Caution, filter criteria are *added*. Each new criteria is added to the current one, which consequently reduces the filtered result.

Example about the impact this can produce :

- You filter the sales of BRUNO and JOHN - then you filter sales amounts above Frs 1000.--. This is applied both to Bruno and John's sales.

Impossible to show all BRUNO sales but only JOHN's sales only above Frs 1000.-. To obtain this you will have to work with the *advanced filter*.

3.2.6 Updating the filter

You have manually modified data in the criteria column and you now need to update the filter : click on the SORT & FILTER button (HOME Tab) and choose the REAPPLY command or the same button on the DATA Tab.

3.2.7 Clearing ALL criteria

The active cell can be located anywhere : click on the SORT & FILTER button (HOME Tab) and choose the CLEAR command or the same button on the DATA Tab.

3.2.8 Turning off the autofilter mode

Click on the FILTER button (DATA Tab) / option FILTER (HOME Tab). It works like a switch.

3.2.9 Copying-pasting-printing the filtered result

No problem. Select and only the filtered rows will be copied-pasted-printed. Caution : the autofilter mode is the only functionality where copying-pasting ... is automatically restricted to the filtered rows and is consequently "secured". It is not the case with manually hidden rows, with an outline view mode and so on.

4 Advanced filter

The advanced filter provides tools to filter on criteria that prove impossible to set using the autofilter mode. Even when the two commands are equivalent, the advanced filter allows you to save the criteria range, a handy disposition.

It requires :

A data table

A criteria range placed at the top or bottom of the table

 4.1 Setting the crite Copy the required c Type the required c 	olumn label			
Link OR : salesmen BRUNO or JOHN or JOHANNA	BRUNO's sales between 500 and 1300 OR all JOHN's sales			
Salesman BRUNO JOHN JOHANNA	AmountAmount>=500<=1200	Salesman BRUNO JOHN	Amount >=500	Amount <=1200
Can be obtained with the autofilter	Can be obtained with the autofilter	Cannot be ob	tained with th	ne autofilter

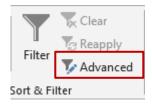
For the criteria range : you can copy-paste the whole header row, even though criteria will be typed only below specific labels.

Number	Inv. Date	Customer Nr.	Qty	Price/Piece	Amount	Salesman	Product
						BRUNO	

Indeed, any empty cell is understood by Excel as *criteria* = *no restriction*. Provided the *number* of *rows containing the criteria* does not change, you may add criteria without having to reset the criteria range. This can prove very handy.

4.2 Filtering

- Active cell in the data table
- DATA Tab SORT & FILTER Group ADVANCED Button



	А	В	С	D	E	F	G	
16	Number	Inv. Date	Customer Nr.	Qty	Price/Piece	Amount	Salesman	Prod
23	106	06.avr.17	8	3	68.25	204.75	PETER	Lang
24	107	10.avr.17	5	7	89.50	626.50	JOHN	Lang
25	Advan	ced Filter	? X	4	95.00	380.00	BRIAN	EAO
26				3	73.25	219.75	JOHANNA	EAO
27	Action	Action			84.75	508.50	BRIAN	Lang
28	● Fi	Iter the list, in-p	lace	12	99.90	1'198.80	BRUNO	Lang
29		opy to another I		13	100.30	1'303.90	BRUNO	Office
30		opy to another i		8	110.00	880.00	JOHN	Gam
31	List ran	ige: \$A\$16	:SH\$40 🔣	1	130.60	130.60	PETER	Office
32	Criteria	Criteria range: r'!\$A\$43:\$A\$46		1	56.30	56.30	BRIAN	Office
33	-			9	25.90	233.10	PETER	Office
34	Copyt	Copy to:			25.00	150.00	JOHN	Lang
35		que records onl	v	4	3.00	12.00	BRUNO	Office
36		que <u>r</u> ecords on	,	3	49.50	148.50	BRIAN	Office
37		ОК	Cancel	8	29.90	239.20	JOHANNA	EAO
38				2	18.60	37.20	JOHN	Office
39	122	30.déc.17	9	7	88.90	622.30	BRUNO	Lang
40	123	31.déc.17	10	8	25.00	200.00	JOHANNA	Lang
41								
42								
43	Salesman							
44	44 JOHN							
45	45 PETER							
46	JOHANNA							
17								1

4.2.1 Filter the list, in-place

The word *list* means *data table*. Filtering is performed directly into the table. When you change the criteria, the previous filter result is removed and replaced with the new one.

Updating the criteria : if you do not need to reset the criteria range, you can run again the filter from this dialog box.

4.2.2 <u>Copy to another</u> Click directly onto the cell from which you want to paste the filtered result.

Caution : <u>you must select a cell from the current worksheet.</u> <u>Impossible to set another worksheet as the destination</u>. Excel allows you to select another sheet but when you validate to run the filter, there will be an error message.

Also : <u>make sure that the destination range of cells is free of data</u> <u>and large enough</u>. If there are data, they will be overwritten with no warning message.

Note : this is one of Excel commands that cannot be UNDONE

4.2.3 Partial extraction

You may copy-paste the filtered result of selected columns only to a new destination.

- Set the criteria range as usual
- Copy-paste the header row corresponding to the criteria at the destination location
- Copy to : make sure to select the pasted header row

	А	В	С	D	Е	F	G	Н
16	Number	Inv. Date	Customer Nr.	Qty	Price/Piece	Amount	Salesman	Product
35	118	10.août.17	4	4	3.00	12.00	BRUNO	Office
36	119	13.sept.17	5	3	49.50	148.50	BRIAN	Office
37	120	17.oct.17	7	8	29.90	239.20	JOHANNA	EAO
38	121	02.nov.17	8	2	18.60		JOHN	Office
39	122	30.déc.17	9	7	88.90		BRUNO	Languages
40	123	31.déc.17	10	8	25.00	200.00	JOHANNA	Langages
41								
42								
43	Number	Price/Piece	Amount	Salesman				
44					empty cells = th	ne whole list		
45						2	~	
46	Number	Price/Piece	Amount	Salesman	Advanced Filte	er ?	×	
47					Action			
48						ist, in-place		
49								
50					Copy to an	nother location		
51					List range:	\$A\$16:\$H\$40	1	
52					Criteria range:	r'!\$A\$43:\$D\$4		
53								
54					Copy to:	r'!\$A\$46:\$D\$4	5 🎫	
55					00py <u>1</u> 01	113/13/10/30/31	- I - HAR	
					_			
56					Unique <u>r</u> eco			
					_		Cancel	

4.2.4 <u>Duplicates (only when you copy to another location).</u>

This will help to remove any duplicates. But be careful as this can be tricky when you are working with partial extractions. Here below an example. The only difference between the two records is the date. The *table or list* has been reduced to those two rows just to make the example easier to follow :

	А	В	С	D	E	F	G	
1	Number	Inv. Date	Customer Nr.	Qty	Price/Piece	Amount	Salesman	Produ
2	122	30.déc.14	9	7	88.90	622.30	BRUNO	Langu
3	122	30.déc.14	9	7	88.90	622.30	BRUNO	Langu
4								
5								
6	Number	Price/Piece	Amount	Salesman	empty cells = the whole liste			
- 7								
8								
9	Number	Price/Piece	Amount	Salesman	unique record	ds:off		
10	122	88.90	622.30	BRUNO				
11	122	88.90	622.30	BRUNO				
12								
13	Number	Price/Piece	Amount	Salesman	unique record	ds:on		
14	122	88.90	622.30	BRUNO				
4.5								

4.2.5 <u>Reverting to a whole table or list</u>

Same as for the autofilter mode : click on the CLEAR button.

4.2.6 Special : calculated criteria

Most of the time you will work with simple criteria. But it could happen that you need a more complex criteria such as « the sales during the last 2 months », « all sales above the global sales average » etc ... These criteria are called *calculated criteria*. But true to say, they are a heavy to work with.

	А	В	С	D	E	F	G	Н
1	Number	Inv. Date	Customer Nr.	Qty	Price/Piece	Amount	Salesman	Product
20	118	25.oct.16	7	8	29.90	239.20	PETER	EAO
21	119	02.nov.16	8	2	18.60	37.20	JOHN	Office
22								
23	Date	20.11.2016			Sales for the	past two	months	
24					- FALSE			
25								
26				- I.	=B2>=TODAY	′()-60		
27								

Here are some calculated criteria and the corresponding filtered result :

	А	В	С	D	E	F	G	н
1	Number	Inv. Date	Customer Nr.	Qty	Price/Piece	Amount	Salesman	Produc
3	101	04.févr.16	5	4	111.95	447.80	BRUNO	EAO
- 7	105	10.avr.16	5	7	89.50	626.50	JOHN	Langua
8	106	13.avr.16	2	4	95.00	380.00	BRIAN	EAO
10	108	19.avr.16	7	6	84.75	508.50	BRIAN	Langua
11	109	01.mai.16	4	12	99.90	1'198.80	BRUNO	Langua
12	110	02.mai.16	9	13	100.30	1'303.90	BRUNO	Office
13	111	08.juin.16	5	8	110.00	880.00	JOHN	Games
22								
23	Average	72.43			Sales above	sales av	erage	
24				Г	- FALSE			
25								
26				<u>ا</u>	F\$21)			
07	1					-		

Caution : the function AVERAGE must refer to a range of cells with absolute references.

Three important things to respect if you set calculated criteria :

- The formula must produce the logical value TRUE or FALSE. Only the lines whose result is TRUE will be shown once the list is filtered.
- The formula must refer to at least one column of the list. The reference of the cell must be in relative mode. This reference can be any cell from the column (if the reference is the column label, the formula will produce the result #NAME? but you can ignore it as this will not affect the list filtering.). On the other hand, if the formula calculates, searches etc... a range of cells, this range must be set in absolute references.
- When you type a label for the calculated criteria *you must not use the name of an existing label.*

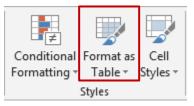
5 Formatting as a table

This was introduced for the first time in the 2003 version. Very handy as it gives the following possibilities :

- Securing adding new records (new records are always *inside* the table something most important when you create and manage pivot tables)
- Easy filtering as the autofilter mode is automatically active
- No need to freeze the header row : scroll down and it is automatic
- Working with a *row total,* at the bottom of the table.

5.1 Creating the data table

- Active cell inside the table
- <u>Through the HOME Tab</u>
- STYLES Group FORMAT AS TABLE Button



• Select the required format in the gallery

If the table (fully or partially) has an existing format (cell font, fill ...), Excel does not overwrite the existing format, unless you first right click the style and decide to clear any existing formatting :

 Apply and <u>C</u> lear Formatting	
 Apply (and <u>Maintain Formatting</u>)	
 Apply (and <u>w</u> aintain Formatting)	

- You are prompted to confirm the range of cells corresponding to the table and specify if the table has a header row or not
- Through the INSERT Tab
- TABLE Group TABLE Button



• Confirm the range of cells ... (selecting the format comes after)

Whatever the method, a data table has the following characteristics :

- Autofilter on
- No need to freeze the header row : scroll down and it is automatic
- If you carefully examine the table, you will notice that there is a border line around the records, with a little triangle on the last cell, at the table right end. This line represents the *security* mentioned in the introduction : the table will be automatically enlarged if you add a new row at the end of the table.

- A DESIGN Tab is displayed in the Ribbon.
- You can change the fill, font color but the inside border lines cannot be removed. (you may remove them only if you convert the table to a range of standard cells)

5.2 Headers row

No need to split/freeze ... The headers row remains on the top :

	Number 💌	Inv. Date 👻	Customer Nr.	▼ Qty ▼	Price/Piece 🔻	Amount 👻	Salesman 👻	Product 👻
22	120	17.oct.11	7	8	29.90	239.20	PETER	EAO
23	121	02.nov.11	8	2	18.60	37.20	JOHN	Office
24	122	30.déc.11	9	7	88.90	622.30	BRUNO	Languages
25	100	24 dán 44	10	0	25.00	200.00		Langagaa

5.3 Adding a record to the table

- Click on the table last cell (right bottom corner) and press the TAB key
- First empty row at the bottom of the table : click in the first cell and type the required data

 then press the ENTER key.

or

In both cases, the new record *belongs to the table*. The table format is automatically applied and the record is displayed inside the security border line around the table.

- If the table displays a total row (see corresponding topic), pressing the TAB key to add a record works fine, provided you click on the last cell *before* the total row.
- Contrary to simple sorting, adding a new record at the end of the table does not lead to loosing the multiple sort keys memorized in the custom sort dialog box.

5.4 Selecting

Selecting a column or a row is similar to what you do in Word :

Row	Point the beginning of the row. The mouse pointer becomes a horizontal arrow : click
Column	Point the top of the column. The mouse pointer becomes a vertical arrow : click
Whole table	Point the table top left corner. The mouse pointer becomes a diagonal arrow : click

5.5 Inserting a calculated column

- Insert a column in the table
- Create the formula/function in the first cell
- The formula/function is inserted in the whole column

Deleting the column : as usual

5.6 DESIGN tab

5.6.1 Naming and sizing the table

The PROPERTIES Group

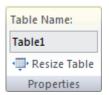


Table NameYou may give a name to the table (handy for pivot tables)
No space and cannot begin with a number

Resize Table It is the dialog box about confirming the range of cells (when you create a table). You can modify

5.6.2 <u>Removing duplicates and converting to range</u>

The TOOLS Group	Summarize with PivotTable Remove Duplicates Convert to Range Tools	Insert Slicer				
Summarize with PivotTable	Explained later					
Remove Duplicates	Same option as explained in a previous topic. See page 10					
Convert to Range	To remove the <i>table definition</i> and keep only the table format. You will be prompted to confirm.					

5.6.3 Filtering using segments

The following group :	Summarize with PivotTable Remove Duplicates Convert to Range Tools	Insert Slicer	Insert Slicers Number Inv. Date Customer Nr. Qty Price/Piece Amount Salesman Product	? Can	

Segments are simply a nice visual tool to make filtering a bit easier

Result choosing PRODUCT / AREA / SALESMAN

	A	В	С	D	E	F	G	ŀ
	Salesm	an 🌾	🧏 Р	roduct	¥= 🍢			
	BRIAN			EAO				
	BRUNG)		Langages				
	PETER	t		Languages				
	JOHN			Office				
				Games				
1								
2	Numbe		Customer	N 🔽 Qt			Salesmar	
3	100	15.déc.16	12	1	100.50		BRUNO	EAO
6	103	04.févr.17	5	4	111.95		BRUNO	EAO
8	105	05.mars.17 16 avr 17	- / 3	2	77.30		BRUNO	EA0 FA0
	ple click	Th avr 171	r		o select one		BBUNU	TEALL
	•						-	
CIF	RL + click			10	o select mult	iple criteria	2	
×]			То	o clear the fil	ter		
DEL	DELETE on the segment border To delete the segment							
5.6.	5.6.4 Modifying the style that has been applied							
The	following	g groups :	П	leader Row	First Column			

The following groups :	Header Row First Column	
	🔲 Total Row 📄 Last Column	
	Banded Rows 🔲 Banded Columns	
	Table Style Options	Table Styles

You can apply another format (TABLE STYLES Group) You can change the fill, bold ... attributes applied to given rows/columns (TABLE STYLE OPTIONS Group). Reminder : you cannot remove the borders lines.

5.6.5 Dynamic subtotals

In the previous group : check on TOTAL ROW A total row is automatically added at the end of the table and various subtotals are possible :

Nur	mber 👻	Inv. Date	Customer Nr. 🗖	Qty 👻	Price/Piece 🔽	Amount 👻	Salesman 👻	Product 🖃
23	121	02.nov.17	8	2	18.60	37.20	JOHN	Office
24	122	30.déc.17	9	7	88.90	622.30	BRUNO	Languages
25	123	31.déc.17	10	8	25.00	200.00	BRUNO	Lanqaqes
26 To	tel.					L .	*	24
27 28 29 30 31 32 33 34	с С	ontent	nt non empty c n ers = counts r ly numbers			None Average Count Count Number Max Min Sum StdDev Var More Function		

These subtotals are said dynamic because they automatically adapt to the current filter :

fx =SUBTOTAL(109;[Amount])										
ner Nr. 💌	Qty 👻	Price/Piece 💌	Amount 👻	Salesman 🖵	Product 💌					
5	7	89.50	626.50	JOHN	Languages					
5	8	110.00	880.00	JOHN	Games					
12	6	25.00	150.00	JOHN	Languages					
8	2	18.60	37.20	JOHN	Office					
			1'915.70	*	5					
	Standard SUM		8'526.60							

Why ?

Take a closer look at the formula bar and you will notice that the function is not the SUM function but the SUBTOTAL function.

5.7 Defining a table using the quick analysis tag

Select the list The following tag will be Numbe 💌 Inv. Da Customer NI Qt Price/Pie Amou 1 100 15.déc.16 12 100.5 100. displayed (bottom right 101 19.déc.16 6 3 120.60 361.8 of selection): Am 102 12.janv.17 111.00 222.0 1 04.févr.17 5 4 447.8 103 111.95 3 104 88.50 88.5 25.févr.17 6 1 ice 2 105 05.mars.17 7 2 77.30 154.6 0 4 68 25 106 06.avr.17 8 3 204.7 107 10.avr.17 5 7 89.50 626.5 ۶ 1 108 13.avr.17 4 95.00 380.0 2 6 3 109 16.avr.17 3 3 73.25 219.7 110 84.75 508. 19.avr.17 6 Point the TABLE button 111 01.mai.17 4 12 99.90 1'198.8 2 and a preview of the 112 02.mai.17 9 13 100.30 1'303.9 5 08.juin.17 110.00 suggestion will be 113 5 8 880.0 1'1 18.juin.17 114 130.60 130.6 2 1 displayed. Click to 1'3 EC 20 validate 800.00000000 Games 50 30 30 1 Formatting T<u>o</u>tals Tables Sparklines Charts Then DESIGN tab to 2 finalize the table. 1 2 _? 2 2 2 Table PivotTable PivotTable PivotTable PivotTable More 2 * MORE : a dialog box 90 6 displays more table Tables help you sort, filter, and summarize data.)0 suggestions 2

5.8 Strong points – weak points

Strong point : subtotals are not located inside the table, they are displayed at the end of the table, as a separate row. Consequently no extra « weight ».

Weak points :

No synoptic view for these subtotals. It goes one by one, filter after filter. If you need subtotals and groups, it would be advisable to consider creating subtotals through the following option : DATA Tab - OUTLINE Group - SUBTOTALS Button.

Also, sheets containing data tables must be copied into another workbook one by one. No multi-selection.

6 Subtotals integrated into the list

6.1 Creating

- Sort the table to display the required groups
- DATA Tab OUTLINE Group SUBTOTAL Button
- Here after the following dialog box :

Caution, default propositions sometimes show little common sense (computer thinking ...), therefore check the settings carefully.

Replace current subtotals An important option when you need to add a subtotal to a column that already has one.

Example : to add the AVERAGE, MIN, MAX functions to the *Amount* column when there is already a SUM subtotal.

ОК

Group Ungroup Subtotal

Outline

Subtotal

Salesman

Qty Price/Piece Amount Salesman

Sum

Use function:

Add subtotal to:

Product

Remove All

Replace <u>current</u> subtotals
 <u>P</u>age break between groups
 Summary below data

At each change in:

G.

?

×

 \sim

~

¥

Cancel

Page break between groups To print each group on a separate page

Summary below data Usually subtotals are added at the *bottom* of the groups. If this option is unchecked, subtotals are added at the *top* of the group.

REMOVE ALL Button To revert to a normal list of records (with no subtotals)

Subtotals by month : The date format must omit the day (for instance : mmm-yy, mmm. yyyy etc....)

Example of subtotals

123		А	В	С	D	E	F	G	Н
	1	Number	Inv. Date	Customer Nr.	Qty	Price/Piece	Amount	Salesman	Product
ГГ・	2	101	19.déc.16	6	3	120.60	361.80	BRIAN	EAO
·	3	108	13.avr.17	2	4	95.00	380.00	BRIAN	EAO
· ·	4	110	19.avr.17	7	6	84.75	508.50	BRIAN	Languages
·	5	115	22.juil.17	1	1	56.30	56.30	BRIAN	Office
· ·	6	119	13.sept.17	5	3	49.50	148.50	BRIAN	Office
—	- 7						1'455.10	BRIAN Total	
Г ·	8	100	15.déc.16	12	1	100.50	100.50	BRUNO	EAO
·	9	103	04.févr.17	5	4	111.95	447.80	BRUNO	EAO
·	10	105	05.mars.17	7	2	77.30	154.60	BRUNO	EAO
·	11	109	16.avr.17	3	3	73.25	219.75	BRUNO	EAO
· ·	12	111	01.mai.17	4	12	99.90	1'198.80	BRUNO	Languages
·	13	112	02.mai.17	9	13	100.30	1'303.90	BRUNO	Office
·	14	118	10.août.17	4	4	3.00	12.00	BRUNO	Office
· ·	15	122	30.déc.17	9	7	88.90	622.30	BRUNO	Languages
—	16						4'059.65	BRUNO Tota	
ΠΓ·	17	123	31.déc.17	10	8	25.00	200.00	JOHANNA	Langages
—	18						200.00	JOHANNA TO	otal
Γ.	10	102	12 iany 17	2	2	111 00	222 00	ЮНИ	Office

The outline mode is applied to the subtotals (chapter at end of present documentation) *To expand/collapse levels* : + and – or detail buttons located right to the SUBTOTAL button. *Expand/collapse all levels* : click on the 1-2-3 buttons located at the top right corner.

6.2 How to copy-paste the subtotals or apply a special format ?

In the chapter about filtering we did mention that the filtered result could be safely printed, copied-pasted It is not the case with subtotals.

- Collapse levels to what is required and select
- Copy-paste, formatting ... will not work properly because
 - The hidden rows are always selected
 - For a paste : you will get false results, 0 values or horrible #REF!.
- <u>Solution</u>: Paste : if pasting hidden rows does not matter to you, use the PASTE SPECIAL command (or the Paste Options tag at the bottom right of the pasted range of cells) and choose to paste values only.

Paste or format : if you want to get rid of the hidden row, restrict the selection to the visible levels (or cells) only

Normal selection then HOME Tab – EDITING Group – Drop-down menu of the FIND & SELECT Button – GO TO SPECIAL Option – VISIBLE CELLS ONLY Option. (ou ALT [+];)

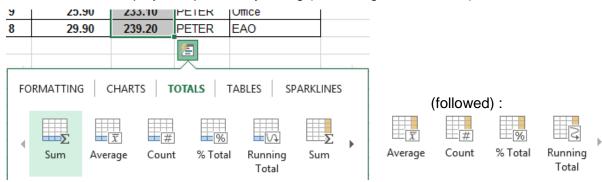
Then perform the required command : apply the format, copy-paste (in the latter case it will be automatically values only)

6.3 Strong points - weak points

Weak point : the subtotals are inserted *directly into the list* and consequently filtering, sorting becomes difficult and sometimes impossible unless you remove them. So most of the time, subtotals are "momentarily" inserted in the list. Moreover the subtotals must be formatted to stand out (only the function title is in bold but not the function result).

7 Adding totals using the quick analysis tag

Select the list to display the quick analysis tag (bottom right of selection):



The colored area indicates where the subtotal will be inserted.

Example with the following table :

Sales	Qtr 1	Qtr 2	Qtr 3
Product 1	45	25	46
Product 2	96	63	13
Product 3	85	65	34
Product 4	74	45	58
Product 5	45	75	26
Product 6	65	35	95
Product 7	89	86	32
Product 8	87	35	14
Product 9	41	79	78

% OF TOTAL (9th button)

7.58%	46
11.23%	13
12.02%	34
11.56%	58
9.54%	26
12.74%	95
13.52%	32
8.88%	14
12.93%	78
	1

Qtr 3

SUM (1st button) :

	627	508	396 둠
Product 9	41	79	78
Product 8	87	35	14
i iouucci	00	00	32

COUNT (3rd button) : function that count the non empty cells

Product 8	87	35	14
Product 9	41	79	78
	9	9	9 🛌

Qtr 3

RUNNING TOTAL (the last button)

46	116
13	288
34	472
58	649
26	795
95	990
32	1197
14	1333
78	1531

If the list has already been defined as a TABLE, the function buttons automatically add the *total row* (an option users usually ignore). Then there is a change : the SUM button still generates a *Sum* but it will be the one managed by the SUBTOTAL function :

F2	F26 ▼ : × ✓ f _* =SUBTOTAL(109;[Amount])								
	Number 👻	Inv. Date 📃 👻	Customer Nr. 👻	Qty 👻	Price/Piece 👻	Amount 👻	Salesman 👻	Product 🖃	
22	106	06.avr.17	8	3	68.25	204.75	PETER	Languages	
23	114	18.juin.17	2	1	130.60	130.60	PETER	Office	
24	116	25.juil.17	2	9	25.90	233.10	PETER	Office	
25	120	17.oct.17	7	8	29.90	239.20	PETER	EAO	
26						8'526.60	*		
27									

8 Pivot tables and pivot charts

The concept behind pivot tables is rather simple : it is a dynamic « single or double entry table ». They use detailed lists in order to generate various syntheses such as sales by area and salesman, by salesman and product etc... Pivot tables are a very powerful analysis tool.

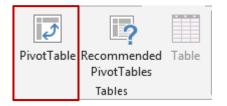
8.1 Creating

• Based on a list of records (not defined as a data table)

Select the list and the quick analysis tag will suggest pivot tables (when you point)	5'6 4'5 3'7 9'9 8'6 1'8	Row Labe HARDWA SOFTWAF TRAINING Grand To	els 🔻 Sur RE RE	m of sales 53300 46400 81200 180900			
* More : dialog box showing all possible suggestions	iubtotals 1 OUNT: 288 NU	FORMATTIN	?	?	DTALS TA	?	PARKLI PARKLI More

O Based on a list of records (not defined as a data table)

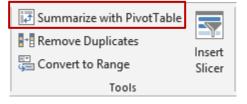
Click inside the list INSERT Tab – TABLES Group



• Based on a list of records defined as a *data table*

Make sure the active cell is inside the table

TABLE TOOLS – DESIGN Tab – TOOLS Group – SUMMARIZE WITH ... Button



The list happens to belong to another open workbook :

Nothing really special : select the destination cell of the future pivot table and start creating it through INSERT Tab – TABLES Group –PIVOTTABLE Button – Select the required data ...

Creation (whatever the method)

Create PivotTab	e					?	×
Choose the data	that y	ou want to	analy	ze			
Select a tab	e or ra	ange					
<u>T</u> able/Ra	nge:	Table2					Ť
○ <u>U</u> se an exte	nal da	ata source					
Choos	e Con	nection					
Conned O Use this wo			odel				
Choose where yo	u war	nt the Pivot	Table	report to be	placed	d b	
New Works	neet						
<u>Existing</u> Wo	rkshe	et					
<u>L</u> ocatior	:						Ť
Choose whether	you w	ant to ana	lyze m	ultiple table	s		
🗌 Add this da	a to t	he Data <u>M</u> o	del				
				OK		Ca	ncel

Select a table or range

<u>The list is not named</u>: Excel automatically retrieves the range of cells corresponding to the list. The range is in absolute references.

<u>The list has been manuelly named</u> : Excel automatically retrieves the name.

<u>Data table</u>: Excel automatically retrieves its name (if you have not renamed the table, the name will be *Table1, Table2*...

<u>The list or the data table belongs to another workbook</u>: select the list or the table in the workbook (it must be open)

Use an external data
sourceFor files created by database programs such as Access. Excel
calls this a *connection*. Follow the Wizard instructions

• Choose the location

New Worksheet : a new blank sheet named *Sheet1* is inserted *before* the sheet containing the list or data table

Existing Worksheet : click in the *Location* text box and select the required worksheet and the starting destination cell

 Left – at the destination cell : On the right side : the PIVOTTABLE FIEL 	LD LIST pane
PivotTable Fields Choose fields to add to report:	Fields Section and Areas Section Stacked
 invoice date product salesman area sales commission payment 	Fields Section and Areas Section Side-By-Side Fields Section Only Areas Section Only (2 by 2)
MORE TABLES Drag fields between areas below:	Areas Section Only (1 by 4) Expand All
▼ FILTERS IIII COLUMNS area ▼ product ▼	 Collapse All Sort A to Z Sort in Data Source Order
■ ROWS Σ VALUES salesman ▼ Sum of sales ▼	Group Related Tables
Defer Layout Update UPDATE	

Result using the above settings :

	Α	В		С	D	E
1	area	(All)	•			
2						
3	Sum of sales	Column Labels	•			
4	Row Labels 🔻	HARDWARE		SOFTWARE	TRAINING	Grand Total
5	JOHN	730	0	29300	7500	44100
6	KEITH	630	0	2500	31400	40200
7	MAX	1950	0	14600	20400	54500
8	PETER	2020	0		21900	42100
9	Grand Total	5330	0	46400	81200	180900

Drag the field into the required section

You can also simply check the field. In this case, Excel will try to automatically figure out its position by analyzing the nature of the data

Number→ValuesText and dates→Row LabelsSpecial : OLAP date/time→Column Labels

Most important : show common sense ! the way the pivot table is arranged is totally up to you. Do not drag too many fields into the sections, or the table will get unreadable and incomprehensible.

It is also not advisable to choose the *Column Labels* section for a field containing mostly unique entries, such as dates for instance. You should rather choose the *Row Labels* section as our eyes read better a long table rather than a large one. Or you could choose the *Report Filter* section, which will guarantee a real fluid reading.

Special : field with lots of dates

If you table has a column full of dates, Excel can automatically group them as soon as you select the corresponding field label.

☐ Country ✓ Order Date ———	Rows	_	Row Labels V
Order nr	Years	-	■2017 ■Qtr1
	Quarters	-	⊞Qtr2
	Order Date	-	
			Grand Total

If you do not like it this way, simply delete the grouping fields and keep only the main label.

Report Filter To automatically adjust the calculations according to an additional field, here *area.*

Users of previous versions : this filter is the old page field

This button displays a drop-down list of views for the *Field List* pane (see above screen capture)

Defer Layout Update and the UPDATE Button When you drag a new field to one of the four sections, the pivot table is automatically updated accordingly. Unless you turn on this option. It will be updated only when you manually click on the UPDATE button.

<u>Note</u>: caution when this option is active, a fair number of commands to manage the pivot table are no longer available (for instance the buttons on the OPTIONS Tab).

Fields to add to report

Some other examples of pivot tables

Synthesis : sales by product. It is a single-entry table :

3	Row Labels 🔻	Sum of sales
4	HARDWARE	53300
5	SOFTWARE	46400
6	TRAINING	81200
7	Grand Total	180900
-	1	1

T FILTERS	
	Σ VALUES
product 🔻	Sum of sales 🔹

Synthesis : sales and commissions by product : a single-entry table

_					
3		Values		T FILTERS	COLUMNS
4	Row Labels 🔻	Sum of sales	Sum of commission		Σ Values \bullet
5	HARDWARE	53300	7995		
6	SOFTWARE	46400	6960		
7	TRAINING	81200	12180		
8	Grand Total	180900	27135		
^					Σ VALUES
				product 🔻	Sum of sales 🔻

Synthesis : sales by salesman and by product (with a possible filter by area). It is a double-entry table:

	A		В	
1	area		(All)	
2				
3	Row Labels	٣	Sum of s	ales
4	■JOHN		4	4100
5	HARDWAR	Ξ		7300
6	SOFTWARE		2	9300
7	TRAINING			7500
8	■ KEITH		4	0200
9	HARDWAR	Ξ		6300
10	SOFTWARE			2500
11	TRAINING		3	1400
12	■MAX		5	4500
13	HARDWAR	Ξ	1	9500
14	SOFTWARE		1	4600
15	TRAINING		2	20400
16	PETER		4	2100
17	HARDWAR	Ε	2	0200
18	TRAINING		2	1900
19	Grand Total		18	0900

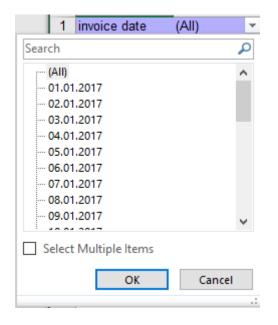
▼ FILTERS	
area 🔻	
ROWS	Σ VALUES
salesman 🔻	Sum of sales 🔹
product 🔹	

Sum of com... 🔻

8.2 Sorting and filtering the pivot table

Pivot tables are said dynamic because there are filters to make the result vary

8.2.1 <u>Report filter</u>



One item : click to select

Multiple selection : first check the SELECT MULTIPLE ITEMS option. Each item then displays the selection case.

Closing the pull-down list : CANCEL button, ESC key, click in the table or into the worksheet.

8.2.2 Field filter (rows or columns)

	4 Row Labels	-
Sel	ect field:	
sal	esman	\sim
₽↓	Sort A to Z	
Z↓	S <u>o</u> rt Z to A	
	More Sort Options	
×	<u>C</u> lear Filter From "salesman"	
	Label Filters	•
	<u>V</u> alue Filters	►
	Search	P
	 ✓ (Select All) ✓ CHARLES ✓ JOHN ✓ KEITH ✓ LUKE ✓ MAX ✓ PETER 	
_	OK Cance	I .:

The first section corresponds to the SORT Group on the OPTIONS Tab.

Other access to the sorting options : right click the field label or any item.

Select field : salesman	The drop-down list displays more than one item when there are several row fields. Here <i>salesman</i> and <i>product</i>
Sort A to Z / Z to A	AZ and ZA : standard ascending/descending sort.
	Note that it is possible to manually drag an item (here one given salesman) and its details, subtotals into the pivot table to set a custom order.
More Sort Options	The first dialog box shows the above options. The MORE OPTIONS button provides additional settings such as :
	 Automatic sort each time the table is updated Sort using custom lists
Filters	Standard filter criteria
Selection cases	Check/Uncheck as required
Clearing filters	

Clearing filters Criteria for one field : option CLEAR FILTER FROM XXX All criteria (all fields) : one by one or OPTIONS Tab – ACTIONS Group – Drop-down menu of the CLEAR Button – CLEAR FILTERS Button

8.3 Simple modifications in the FIELD LIST pane

8.3.1 <u>Dragging a field into another section – Removing a field</u>

Fields can be dragged from one section to another. You may also right click the field label.

You can also check/uncheck the field in the Field List, at the top of the pane. The destination section is automatically set by Excel according to the nature of the data.

If you drag the field outside the pane, you remove it.

Order of the fields : click and drag to set the order.

You can also work with the field's drop-down list and its commands.

8.3.2 Changing the default function

Adding is the default calculation but you can change to another one.

• Click on the triangle located at the right of the value field

	Move <u>U</u> p
	Move <u>D</u> own
	Move to Beginning
	Move to <u>E</u> nd
T.	Move to Report Filter
■	Move to Row Labels
	Move to Column Labels
Σ	Move to Values
X	Remove Field
0	Value Field Setti <u>n</u> gs
Sum	of sales 🔻

• VALUE FIELD SETTINGS

Value Field Settings	? ×							
Source Name: sales								
Custom Name: Sum of	sales							
Summarize Values By	Show Values As							
Summarize value field	by							
Choose the type of cal data from the selected	culation that you want field	to use to summarize						
Sum Count Average Max Min Product	~							
<u>N</u> umber Format	ОК	Cancel						

8.3.3 Adding a function

A value field can be dragged twice

Σ VALUES	
 Sum of sales 	-
Sum of sales2	-
	UPDATE

Then you change the function (see previous topic). Why not also rename the cell label ? Caution : the layout automatically applied by Excel is often not the best choice ...

	Product HARDWARE		SOFTWARE		TRAINING		Total Sum	Total Average
Area	 Sum 	Average	Sum	Average	Sum	Average		
EAST			11300	3767	31400	7850	42700	6100
NORTH	24200	6050	9000	9000	9500	4750	42700	6100
SOUTH	13600	6800	10100	3367	29100	7275	52800	5867
WEAST	15500	5167	16000	5333	11200	5600	42700	5338
Grand Total	53300	5922	46400	4640	81200	6767	180900	5835

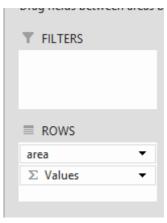
The table is too large and it is quite ... ugly !

The Field List shows to what the VALUES field will refer (COLUMNS or ROWS ?) :

T FILTERS	
	product 🔻
	Σ Values \checkmark
	Σ VALUES
area 🔻	Sum 🔻
	Average 🔻

The Σ VALUES can be dragged from the COLUMNS box into the ROWS box and the layout will be greatly improved :

	P	roduct 🛛 💌			
Area	₹ H	IARDWARE	SOFTWARE	TRAINING	Grand Total
EAST					
Sum			11300	31400	42700
Average			3767	7850	6100
NORTH					
Sum		24200	9000	9500	42700
Average		6050	9000	4750	6100
SOUTH					
Sum		13600	10100	29100	52800
Average		6800	3367	7275	5867
WEAST					
Sum		15500	16000	11200	42700
Average		5167	5333	5600	5338
Total Sum		53300	46400	81200	180900
Total Averag	е	5922	4640	6767	5835



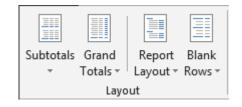
8.4 Creating a worksheet showing the calculation details

Double-click a total and a worksheet will be automatically created. It will list all the records used in the calculation. (Here the total of sales of someone called Max) :

		А	В	С	D	E	F	G	Н	
1	i	nvoice date 💌	product 💌	salesman 💌	area	country	free-lance 💌	sales 💌	commission 💌	pay
2		22.01.2017	HARDWAR	MAX	NORTH	SPAIN	NO	6800	1020	22
3		16.01.2017	TRAINING	MAX	NORTH	SPAIN	NO	4600	690	16
4		13 01 2017	SOFTWAR	MAX	NORTH	SWIT7FRI	NO	9000	1350	13

8.5 DESIGN Tab : changing the layout and the format

LAYOUT Group



8.5.1 Subtotals

If the table has more than one row or column fields, then internal subtotals are created

The drop-down menu of the SUBTOTALS button					☑ Row Heade		
	Subtotals *	Grand Totals ▼	Report Layout ∗	Blank Rows ≖	🗹 Column He		
	Do Not Show Subtotals						
	Show all Subtotals at <u>B</u> ottom of Gro						
		Show all S	ubtotals at	t <u>T</u> op of	Group		
* <i>Last option</i> : available only for pivot tables connected to an OLAP data source.		Include Fil	tered Iten	ns in Tot	als		

Here below a pivot table (sales by product and by salesman) :

Default subtotals

3	Row Labels 🛛 💌	Sum of sales
4	■ JOHN	44100
5	HARDWARE	7300
6	SOFTWARE	29300
7	TRAINING	7500
8	■ KEITH	40200
9	HARDWARE	6300
10	SOFTWARE	2500
11	TRAINING	31400
12	■MAX	54500
13	HARDWARE	19500
14	SOFTWARE	14600
15	TRAINING	20400
16	PETER	42100
17	HARDWARE	20200
18	TRAINING	21900
19	Grand Total	180900

Do Not Show Subtotals

Row Labels	Sum of sales
HARDWARE	7300
SOFTWARE	29300
TRAINING	7500
■ KEITH	
HARDWARE	6300
SOFTWARE	2500
TRAINING	31400
■MAX	
HARDWARE	19500
SOFTWARE	14600
TRAINING	20400
PETER	
HARDWARE	20200
TRAINING	21900
Grand Total	180900

Show all Subtotals at Bottom of Group

Row Labels	Sum of sales		
■JOHN			
HARDWARE	7300		
SOFTWARE	29300		
TRAINING	7500		
JOHN Total	44100		
■ KEITH			
HARDWARE	6300		
SOFTWARE	2500		
TRAINING	31400		
KEITH Total	40200		
■MAX			
HARDWARE	19500		
SOFTWARE	14600		
TRAINING	20400		
MAX Total	54500		
PETER			
HARDWARE	20200		
TRAINING	21900		
PETER Total	42100		
Grand Total	180900		

8.5.2 Grand Totals

The drop-down menu of the GRAND TOTALS button

		🗹 Row Hei
Grand Totals ▼	Report Blank Layout • Rows •	🗹 Column
	O <u>f</u> f for Rows and (Columns
	O <u>n</u> for Rows and C	olumns
	On for <u>R</u> ows Only	
	On for <u>C</u> olumns Or	ily

Here below a pivot table (simple : sales by salesman)

Sum of sales	Column	Labels 💌				
Row Labels	-	JOHN	KEITH	MAX	PETER Gr	and Total
HARDWARE		7300	6300	19500	20200	53300
SOFTWARE		29300	2500	14600		46400
TRAINING		7500	31400	20400	21900	81200
Grand Total		44100	40200	54500	42100	180900

Off for Rows and Columns

Sum of sales Column L	.abels 💌			
Row Labels 💌	JOHN	KEITH	MAX	PETER
HARDWARE	7300	6300	19500	20200
SOFTWARE	29300	2500	14600	
TRAINING	7500	31400	20400	21900

Show all Subtotals at Top of Group Corresponds to the default subtotals

On for Rows and Columns = *By default*

On for Rows only

Sum of sales	Column Labels 💌				
Row Labels 💌	JOHN	KEITH	MAX	PETER	Grand Total
HARDWARE	7300	6300	19500	20200	53300
SOFTWARE	29300	2500	14600		46400
TRAINING	7500	31400	20400	21900	81200

On for Columns only

Sum of sales	Column Labels 💌			
Row Labels 💌	JOHN	KEITH	MAX	PETER
HARDWARE	7300	6300	19500	20200
SOFTWARE	29300	2500	14600	
TRAINING	7500	31400	20400	21900
Grand Total	44100	40200	54500	42100

8.5.3 Report Layout

The drop-down menu of the REPORT LAYOUT button	Row Headers
The options will let you make very light changes.	Report Blank Layout - Rows - Column Headers
	Show in <u>C</u> ompact Form
By default : the pivot table is in Compact Form	Show in Outline Form
	Show in <u>T</u> abular Form
	Repeat All Item Labels
	Do <u>N</u> ot Repeat Item Labels

Here below the modifications applied to the pivot table on page 56

Outline Form			Tabular Form		
salesman	product	Sum of sales	alcallal		Juli Ol aulea
■JOHN		44100		HARDWARE	7300
BJOHN				SOFTWARE	29300
	HARDWARE	7300		TRAINING	7500
	SOFTWARE	29300	JOHN Total		44100
	TRAINING	7500	■ KEITH	HARDWARE	6300
		40200		SOFTWARE	2500
	HARDWARE	6300		TRAINING	31400
	SOFTWARE	2500	KEITH Total		40200
_	TRAINING	31400	■MAX	HARDWARE	19500
BMAX		54500		SOFTWARE	14600
	HARDWARE	19500		TRAINING	20400
	SOFTWARE	14600	MAX Total		54500

Repeat All Item Labels (option to combine with an Outline or Tabular mode)

product	🔻 area	Sum of sales
HARDWARE		53300
HARDWARE	NORTH	24200
HARDWARE	SOUTH	13600
HARDWARE	WEAST	15500
SOFTWARE		46400
SOFTWARE	EAST	11300
SOFTWARE	NORTH	9000
SOFTWARE	SOUTH	10100
SOFTWARE	WEAST	16000
TRAINING		81200
TRAINING	EAST	31400
TRAINING	NORTH	9500
TDAINING		20100

8.5.4 Blank line between items

The drop-down menu of the BLANK ROWS button

	Row Headers Banded Rows
Blank Rows •	Column Headers 🗌 Banded Colum
	Insert Blank Line after Each Item
	<u>R</u> emove Blank Line after Each Item

By default : no blank line separates the groups

The beginning of the previous table showing blank lines :

Border, fill color ... are allowed but no data typing

3	product	Sum of sales			
4	HARDWARE				53300
5	HARDWARE		NORT	Η	24200
6	HARDWARE		13600		
7	HARDWARE		WEAS	ST	15500
8					
9	SOFTWARE				46400
10	SOFTWARE	EAST			11300
11	SOFTWARE		9000		

8.5.5 Modifying the table format

The PIVOTTABLE STYLE OPTIONS and PIVOTTABLE STYLES groups :

Row Headers Banded Rows	
🖉 Column Headers 🔲 Banded Columns	
PivotTable Style Options	PivotTable Styles

Row Headers Column Headers Banded Rows Banded Columns Caution, turning off headers does not mean that the information is removed. Only the format will be removed (border for instance)

The Styles Gallery If y

If you have manually changed the format, it will be maintained when you click on the style. Unless you right click it and set otherwise :

Apply and <u>C</u> lear Formatting	
Apply (and <u>M</u> aintain Formatting)	
Modif <u>y</u>	
Duplicate	
Delete	
Set As <u>D</u> efault	
Add Gallery to Quick Access Toolbar	

Please note that a style can be set as the *default style*.

8.5.6 <u>Removing the table format / Creating a new custom table style</u>

The last two options at the bottom of the styles gallery :

		Ξ		ΞΞ		Ξ	= =	Ξ	Ξ	Ξ	Ξ	Ξ	= :	Ξ	=	Ξ	Ξ	Ξ	Ξ	Ξ	Ξ	Ξ	Ξ	•
1	New <u>P</u> iv	votT	able	e Sty	le																			
疁	<u>C</u> lear																							

Clear Font color, fill color, borders ... everything is removed

New PivotTable Style	Here the dialog box :		
	New PivotTable Style		? ×
	Name: PivotTable Style 1		
	Table Element:	Pre	view
	Whole Table Report Filter Labels Report Filter Values First Column Stripe Second Column Stripe First Row Stripe Second Row Stripe First Column Header Row		300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300
	Element Formatting:	ОК	Cancel

Name the style and set its format attributes (font, border, fill) for each item in the table. To do so click on the FORMAT button.

<u>Note</u> : starting from scratch is a little bit long and heavy. It will be more comfortable to start from the closest style and then customize it :

- Right click the style in the gallery
- DUPLICATE Option
- The dialog box is the same as the one for a new style
- Name the copy of the style and modify as necessary
- Validate

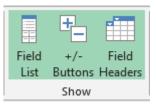
The new pivot table style will be displayed at the top of the styles gallery. Point and Excel will show its name. Right click and you will be able to edit it, remove it, set it as default style etc ...



8.6 ANALYZE Tab : working more deeply

8.6.1 <u>Displaying/Hiding table elements</u>

The SHOW/HIDE Group



The buttons are clear : you can hide the *Field List* pane, the Outline *Buttons* that are automatically added in case of internal subtotals, *Field Headers* (headers are the *row* and *column labels* that can be at times a bit "bulky").

8.6.2 Deleting the table, selecting, moving

The ACTIONS Group



Clear The available options from the drop-down list : CLEAR ALL (deleting the whole table and leaving only the empty structure) or CLEAR FILTERS (where there are more than one fields).

Deleting the table : you can also delete the rows manually

Select	¢.						
	Select	Move PivotTable	Fields, & Se				
	L L	Labels and Values					
		alues					
		abels					
	E	ntire Pivot <u>T</u> a	ble				
	► E	nable Selecti	on				

● When the drop-down list is displayed, the first three commands are never available. You must first select the entire table ((Entire PivotTable), then the options become available.

1

Enable Selection : to select a row by simply pointing the beginning of it (the mouse pointer will show the following shape : \rightarrow)

Move PivotTable	Move PivotTable			?	×
	O <u>N</u> ew Workshe	Choose where you want the PivotTable report to b <u>New Worksheet</u> <u>Existing Worksheet</u>			
	<u>L</u> ocation:	Sheet2!A3			Ť
			ОК	Cano	el

8.6.3 Updating the table data

The DATA Group	Refresh	Change Data Source *					
Refresh	Indeed there is no link between the ta source data.		Refr Co Co Co Co Co Co Co	Change Data Source * Refresh Refresh <u>A</u> II Refresh Status Cancel Refresh Connection Properties			
	Refresh	All tables bas	sed o	on the same source			
	Refresh All			urrent workbook, even thoug ne from different sources	h		
	The other options	Related to external source data.					



Connection Properties : for external source data

Clicking on the top of the button = CHANGE DATA SOURCE :

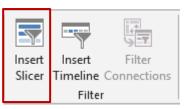
Change PivotTable Data Source					×	
Choose the data that you want to analyze Select a table or range						
<u>T</u> able/Range	List_with_examp	oles			<u>↑</u>	
🔘 Use an external (lata source					
Choose Co	nnection					
Connection (name:					
			OK	(Cancel	

Note : naming the table can be a great help when there are more than one source data in the workbook.

8.6.4 Adding a slicer

Change Data Source

The command is located in the SORT & FILTER group

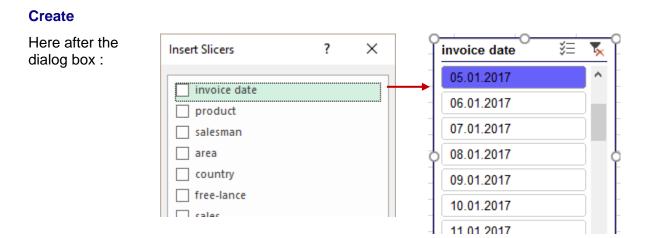


Principle : it works just like the REPORT FILTER but has a great advantage : it is very visual. The slicer is used to update the table result according to an additional criteria.

Simply click on the required criteria and the table is automatically filtered to match the selected request :

2			invoice date	5		2	Pow Labole	Sum of sales
3	Row Labels -	Sum of sales			-			
4	CHARLES	12400	05.01.2017			4	KEITH	1800
5	JOHN	31700		= 1		5	Grand Total	1800
6	KEITH	24900	06.01.2017		11.	6		
7	LUKE	31000	07.01.2017					
8	MAX	45500		- 1				
9	PETER	35400	08.01.2017					
10	Grand Total	180900	09.01.2017					
11								
40			10 01 2017					

Back to full list : click on the filter button (at the slicer top right)



Manage the slicer (OPTIONS Tab)

Use the <u>SLICER STYLES</u>, <u>BUTTONS</u> and <u>SIZE</u> groups to manage the « look » of the slicer.. *Note : sizing can also be done using the mouse. More comfortable.*

	• Columns: 1	1 Height: 6.62 cm	*
Slicer Styles	 Height: 0.63 cm ↓ Width: 4.02 cm ↓ 	Width: 5.08 cm	÷
	Buttons	Size	5

The PIVOTTABLE CONNECTIONS button

By default all tables created on the same source are linked to the slicer. Use this button to control and act on the links :

in	cer Caption voice date Slicer Set		Report Connections		Slicer Style		Bring Forv Send Back	ward	
E	Report Co	onnecti	ons (invoice dat	e)				?	×
	Select Pive	otTable	and PivotChart r	eports to connect to	o this filter				
		Name				Sheet			
	🗹 🚺	PivotTa	able3			Analysis			
1	☑ 🗊	PivotTa	able5			Analysis			
2	🗖 🖬	PivotTa	able2			Sheet2			
3									
4									
6							OK	Ca	ncel

<u>The SLICER SETTINGS button</u> gives access to its properties (display the header or not, name ...)

Slicer Settings	Slicer Styles
Slicer Settings	? ×
Source Name: invoice date Name to use in formulas: Slicer_invoice_date <u>Name:</u> invoice date Header <u>O</u> <u>D</u> isplay header <u>C</u> aption: invoice date Item Sorting and Filtering <u>A</u> scending (Oldest to Newest) <u>O</u> Descendin <u>g</u> (Newest to Oldest) <u>U</u> Use Custo <u>m</u> Lists when sorting	 Hide items with no data ✓ Visually indicate items with no data ✓ Show items with no data last
	Sh <u>o</u> w items deleted from the data source

8.6.5 <u>Using TIMELINE to display the data for a specific period of time</u>

For which tables ? Pivot tables where dates are part of the source list (whether the date field is visible or not in the pivot does not matter). As this one below .

Sum of TotalPrice	Column Labels 💌					
Row Labels	01.01.2017	02.01.2017	03.01.2017	04.01.2017	05.01.2017	06.01.201
Berglunds snabbköp						
Blondel père et fils						
B's Beverages						
Centro comercial Moctezuma						
Chop-suey Chinese						
Comércio Mineiro						
Ernst Handel						
Folk och fä HB						
Frankenversand	13090					
GROSELLA-Restaurante		4950	556			
Hanari Carnes						
HILARIÓN-Abastos						
Hungry Owl All-Night Grocers						
Lehmanns Marktstand						
LILA Supermercade						

The values end up scattered and the pivot table is quite ... ugly ...

The option is found in the FILTER group

Also INSERT Tab – FILTER Group

Insert	Insert Timeline C Filter	Filter	
Insert Timeli	nes	?	\times

Creating

- TIMELINE Button
- Excel finds fields with dates

Order Date

- Select the filter criteria
- Drag the handles to set the beginning and end of the required time span

The pivot is reduced to the set period, here the first week in January 2013

Sum of TotalPrice Row Labels	Column L 2		26.04.20	017 27.04	1.2017 28	.04.201	7 29.04.2017 30.04.
Centro comercial Moctezuma Chop-suey Chinese	Order	Date		_0			C K
Ernst Handel Folk och fä HB	Tr2 - Tr	3 2017				M	IOIS -
Frankenversand Hanari Carnes	0 ²⁰¹⁷ FÉVR	MARS	AVR	MAI	JUIN	זחור	ANNÉES
HILARIÓN-Abastos Ottilies Käseladen Que Delícia Rattlesnake Canvon Grocerv	•						 MOIS JOURS

8.6.6 <u>Manually grouping rows & columns – grouping date fields</u>

The GROUP Group	 → Group Selection ☑ Ungroup ☑ Group Field Group
Group Selection	Corresponds to a manual Outline (see chapter about it). You may then select rows (more rarely columns) and group them
Ungroup	Corresponds to a manual Outline (see chapter about it). To remove any custom grouping on rows or columns
Group Field	This option becomes available when the <i>nature of the data is compatible with grouping</i> . Classical case : dates as in the following example :

Particularly interesting with fields containing dates (as in the table on page 65)

Right click one of the	Sum of TotalPrice	Column Labels					
Right click one of the date occurrences and select the GROUP command (equivalent to the button on the ribbon). Excel automatically suggests to group by year, quarter, month, day The whole table gets drastically reduced		▼ janv 9054 a 13090 5500	févr 7100 2397 10845 3040 3093	7905	avr 385	mai 1713.6 10402 5599.5	juin 400 15799.4 3478
	Morgenstern Gesundkost Ottilies Käseladen	6004					6578.25 2240

<u>Automatically grouping dates</u> - Reminder : Excel can automatically detect a column with dates and group the dates directly in the *Field List.* (already mentioned on page 50)

	A		В	С	D	E					
1								PivotTable Field	S	*	×
2											
3	Sum of TotalPrice	Column	Labels 💌					Choose fields to add to repo	ort:	-0	} - -
4	Row Labels 🔹 🔻		1	2	3						
5	■ 2017							Search			Q
6	🗏 Qtr1										-
7	janv		9970.8	8854	12280.7	5115.8	3	Client			
8	févr		10543.5			7078		Employee			
9	mars					547	.	City			
10			8074.4		8404.5	33325.7					
11	⊞ Qtr3				1732.8	459		Country			
12	⊞ Qtr4							✓ Order Date			
13	■ 2016							Order nr			
14			-			1309		Product			
	Grand Total		28588.7	8854	22418	63750.6	5	✓ TotalPrice			
16								✓ Quarters			Ŧ
17											
18								Drag fields between areas b	elow:		
19											
20								T Filters	III Columns		
21									Employee		-
22									Linpioyee		
23											
24											
25											
26								Rows	Σ Values		
27								Years 💌	Sum of TotalPr	ico	-
28									Sum of TotalPr	ice	
29								Quarters 🔻			
30								Order Date 🔻			
31											
32							-				
	 ↔ List2- 	calculated	d-field	Calcu	ated	÷ :		Defer Layout Update		Upo	date
	<u> </u>				- · ·						
Sin	nply remove the	e fields	you do	not i	need						

8.6.7 Adding a formula in the table

It is the CALCULATIONS Group	Fields, Items, & Sets \checkmark Colap Relationships Tools \checkmark
	Image: fxImage: fxImage: fxImage: fxields, Items, & Sets \neg OLAP Relationships Tools \neg PivotChaCalculated Field Calculated ItemField
	Solve Order
	Create Set Based on <u>R</u> ow Items Create Set Based on <u>C</u> olumn Items

Manage Sets...

Calculated field

Insert Cal	culated Field		?	×
<u>N</u> ame: For <u>m</u> ula:	Net = sales - commission	~	<u>A</u> dd Delete	
Eields: invoice da product salesman area sales commissi payment		ОК	Clo	se

• Indicate the name of the field and create the required mathematical formula. You <u>must</u> use existing fields because as you can notice, the dialog box does not let you click onto the worksheet on any cell. On the other hand, you can use a constant as a percentage for instance.

Insert the fields by clicking on the INSERT FIELD button, link them with the appropriate mathematical operator and click on the ADD button when you have finished.

You can include functions such as an IF but true to say it is ... heavy.

• A column with the new field is automatically added to the table and in the *values* section of the Field List ...pane.

The other options are more complicated and will not be covered in this documentation.

<u>Calculated Item</u> : creating a special row item <u>Solve Order</u> : priority order for custom formulas <u>List Formulas</u> : creating a worksheet that will list all the formulas and their order.

8.6.8 Adding a value setting such as "in % of Grand Total"

First add the calculated field a second time (unless you need a replacement)

	Σ VALUES	
-	Sum of TotalPrice	•
	Sum of TotalPrice2	•

Several possibilities :

• Right click in the field column and select the SHOW VALUES AS option

7'100.0			1	
2'397.0	<u>С</u> ору			
400.0 📰	<u>F</u> ormat Cells			
1'713.6 10'845.0	Number Forma <u>t</u>		-	
15'799.4 🗋	<u>R</u> efresh			
3'478.0 17'683.0	Sort	F	~	No Calculation
5'506.0 🗙	Remove "Sum of TotalPrice2"			% of <u>G</u> rand Total
10'787.0 5'599.5	Su <u>m</u> marize Values By	F		% of <u>C</u> olumn Total
10'945.0	Show V <u>a</u> lues As	×		% of <u>R</u> ow Total
5'769.3 8'927.0	Show D <u>e</u> tails			% <u>O</u> f
1'254.(Value Field Settings			% of <u>P</u> arent Row Total
6'004.0				% of Parent Column Total
6'578.2	PivotTable <u>O</u> ptions			% of Par <u>e</u> nt Total
3'053.6	Hide Fiel <u>d</u> List	_		Difference From

In the FIELD LIST – Drop-down list of the field and VALUE FIELD SETTINGS option

Value Field Settings	?	×
Source Name: sales		
Custom Name: Sum of sales		
Summarize Values By Show Values As		
Show v <u>a</u> lues as		
No Calculation		\sim
No Calculation		~
% of Grand Total % of Column Total		
% of Row Total		
% Of		_
% of Parent Row Total Sales commission		~
Number Format OK	G	ancel

8.6.9 Field settings : adding internal functions to a table

The ACTIVE FIELD Group

* Options related to hierarchy (Drill) options are for tables created using the data model feature (a bit like in Access).

Active Field:	J		+3			
salesman	Drill	Drill	_			
illi Field Settings	Down	Dim	1			
Active Field						

All the group options correspond to commands already explained.

The + and – buttons

To expand/collapse the groups when there are several row/columns fields. Corresponds to clicking on the + or – buttons located in the table, left to the item name.

If the row/column has only one field, then clicking on the + or – buttons generates a dialog box to choose which field to add (the dialog box calls this detail). The chosen detail or field is automatically added to the Field List pane.

This corresponds to dragging the field into the required section.

Field Settings			?	>
Source Name: salesm	an			
Custom Na <u>m</u> e: sales	man			
Subtotals & Filters	Layout & Print			
Subtotals				
○ <u>A</u> utomatic				
O Non <u>e</u>				
Outlow				
Select one or mo	re functions:			
Sum		~		
Count Average				
Max				
Min Product				
Filter				
_				
<u>I</u> nclude new item	is in manual filter			
			_	

Custom Name

Up to you. The name has no incidence on the data source but it can be helpful when the source field names are not very clear.

The custom name is displayed in the Field List ... pane and in the pivot table.

Caution : it is not allowed to choose the same name as the source name.

Subtotals & Filters Tab

Subtotals

To add functions to a row/column field. Click to select or deselect the function. But caution, adding a function is only visible if the table has more than on row/column field.

A standard table Sum by default

Row Labels	Sum of sales
■ JOHN	44100
HARDWARE	7300
SOFTWARE	29300
TRAINING	7500
■ KEITH	40200
HARDWARE	6300
SOFTWARE	2500
TRAINING	31400
■ MAX	54500
HARDWARE	19500
SOFTWARE	14600
TRAINING	20400
PETER	42100
HARDWARE	20200
TRAINING	21900
Grand Total	180900

AVERAGE – MAX – MIN are added to the salesmen (click a first name) (a number format has been applied)

Row Labels	Sum of sales
■JOHN	
HARDWARE	7'300
SOFTWARE	29'300
TRAINING	7'500
JOHN Average	4'900
JOHN Max	9'200
JOHN Min	1'800
■ KEITH	
HARDWARE	6'300
SOFTWARE	2'500
TRAINING	31'400
KEITH Average	5'743
KEITH Max	8'600
	410.00

AVERAGE – MAX – MIN are added to the products (click a product) (a number format has been applied)

Row Labels	Sum of sales
■JOHN	44'100
HARDWARE	7'300
SOFTWARE	29'300
TRAINING	7'500
KEITH	40'200
HARDWARE	6'300
SOFTWARE	2'500
TRAINING	31'400
■ MAX	54'500
HARDWARE	19'500
SOFTWARE	14'600
TRAINING	20'400
PETER	42'100
HARDWARE	20'200
TRAINING	21'900
HARDWARE Average	5'922
HARDWARE Max	8'500
HARDWARE Min	3'000
SOFTWARE Average	4'640
SOFTWARE Max	9'200
SOFTWARE Min	1'800
TRAINING Average	6'767
TRAINING Max	12'000
TRAINING Min	1'800
Grand Total	180'900

Note : working with the field settings has no influence on the presence and location of the main fields dragged into the Field List ...pane. It is a fully internal work.

Removing the additional functions

Revert to the above dialog box and set subtotals as automatic

What is the difference with dragging a field once more into a given section in the Field List pane and then simply changing the function ?

Here after the same pivot table but the functions have been added in the Field list pane :

Values										
Row Labels 🛛 💽	Sum of sales	Average of sales	Max of sales	Min of sales						
■JOHN	44'100	4'900	9'200	1'800						
HARDWARE	7'300	7'300	7'300	7'300						
SOFTWARE	29'300	4'186	9'200	1'800						
TRAINING	7'500	7'500	7'500	7'500						
■ KEITH	40'200	5'743	8'600	1'800						
HARDWARE	6'300	6'300	6'300	6'300						
SOFTWARE	2'500	2'500	2'500	2'500						
TRAINING	31'400	6'280	8'600	1'800						
■ MAX	54'500	6'056	12'000	3'000						
HARDWARE	19'500	4'875	6'800	3'000						
SOFTWARE	14'600	7'300	9'000	5'600						
TRAINING	20'400	6'800	12'000	3'800						
PETER	42'100	7'017	9'900	3'000						
HARDWARE	20'200	6'733	8'500	3'700						
TRAINING	21'900	7'300	9'900	3'000						
Grand Total	180'900	5'835	12'000	1'800						

<u>Filter</u>

To include or exclude new items in the pivot table report when a filter has been applied

Layout & Print Tab

Relates to the previously explained subtotals To define layout settings such as inserting a blank line between groups, placing the items belonging to a second field in a separate column rather than above (result looks more like a table) etc ...

8.6.10 Various other options

OPTIONS Tab –	PIVOTTABLE Group)	PivotTable Name: PivotTable27 E: Options * PivotTable	
PivotTable Name	Up to you. Handy v same source data.	when there are se	everal pivot tables	created on the
	It is an internal nan	ne that appears r	nowhere else	
Options	Drop-down list :	Options 🔹	Field Settings	
		Options		
		Show Rep	ort Filter <u>P</u> ages	
		✓ <u>G</u> enerate	GetPivotData	

<u>Options</u>	All the default settings for the functionality. A dialog
	box with a lot of tabs.

Examples of some settings :

- Should Excel automatically adjust the column width when updating the table ?
- Should Excel maintain the cell format when updating the table ?
- Should Excel display the row/column totals by default?
- Etc ...

Show Report Filter If you have set a report filter by area, country ... this option will give you the possibility to create a pivot table by area, country ... each table on a separate worksheet.

> Set if the function GETPIVOTDATA must be used when extracting data from the pivot table (when you type the = sign and click on a result in the pivot table).

8.6.11 Creating a pivot chart

O

Based on an existing pivot table : the TOOLS Group

Pages

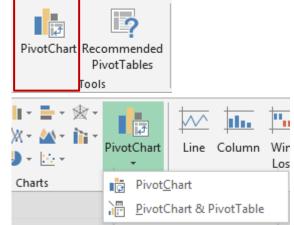
Generate <u>GetPivotData</u>

0

From scratch : the pivot table will be automatically created

INSERT Tab – TABLES Group – Drop-down menu of the PIVOTTABLE Button

First method : select the required chart type (usual chart dialog box)



isert (Chart		?	×
Recom	mended Charts	All Charts		
	Recent Templates Column Line	Clustered Column		
	Pie Bar Area	Sales achieved Chart Title		
☆ @ Ш	X Y (Scatter) Map Stock	Area Area Area Area Area Area Area Area		
æ	Surface			
★	Radar Treemap			
٢	Sunburst			
dh. Įį₽	Histogram Box & Whisker			
in III	Waterfall			

• Second method : it works just like creating a pivot table but the pivot chart is created simultaneously. By default the chart is a column chart. You may change the type later on.

	A	B	С	D	E	F	G	Н	1 I I	J	K	A	
1				.ç							Q [PivotChart Fiel	ds 👻 👻
2 3 4		PivotTable3 a report, chi			To build a	ı PivotChart,	Chai		PivotChart	Field List		Choose fields to add to re	port:
5 6 7 8 9 10 11 12 13 14		PivotTable									- - - - - - - - - -	invoice date product salesman area country free-lance sales commission payment	
15 16 17 18											-	Drag fields between areas	• below:
19 20												T FILTERS	IIII LEGEND (SERIES)
21 22 23 24													
24													∑ VALUES

As the pivot table is linked to the source pivot table, it is not possible to change the chart structure. Changes must be done to the source data. Moreover, it is usually not advisable to build a chart based on a pivot table with several row/column fields.

Manage : use the ANALYZE, DESIGN and FORMAT Tabs to manage the pivot table

Complex pivot tables (for instance more than one row / column labels). Do not hesitate to use the collapsing button () to close levels and make sure that the pivot chart remains easy to read and understand.

9 Data base functions

These functions are now often replaced by the total row (*data table*), by multiple criteria (filter) or by creating a pivot table ...

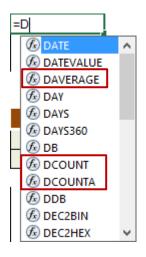
But it is important to know that these functions exist and that they could well prove to be very helpful if one day you cannot use a total row or filter or create a pivot table ...

Type =D in a cell and automatically the list of functions will include – among others – the database functions (all starting with D)

The syntax is the following:

=DSUM(data_base ;field ;criteria)

Data_base = the list (including the column labels) Field = the column concerned by the function result Criteria = the criteria zone with the column labels and below the required criteria



Here below the beginning of a list :

	А	В	С	D	E	F
1	Date 👻	💿 Salesman 👻	Product 👻	Qty 👻	Price 🔻	Amount 👻
2	28.10.2016	Small	M27	11	34.00	374.00
3	06.11.2016	Dickson	M27	23	34.00	782.00
4	15.11.2016	Graham	M27	25	34.00	850.00
5	24.11.2016	Greene	M27	1	34.00	34.00
6	03.12.2016	Pendergast	M27	2	34.00	68.00
7	12.12.2016	Pendergast	M27	12	34.00	408.00
8	21.12.2016	Ryan	M27	1	34.00	34.00
9	30.12.2016	Greene	M64	10	79.00	790.00
10	08.01.2017	Maskelene	M64	15	79.00	1'185.00
11	17.01.2017	Pendergast	M64	2	79.00	158.00
12	26.01.2017	Pendergast	M64	11	79.00	869.00
13	13.02.2017	Smithback	M72	1	91.00	91.00
14	22.02.2017	Smithback	M72	1	91.00	91.00
15	03.03.2017	Small	S09	25	44.00	1'100.00
16	21.03.2017	Greene	S09	22	44.00	968.00
17	30.03.2017	Pendergast	S09	5	44.00	220.00
18	08.04.2017	Pendergast	S09	14	44.00	616.00
19	17.04.2017	Smithback	S09	31	44.00	1'364.00
20	26.04.2017	Smithback	S09	10	44.00	440.00
~ *	00.00.00.07	12.11	000	00		000.00

Here below samples of criteria zones and the D functions below :

Salesman	Product	Qty	Price	Amount			
Greene							
2'322.00	=DSUM(\$A\$1:\$F\$129;\$F\$1;\$I\$1:\$N\$2)						
387.00	=DAVERAGE(\$A\$1:\$F\$129;\$F\$1;\$H\$1:\$M\$2)						
6	6 =DCOUNTA(\$A\$1:\$F\$129;\$F\$1;\$H\$1:\$M\$2)						
59	=DSUM(\$A\$1:\$F\$129;\$D\$1;\$H\$1:\$M\$2)						
	Greene 2'322.00 387.00 6	Greene	Greene	Greene			

=DSUM(\$A\$1:\$F\$129;\$F\$1;\$I\$1:\$N\$2)

The data base or list

The AMOUNT field (the column label is in F1) The criteria zone. ●[∞] labels **and** criteria below

The references are all absolute in order to be able to create the first function, copy down across cells and then simply change the name of the function.

For the *Number of Invoices* we could have used the DCOUNT function (counts only cells containing numbers) but the COUNTA function is larger and enables the user to write in the list a text information such as "unknown" or "pending" without affecting the total number of invoices.

When the criteria are in line, the logical link is AND

Date	Salesman	Product	Qty	Price	Amount
	Kelly				
	Dickson				
Sum of Amount	14'542.00				
Average of Amount	765.37				
Number of Invoices (rows)	19				
Sum of Qty	274				

When the criteria are in column, the logical link is OR (which we often translate with an AND when we speak ...)

Date	Salesman	Product	Qty	Price	Amount
<=31.12.2016	Greene				
824.00					
412.00					
2					
11					
	<=31.12.2016 824.00	<=31.12.2016 Greene 824.00	<=31.12.2016 Greene 824.00	<=31.12.2016 Greene 824.00	<=31.12.2016 Greene 50 50 50 50 50 50 50 50 50 50 50 50 50

When two criteria with an AND logical link are applied to the same field, you must copy the column label once more (to keep the criteria in line). Here the D functions only work on the year 2012 as the criteria set that it should be *after 1.1.2016 and before 31.12.2016*

POWER QUERY

.....

.....

1 What is Power Query

Power Query is a free add-in available since Office 2010 & 2013 releases and also for the Power BI Designer. It has been now natively integrated into the 2016 Office release. It's an intuitive tool that lets you manipulate, transform, consolidate, enrich, merge and do much more with your data. It **Extracts** data from almost any data source, **Transforms** that data somehow and then **Loads** it somewhere – either Excel, Power Pivot or the Power BI Designer canvas.

Some of the Power Query commands are equivalent to using functions such as VLOOKUP, INDEX, MATCH, OFFSET, INDIRECT ... but really, they prove far more intuitive and comfortable to use.

1 Options about how the program will work

Query Options		File Get Data * Ta		Insert	
GLOBAL Data Load Power Query Editor Security Privacy Diagnostics CURRENT WORKBOOK Data Load Regional Settings Privacy	 Default Query Load Settings Use standard load settings Specify custom default load settings: Load to worksheet Load to Data Model Fast Data Load () Data Cache Management Options () Currently used: 0 bytes Clear Cache Maximum allowed (MB): 4096 () Restore Defaults		From <u>File</u> From <u>Datab</u> From <u>Azure</u> From <u>Online</u> From <u>Other</u> Combine <u>Q</u> u unch Power ta Source <u>S</u> e ery O <u>p</u> tions	e S <u>e</u> rvices Sources Heries Query Editor ttings	
Also from the Query E	ok ditor : FILE – OPTIONS AND SETTINGS	Cancel			

DATA Tab – GET & TRANSFORM DATA Group

2 Creating and managing a query

2.1 The source data

DATA Tab - GET & TRANSFORM Group

Get From From Table/ Recent Existing Data * Text/CSV Web Range Sources Connections	Get Data *	From Text/CSV	From B Web	From Tabl	
Get & Transform Data		From <u>F</u> ile	•		Þ
	 P	From <u>D</u> at	tabase		×
	B	From <u>A</u> zı	ıre		F
		From On	line S <u>e</u> rv	vices	×
		From <u>O</u> th	her Sour	ces	×
	5	Combine	Queries	;	F
	👿 L	aunch Pow	ver Query	/ Editor	
	🔓 D	ata Source	<u>S</u> ettings		
	E Q	uery O <u>p</u> tio	ons		

Here below a source table :

	А	В	С	D	E	F	G	н
1	Client 💌	Employee 💌	City 💌	Country 🚽 💌	Order Date 💌	Order nr 💦 💌	Product 🗾	TotalPrice 💌
2	Frankenversand	4	München	Germany	01.01.2017	10267	Raclette Courdavault	13'090.00 F
3	GROSELLA-Restaurante	8	Caracas	Venezuela	02.01.2017	10268	Thüringer Rostbratwurst	4'950.00 F
4	GROSELLA-Restaurante	8	Caracas	Venezuela	03.01.2017	10268	Mozzarella di Giovanni	556.00 F
5	White Clover Markets	5	Seattle	United States	04.01.2017	10269	Mozzarella di Giovanni	2'641.00 F
6	Rattlesnake Canyon Grocery	6	Albuquerque	United States	05.01.2017	10272	Sir Rodney's Marmalade	1'944.00 F
7	Rattlesnake Canyon Grocery	6	Albuquerque	United States	06.01.2017	10272	Mozzarella di Giovanni	3'336.00 F
8	QUICK-Stop	3	Cunewalde	Germany	07.01.2017	10273	Boston Crab Meat	4'189.50 F
9	QUICK-Stop	3	Cunewalde	Germany	08.01.2017	10273	Lakkalikööri	2'257.20 F
10	Vins et alcools Chevalier	6	Reims	France	09.01.2017	10274	Mozzarella di Giovanni	973.00 F
11	Magazzini Alimentari Riuniti	1	Bergamo	Italy	10.01.2017	10275	Raclette Courdavault	1'254.00 F
12	Tortuga Restaurante	8	México D.F.	Mexico	11.01.2017	10276	Konbu	240.00 F
13	Morgenstern Gesundkost	2	Leipzig	Germany	12.01.2017	10277	Rössle Sauerkraut	3'640.00 F
14	Morgenstern Gesundkost	2	Leipzig	Germany	13.01.2017	10277	Tarte au sucre	2'364.00 F
15	Berglunds snabbköp	8	Luleå	Sweden	14.01.2017	10278	Raclette Courdavault	3'300.00 F
16	Berglunds snabbköp	8	Luleå	Sweden	15.01.2017	10278	Vegie-spread	1'404.00 F
17	Berglunds snabbköp	8	Luleå	Sweden	16.01.2017	10278	Röd Kaviar	1'500.00 F
18	Lehmanns Marktstand	8	Frankfurt a.M.	Germany	17.01.2017	10279	Alice Mutton	1'755.00 F
19	Berglunds snabbköp	2	Luleå	Sweden	18.01.2017	10280	Pâté chinois	1'920.00 F
20	Berglunds snabbköp	2	Luleå	Sweden	19.01.2017	10280	Rhönbräu Klosterbier	930.00 F
21	Romero y tomillo	4	Madrid	Spain	20.01.2017	10281	Teatime Chocolate Biscuits	36.50 F
22	Romero y tomillo	4	Madrid	Spain	21.01.2017	10281	Steeleye Stout	288.00 F
23	Romero y tomillo	4	Madrid	Spain	22.01.2017	10282	Ravioli Angelo	156.00 F
24	Romero y tomillo	4	Madrid	Spain	23.01.2017	10282	Nord-Ost Matjeshering	621.00 F
25	LILA-Supermercado	3	Barquisimeto	Venezuela	24.01.2017	10283	Teatime Chocolate Biscuits	657.00 F
26	LILA-Supermercado	3	Barquisimeto	Venezuela	25.01.2017	10283	Camembert Pierrot	4'760.00 F
27	LILA-Supermercado	3	Barquisimeto	Venezuela	26.01.2017	10283	Mozzarella di Giovanni	1'000.00 F
28	Lehmanns Marktstand	4	Frankfurt a.M.	Germany	27.01.2017	10284	Schoggi Schokolade	1'974.37 F
29	Lehmanns Marktstand	4	Frankfurt a.M.	Germany	28.01.2017	10284	Camembert Pierrot	2'040.00 F
	0111011 01		o 11	~	00.04.0047	40005	el :	01500.00.5

I chose FROM TABLE / RANGE (a standard table) The Query Editor window is run and displayed

ile	5		Column View						^
se & ad •		eriew - Manage -	Choose Remove Columns - Columns -	Keep Remove Rows • Rows •	Ž↓ Z↓ Split Gro Column ▼ By	Use First Row as Headers	Gamma Comparies → Comparis Append Queries →	Manage Parameters •	Data source settings
ose		Query	Manage Columns	Reduce Rows	Sort	Transform	Combine	Parameters	Data Sources New Query
	×	$\sqrt{f_X}$ = Table.Tra	ansformColumnTypes	(Source,{{"Clien	t", type text}, {	"Employee", Int64.Type}, {"(Tity", type text},	~	Query Settings
		A ^B _C Client	 1²3 Employee 	A ^B _C City	A ^B _C Country	🔄 Order Date 🔄 123 Orde	er nr 🔄 🖉 A ^B C Product		
	1	Frankenversand		4 München	Germany	01.01.2017 00:00:00	10267 Raclette Cour		▲ PROPERTIES
	2	GROSELLA-Restaurante		8 Caracas	Venezuela	02.01.2017 00:00:00	10268 Thüringer Ros	tbratwurst	Name
	3	GROSELLA-Restaurante		8 Caracas	Venezuela	03.01.2017 00:00:00	10268 Mozzarella di	Giovanni	Query by default
	4	White Clover Markets		5 Seattle	United States	04.01.2017 00:00:00	10269 Mozzarella di	Giovanni	All Properties
	5	Rattlesnake Canyon Grocery		6 Albuquerque	United States	05.01.2017 00:00:00	10272 Sir Rodney's I	/larmalade	▲ APPLIED STEPS
	6	Rattlesnake Canyon Grocery		6 Albuquerque	United States	05.01.2017 00:00:00	10272 Mozzarella di	Giovanni	
	7	QUICK-Stop		3 Cunewalde	Germany	07.01.2017 00:00:00	10273 Boston Crab	Veat	Source
	8	QUICK-Stop		3 Cunewalde	Germany	08.01.2017 00:00:00	10273 Lakkalikööri		X Changed Type
	9	Vins et alcools Chevalier		6 Reims	France	09.01.2017 00:00:00	10274 Mozzarella di	Giovanni	
	10	Magazzini Alimentari Riuniti		1 Bergamo	Italy	10.01.2017 00:00:00	10275 Raclette Cour		
	11	Tortuga Restaurante		8 México D.F.	Mexico	11.01.2017 00:00:00	10276 Konbu	~	
	12	<						>	
	3								

The source file columns are displayed. You can then work on them as necessary (developed in the next chapters)

	Fichie	er	Home	Transf
]	G	Prop Advia
2.2 Close and Load	Close Load	&ı ▼	Refresh Preview •	III Mar
Once you have finished, simply click on the following button			e & Load	
			e & Load	То

CLOSE & LOAD

CLOSE & LOAD TO

The list is pasted on the active sheet and it is automatically formatted as a *table*

Import Data	?	×			
Select how you want to view this data in	ı your v	vorkbook.			
=\$A\$1	Ť				
New worksheet					
Add this data to the Data Model					
Properties * OK	(Cancel			

Table

The *table* is created on the active sheet but you can select another sheet (you cannot select another *workbook*).

Pivot Table or Chart

No separate table is created on the active sheet, you directly get to the Pivot functionality

Only Create Connection

The table is not created on the active sheet. There is only a connection to the Query Editor. Implication : if you later on want to create the table, you cannot simply click again on the LOAD button (the first option will do nothing and the second option will remain greyed out. You will have to go through EXISTING CONNECTIONS...

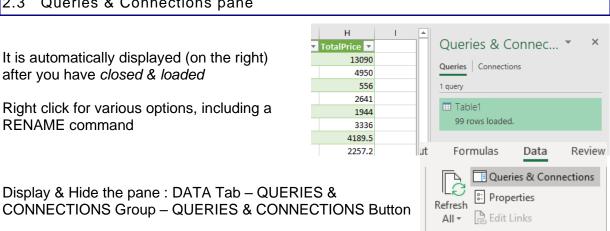
Here below the result with a simple CLOSE & LOAD. A normal table :

	A	В	с	D	E	F	G	н
1	Client 🔽	Employee 💌	City 🔽	Country 🛛 💌	Order Date 🛛 💌	Order nr 💌	Product	TotalPrice 💌
2	Frankenversand	4	München	Germany	01.01.2017 00:00	10267	Raclette Courdavault	13090
3	GROSELLA-Restaurante	8	Caracas	Venezuela	02.01.2017 00:00	10268	Thüringer Rostbratwurst	4950
4	GROSELLA-Restaurante	8	Caracas	Venezuela	03.01.2017 00:00	10268	Mozzarella di Giovanni	556
5	White Clover Markets	5	Seattle	United States	04.01.2017 00:00	10269	Mozzarella di Giovanni	2641
6	Rattlesnake Canyon Grocery	6	Albuquerque	United States	05.01.2017 00:00	10272	Sir Rodney's Marmalade	1944
7	Rattlesnake Canyon Grocery	6	Albuquerque	United States	06.01.2017 00:00	10272	Mozzarella di Giovanni	3336
8	QUICK-Stop	3	Cunewalde	Germany	07.01.2017 00:00	10273	Boston Crab Meat	4189.5
9	QUICK-Stop	3	Cunewalde	Germany	08.01.2017 00:00	10273	Lakkalikööri	2257.2
10	Vins et alcools Chevalier	6	Reims	France	09.01.2017 00:00	10274	Mozzarella di Giovanni	973
11	Magazzini Alimentari Riuniti	1	Bergamo	Italy	10.01.2017 00:00	10275	Raclette Courdavault	1254
10		-	And the second		** ** *** *** **	40070	17 I	0.40

2.3 Queries & Connections pane

It is automatically displayed (on the right) after you have closed & loaded

Right click for various options, including a **RENAME** command



Queries & Connections

A QUERY Tab is added on the ribbon with the following commands :

File	Home	Inser	t Dra	w	Page Layout	Formulas	Data	Review	V
Edit F	Properties	X Delete	Refresh	Load To	Duplicate DReference	Merge /	Append	Export Connection Fi	le
	Edit		Loa	d	Reuse	Com	oine	Share	

2.4 Link between the query and the generated table

Delete the table - the query remains Delete the query - the table remains

- → Edit the query and re-generate the table
- → This link is removed continue manually

2.5 Running the Query Editor again

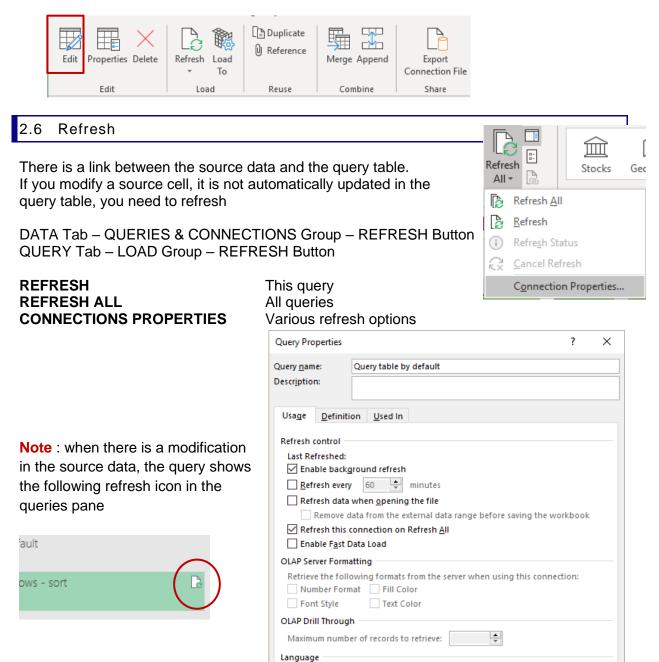
Whatever your cell position

DATA Tab – QUERIES & CONNECTIONS Group – QUERIES & CONNECTIONS Button. It displays a pane on the right, showing the various queries

<u>Point</u> a query to display a window that will summarize all its properties and <u>double-click</u> to run the Query Editor

Queries & Connec 👻 🗙						
Queries Connections						
1 query						
Table199 rows loaded.						

• When active in the query table : additional QUERY Tab on the Ribbon



Retrieve data and errors in the Office display language when available

Cancel

OK

2.7 Query Properties

Through the PROPERTIES Button either on the DATA Tab or the QUERY Tab Also right click on the query name in the queries pane

External	Data Properties		?	×		
Query						
Name:	Query table by de	efault		- -		
Data forr	natting and layout					
	☐ Include row numbers					
~		he data range chang data, delete unused		fresh:		
0	nsert entire ro <u>w</u> s f	or new data, clear un	used cells			
0	Overwrite existing	cells with new data, o	lear unuse	d cells		
		ОК	Can	cel		

3 The Query Editor window

3.1 Filtering

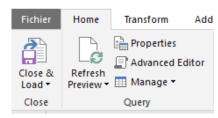
The usual filter commands An interesting one : REMOVE EMPTY

In this list, people have added manual subtotals ...

А	В	С	D		E		F C		
Country	💌 Salesman 🛛 💌	Date 🔽 Produ	:t-1	▼ Pro	duct-2	💌 Produ	uct-3 🔹 🔽 Product-4		
France	Lucy	10.04.2019		25		14	26		
	John	11.04.2019		63		78	83		
	Kevin	12.04.2019		58		95	84		
	Peter	13.04.2019		78		51	75		
	Edna	14.04.2019		96		48	35		
	Frances	15.04.2019		45		95	75		
	Max	16.04.2019		12		63	85		
	Total			377		444	463		
Switzerland	Luke	10.04.2019		25		14	26		
	Laurent	11.04.2019		63		78	83		
	Mark	12.04.2019					1		
	Arthur	13.04.2019		>	$\langle \vee$	' fx	= Table.FillDo	wn(#"Changed	Type",{"Coun
	Jenna	14.04.2019			-	-			
	Vero	15.04.2019			ABC CO	ountry	A ^B _C Salesman	💌 📆 Date	
	Annie	16.04.2019							
	Total			a 1	FA↓	Sort As	cending		
Italy	Julia	10.04.2019		2	FZI	c			
	-	** ** ****			- Z↓	Sort De	scending		
				3	F	Clear So	ort		
				4	F	cical 5			
Select or	ne column sha	owing the empty	/		F ×	Clear Fi	lter		
		• • •		5	F ~				
cens (noi	n the Date –	Product-1, 2)	6	F	Remove	e Empty		
				7	F	Date/Ti	me Filters		•
rney are	all removed			0	E .	D'atte, II	ine riners		
				8		Search			
				9	S	Search	1		
				10	S	✓ (S	elect All)		
				11	s	✓ (n	null)		^
						- C (0	ising .		

3.2 HOME TAB

3.2.1 Managing the query



REFRESH PREVIEW	It is usually automatic. Should this not be the case, you can click on this button						
PROPERTIES	A dialog box to rename the query and add a description You can also tick a box called FAST DATA LOAD (to boost up the query load) but Microsoft warns that Excel might become more unresponsive						
ADVANCED EDITOR	Codes behind						
MANAGE Manage Delete	You can delete the Query – The table inserted onto the sheet will remain but dissociated from its source data (→ no updating) Duplicate & Reference seem very similar. Here after the differences						
Duplicate	Query 1 shows what you have done						
	 ▲ APPLIED STEPS Source Changed Type Removed Other Columns Kept Range of Rows X Sorted Rows Query 2 is a duplicate (the steps remain and you add something new) 						
	 ▲ APPLIED STEPS Source Changed Type Removed Other Columns ★ Kept Range of Rows ★ Sorted Rows ★ Uppercased Text 						

Query 3 is a reference. It starts from query 2 and does not display the previous steps, starts fresh		
APPLIED STEPS Source Reordered Columns Finished ? click on CLOSE AND LOAD, a new sheet will be		
automatically created for every added query. If you simply close the Editor window, you are prompted to save or discard the changes. If you keep them, a new sheet is automatically created.		

3.2.2 Each step is memorized and can be deleted

Point the step to remove and click on the cross There is no UNDO command

3.2.3 <u>Choose Columns / Rows – Keep Columns / Rows</u>

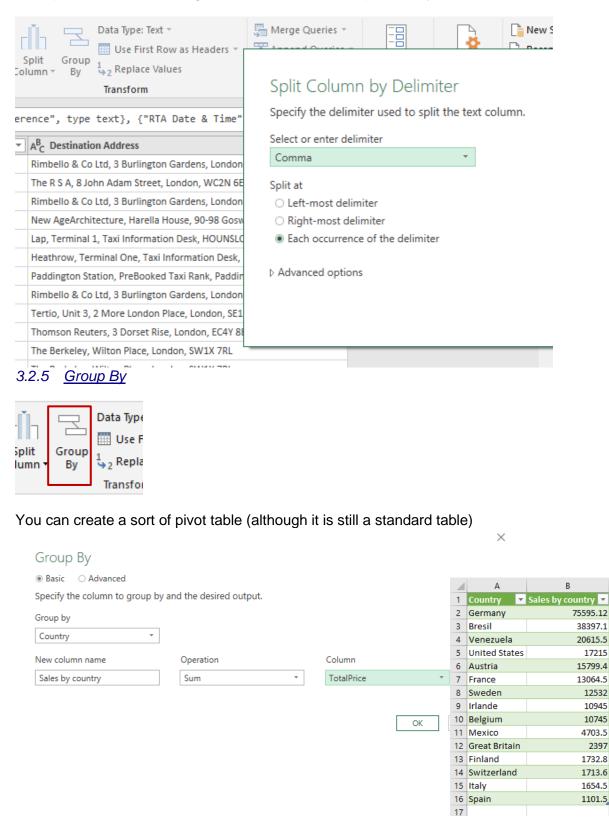
Choose Remove	Keep Remove	2↓
Columns + Columns +	Rows • Rows •	∡↓
Manage Columns	Reduce Rows	Sort

CHOOSE COLUMNS	CHOOSE COLUMNS A dialog box lists all columns labels Select what you need to keep GO TO COLUMN To navigate to a given label	
REMOVE COLUMNS	REMOVE COLUMNS A dialog box lists all columns labels Select what you want to remove REMOVE OTHER COLUMNS To remove all columns but the active one	
KEEP ROWS	Choose what you need to keep (how many rows at the top, at the bottom, a given range of rows etc)	
REMOVE ROWS	Choose what to remove (alternate, duplicates, blank etc)	
SORT	As usual	

3.2.4 Split Column

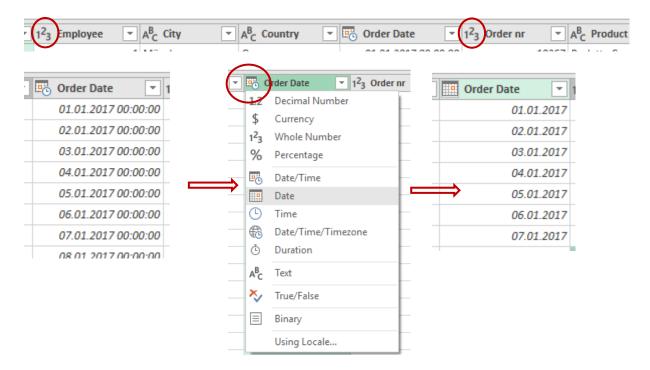
Very similar to the well-know TEXT TO COLUMNS ...

Example : a column showing a full address - items separated by a comma



3.2.6 <u>Data Type</u>

The header row indicates for each column its type of data et this can be changed



You are prompted whether to modify without adding a new step or by creating a new step

3.2.7 Use First Row as Headers – Replace Values

Data Type: Text 🝷
🛄 Use First Row as Headers 🔻
1 2 Replace Values
Transform

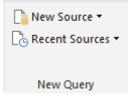
ΔΑΤΑ ΤΥΡΕ	You can change the type of data for the selected column (but no real format options)	
USE FIRST ROW	1 Row = Headers or Headers = 1 Row	
REPLACE VALUES	To replace one given value with another one - Because you cannot type into this window - Caution : it is not a global replace	

3.2.8 Special and advanced



Some of the above commands are explained at the end of this doc

3.2.9 New query



Equivalent to the creating buttons from the DATA Tab

3.3 TRANSFORM TAB

Some buttons are in more than one tab

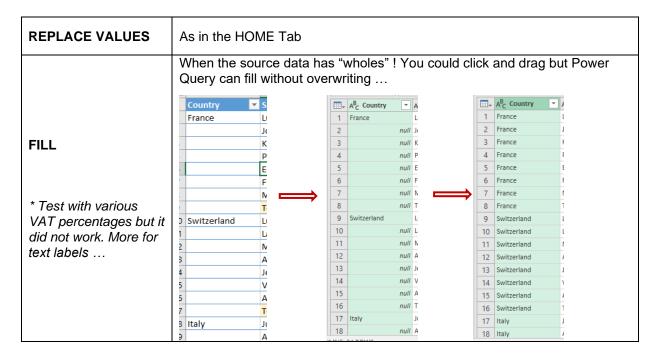
3.3.1 <u>Group By , Headers, Transpose, Reverse Rows, Count Rows, Data Type, Detect</u> <u>Data Type, Rename</u>

File	Home	Transform	Ad	d Column	View
Group	Use First Row as Headers •	fanspose 다음 Reverse R	ows	Data Type: D 7 Detect D 1 Rename	ecimal Number 🕶 ata Type
	Table				

GROUP BY USE FIRST ROW	As in the HOME Tab	
TRANSPOSE	As in the COPY-PASTE SPECIAL command	
REVERSE ROWS Last rows become first		
COUNT ROWSReturns how many rows in the table Caution : this last step removes the result of all previous commands		
DATA TYPE As in the HOME Tab		
DETECT DATA TYPE	Usually not an issue with an Excel file but more with export from external data sources	
RENAME Important as you cannot type directly		

3.3.2 <u>Replace Values, Fill, Pivot & Unpivot Columns</u> <u>Move, Convert to List</u>

1 Replace Values -	🖫 Unpivot Columns 🔻
👽 Fill 🔻	🖽 Move 🕶
Pivot Column	Convert to List
Any Column	



PIVOT COLUMN

Pivot and Unpivot Columns will help you restructure correctly the data. It is a bit like a partial and internal "transpose"

Source table

	А	В		С
1	Invoice nr 👘 💌	Category	•	Amou 💌
2	1234	Production		333
3	1234	Тах		32
4	1234	Shipping		10
5	3698	Production		256
6	3698	Тах		24
7	3698	Shipping		20
8	8794	Production		1256
9	8794	Тах		89
10	8794	Shipping		60
11	5687	Production		250
12	5687	Тах		50
13	5687	Shipping		10

3 infos for each Invoice nr

A bad presentation !

Solution 1 : a pivot table

Sum of Amour	Sum of Amount Column Labels 💌				
Row Labels	 Shipping 	Тах	Production		
1234	10	32	333		
3698	20	24	256		
5687	10	50	250		
8794	60	89	1256		
Grand Total	100	195	2095		

T Filters	III Columns
	Category 🔻
■ Rows	Σ Values
Invoice nr 🔻	Sum of Amount 🔻

A quick and easy tool but the source data remains unclear ...

Solution 2 : Power Query and the PIVOT COLUMN command

X	$\sqrt{f_X} = Tat$	ble.TransformColu	mnTypes(<pre>s(Source,{{"Invoice nr", Int64.Type}, {"Category", type text}, {"</pre>
	1 ² 3 Invoice nr	A ^B _C Category	1 ² 3 Amo	nount 💌
1	1234	Production		333
2	1234	Тах	Г	22
3	1234	Shipping		-
4	3698	Production		Pivot Column
5	3698	Tax		Use the names in column "Category" to greate new columns
6	3698	Shipping		Use the names in column "Category" to create new columns.
7	8794	Production		Values Column 🛈
8	8794	Tax		Amount 👻
9	8794	Shipping		
10	5687	Production		▷ Advanced options
11	5687	Tax		Learn more about Pivot Column
12	5687	Shipping		

First select the CATEGORY column

Reasoning : the Category column should be reorganized with the Amount column *Advanced options* : what function do you want ? Here none

\times	$\sqrt{f_x} = 1$	able.Pivot(#"Changed	Type", List.	Distinct(#"Changed
	1 ² 3 Invoice nr	1 ² 3 Production	1 ² 3 Tax 💌	1 ² ₃ Shipping
1	123	4 333	32	10
2	369	8 256	24	20
3	568	7 250	50	10
4	879	4 1256	89	60

Invoice nr	Production	💌 Ta	ax 🔄 🔽 Ship	ping 💌
1	234	333	32	10
3	698	256	24	20
5	687	250	50	10
8	794	1256	89	60

UNPIVOT COLUMNS

It is the opposite problem ...

	А	В	С	D	E	F	G	н	I. I.
1	Order Date 💌	Received Date 📃 💌	PO# 💌	Vendor 🗾 💌	Apples 💌	Pears 💌	Oranges 🔽	Coffee 💌	Tea 💌
2	15.01.2019	27.01.2019	100203	Vend A	10	94	49		
3	17.01.2019	25.01.2019	100204	Vend A	49	100	60		
4	18.01.2019	26.01.2019	100205	Vend B				37	
5	19.01.2019	01.02.2019	100206	Vend C					58
6	20.01.2019	28.01.2019	100207	Vend B				69	
7	21.01.2019	30.01.2019	100208	Vend B				77	
8	23.01.2019	29.01.2019	100209	Vend C					84
9	24.01.2019	01.02.2019	100210	Vend A	20	78			
10	25.01.2019	05.02.2019	100211	Vend B				16	
11	26.01.2019	07.02.2019	100212	Vend A	49		73		
12	28.01.2019	08.02.2019	100213	Vend C					59
13	30.01.2019	11.02.2019	100214	Vend A	82	31	87		1. Sec. 1. Sec
14									

Columns E to I should be like this :

_	ĸ	L	M	N	U	P
0	rder Date 💌	Received Date 💌	PO# 🛛 💌	Vendor 🔻	Produc 💌	Qty 💌
_	15.01.2019	27.01.2019	100203	Vend A	Apples	10
	15.01.2019	27.01.2019	100203	Vend A	Pears	94
_	15.01.2019	27.01.2019	100203	Vend A	Oranges	49
	17.01.2019	25.01.2019	100204	Vend A	Apples	49
_	17.01.2019	25.01.2019	100204	Vend A	Pears	100
	17.01.2019	25.01.2019	100204	Vend A	Oranges	60
_	18.01.2019	26.01.2019	100205	Vend B	Coffee	37
	19.01.2019	01.02.2019	100206	Vend C	Теа	58
	20.01.2019	28.01.2019	100207	Vend B	Coffee	69
	21.01.2019	30.01.2019	100208	Vend B	Coffee	77
_	23.01.2019	29.01.2019	100209	Vend C	Теа	84
_	24.01.2019	01.02.2019	100210	Vend A	Apples	20
	24.01.2019	01.02.2019	100210	Vend A	Pears	78

Select the columns from E to I and click on the UNPIVOT COLUMNS Button : automatically done !

MOVE	Choose from the list But you can also simply click and drag the column label
CONVERT TO LIST	The selected column is isolated and this new query can be pasted into the workbook

3.3.3 Split Column, Format, Merge Columns, Extract, Parse



SPLIT COLUMN	As in the HOME Tab
ORMAT ABC ormat Parse ▼ Iowercase UPPERCASE Capitalize Each Word Trim Clean Add Prefix Add Suffix	 Not number formatting But working on the text Case Trim = remove all spaces but not between words Clean = remove all non printable characters Add Prefix / Suffix = add a code in front or at the end
MERGE COLUMNS	Example : The choices for the separator do not include <i>dash</i> , so I first added the dash as a prefix and then merged the two selected columns. Any column "Changed Type", {{"Country", each "-" * A ^B _C City * A ^B _C Country * each "-" * A ^B _C City * A ^B _C Country * Country * München * Germany * Choese how to merge the selected columns. * Garacas * Venezuela * Choese how to merge the selected columns. * Separator * None * None * None * None * None Colon Comma Equals Sign

EXTRACT	To extract and avoid the old long functions LEFT, RIGHT !			
ABC 123 Extract ▼ ∑ Length First Characters Last Characters Range Text Before Delimiter Text After Delimiter Text Between Delimiters	(Text Before Delimiter → a dialog box pops up to indicate which character) Here below the Country extracted from the previously merged column : A ^B _C City and Country ♥ ♥ 4 Germany 8 Venezuela 8 Venezuela 5 United States 6 United States 3 Germany			
PARSE	To extract text from special formatted text			
11., <u>1.1.1.1.</u>)				

3.3.4 <u>Number Column (Functions) Date & Time Column (Extraction)</u>

$\begin{array}{c c} \hline X \\ \searrow \end{array} & \begin{array}{c} \bullet & \bullet \\ \hline \end{array} & 10^2 \\ \hline & & \bullet \\ \hline & & \hline \\ \hline & & \bullet \\ \hline \hline & & \bullet \\ \hline \hline \hline & & \bullet \\ \hline \hline & & \bullet \\ \hline \hline \hline \hline \hline \\ \hline \hline \hline \hline \hline \\ \hline \hline \hline \hline \hline \hline$	Date Time Duration
Number Column	Date & Time Column

NUMBER COLUMN	Set of function	Set of functions you can apply to the selected column				
DATE & TIME COLUMN	Each time a extracted.	new column is a	added at the	right end sho	owing what you	
	Here below t	he year and mo	onth from the	date columr	1	
	Date 💌	A ^B _C Attribute	1.2 Value	1 ² 3 Year 💌	1 ² 3 Month	
	10.04.2019	Product-1	25	2019	4	
	10.04.2019	Product-2	14	2019	4	
	10.04.2019	Product-3	26	2019	4	
	10.04.2019	Product-4	65	2019	4	
	10.04.2019	Product-5	25	2019	4	
	11.04.2019	Product-1	63	2019	4	
	11.04.2019	Product-2	78	2019	4	
	11.04.2019	Product-3	83	2019	4	

| The Query Editor window

3.4 ADD COLUMN TAB Home Transform Add Column View 🚔 Conditional Column 웹 Index Column 🝷 Column From Custom Invoke Custom 💼 Duplicate Column Examples Column Function General ASC Merge Columns Trigonometry 🖲 xσ + -10 ÷× ABC Extract -Σ 3.00 Rounding * Statistics Standard Scientific Format Date Duration Time abc Parse -🔢 Information 🝷 -----From Number From Text From Date & Time

Same buttons as on the other tabs

3.4.1 <u>Column From Examples, Custom Column, Invoke Custom Function, Duplicate</u> <u>Column</u>

COLUMN FROM EXAMPLES	Samples of information that can be extracted for a new column
Column From Examples • From All Columns From Selection	Example : Source data has a column with prices Click on the COLUMN FROM EXAMPLES Button Select FROM SELECTION A new column is created at the end Double-click on the first empty cell Various infos are listed :
	Column1 All Proper All Proper 13090 (TotalPrice) 1.2 1.570719932601004 (Arctangent of TotalPrice) 1.2 4.1169396465507555 (Base-10 Logarithm of TotalPrice) 1.2 -0.52627070952579658 (Cosine of TotalPrice) 1.2 2242946629000 (Cube of TotalPrice) 1.2 2242946629000 (Cube of TotalPrice) 1.2 9.4796038589039462 (Natural Logarithm of TotalPrice) 1.2 0.850317082208287 (Sine of TotalPrice) 1.2 1 (Sign of TotalPrice) 1.2 114.41153787970862 (Square Root of TotalPrice) 1.2 1.41153787970862 (Square Root of TotalPrice) 1.2 1.41153787970862 (Square Root of TotalPrice) 1.2 TRUE (TotalPrice Is Even) 1.2 FALSE (TotalPrice Is Odd) AB 5 (Length of TotalPrice)

	I have chosen TRU	JE (TotalPrice	is Even)		
	1.2 TotalPrice				
	13090	TRUE	is even		
	4950				
	556				
	2641	FALSE			
	1944	TRUE			
	3336	TRUE			
	4189.5	FALSE			
	2257.2	FALSE			
	973				
	1254				
	240	TDIIC			
	But a main differen percentage). You c Click on the button The following box v	and a new co	olumns into a ca		AT
	Custom Column Add a column that is comp New column name	uted from the other co	plumns.		×
	Custom				
	Custom column formula: = [TotalPrice]*[Tax]			Available columns: Crty Country Order Date	^
				Order nr Product TotalPrice Tax Is Even	¥
	Learn about Power Query for	mulac		<< Insert	
	✓ No syntax errors have b			OK	Cancel
	1.2 TotalPrice 💌	% Tax 🝷	🏷 Is Even 📼	1.2 Custom 💌	
	13090	8.00%	TRUE	1047.2	~
	4950		TRUE		
	556	6.00%	TRUE	33.36	
	2641	6.00%	FALSE	158.46	
	1944	8.00%	TRUE	155.52	
CUSTOM FUNCTION	If you have created (super advanced)	l a custom fur	nction inside this	file	

| The Query Editor window

CONDITIONAL COLUMN	A good old IF Click on the button, a new column is created, and the following dialog box is displayed

Output ① 200 Then ABC + Above limit	
00 Then ABC Above limit	
	•••

(no need for quotes as in Excel)

•	1.2 Tax on Price	ABC 123 Conditional function	
%	1047.2	Above limit	
%	390	5 Above limit	
6	33.30	5 null	
8	158.40	5 null	
8	155.52	? null	
%	200.10	Above limit	
8	335.10	Above limit	

INDEX COLUMN Index Column From 0 From 1 Custom	Simply a new column numbering the rows Either from 0 or 1 or any special number
DUPLICATE COLUMN	The selected column is duplicated and added at the right end

 \times

4 The Query Tab

Displayed as soon as a query has generated a table

File	Home	Inser	t Draw	Page Layout	Formulas Dat	a Review V
Edit F	Properties	X Delete	Refresh Load	[] Duplicate ∅ Reference	Merge Append	Export Connection File
	Edit		Load	Reuse	Combine	Share

All buttons can be found either in the DATA Tab or in the QUERY EDITOR

5 When create only a connection

When you create only a connection to the source data, there is no table pasted into the active sheet.

But you can create pivot tables from the query very easily and that can be very comfortable

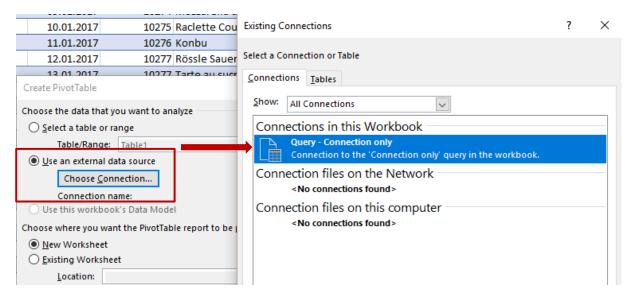
1 Source data

	А	В	С	D	E	F	G	н	1
1	Client 🔽	Employee	City 👻	Country 🚽 💌	Order Date 💌	Order nr 💦 🔽	Product 🗸	TotalPrice 💌	Tax 💌
2	Frankenversand	4	1 München	Germany	01.01.2017	10267	Raclette Courdavault	13'090.00 F	8%
3	GROSELLA-Restaurante	5	3 Caracas	Venezuela	02.01.2017	10268	Thüringer Rostbratwurst	4'950.00 F	8%
4	GROSELLA-Restaurante	٤	3 Caracas	Venezuela	03.01.2017	10268	Mozzarella di Giovanni	556.00 F	6%
5	White Clover Markets	5	5 Seattle	United States	04.01.2017	10269	Mozzarella di Giovanni	2'641.00 F	6%
6	Rattlesnake Canyon Grocery	(5 Albuquerque	United States	05.01.2017	10272	Sir Rodney's Marmalade	1'944.00 F	8%
7	Rattlesnake Canyon Grocery	(5 Albuquerque	United States	06.01.2017	10272	Mozzarella di Giovanni	3'336.00 F	6%
8	QUICK-Stop	3	3 Cunewalde	Germany	07.01.2017	10273	Boston Crab Meat	4'189.50 F	8%
9	QUICK-Stop		3 Cunewalde	Germany	08.01.2017	10273	Lakkalikööri	2'257.20 F	8%
10	Vins et alcools Chevalier	(5 Reims	France	09.01.2017	10274	Mozzarella di Giovanni	973.00 F	6%
11	Magazzini Alimentari Riuniti	1	L Bergamo	Italy	10.01.2017	10275	Raclette Courdavault	1'254.00 F	8%
12	Tortuga Restaurante	8	3 México D.F.	Mexico	11.01.2017	10276	Konbu	240.00 F	8%
13	Morgenstern Gesundkost	1	2 Leipzig	Germany	12.01.2017	10277	Rössle Sauerkraut	3'640.00 F	8%
	Manager and the construction of the set		a di addaadaa	· · · · · · · · · · · · · · · · · · ·	10.01.0017	10077	T-4	00000	-00/

2 Create the query as usual and make necessary modifications (one merged column *Location* – a new column *Tax on Price*)

			-
	Tax 💌	123 Tax on Price	
	 0.08	1047.2	
P	0.08	396	1
Location	0.06	33.36	
lünchen-Germany	0.06	158.46	
Caracas-Venezuela	0.08	155.52	ľ
aracas-Venezuela	0.06	200.16	
	 0.08	335.16	
attle-United States	 0.08	180.576	
uquerque-United States	0.06	58.38	
buquerque-United States	0.08	100.32	
unewalde-Germany	0.08	19.2	
	0.08	291.2	
unewalde-Germany	 0.08	189.12	
ims-France	0.08	264	

3 INSERT - PIVOT TABLE



The PivotTable Fields displays all fields including the new ones ... The pivot corresponds to another query in Queries & Connections (it has been named Pivot) Create the pivot as usual

	A	В						
1	Employee	(All)	Queries & Connections	- X	PivotTable Fields		*	×
2			Queries Connections		Choose fields to add to report:		⊘	-
3	Row Labels 🔻	Sum of Tax on Price	Queries Connections		choose neids to add to report		22	
4	Albuquerque-United States	1'099.20	2 queries		Search			ρ
5	Barquisimeto-Venezuela	740.80						
6	Bergamo-Italy	100.32	Connection only		Client			
7	Bern-Switzerland	137.09	Connection only.		✓ Employee			
8	Bräcke-Sweden	278.24	III Pivot		✓ Location			
9	Caracas-Venezuela	429.36	99 rows loaded.		Order Date			
10	Charleroi-Belgium	859.60			Order nr			
11	Cork-Irlande	875.60			Product			
12	Cunewalde-Germany	2'419.48			Tax			
13	Frankfurt a.MGermany	461.55			Tax on Price			
14	Graz-Austria	1'251.66			TotalPrice			
15	Köln-Germany	526.26			More Tables			
16	Leipzig-Germany	480.32						
17	London-Great Britain	191.76						
18	Luleå-Sweden	724.32						
19	Lyon-France	223.32						
20	Madrid-Spain	88.12			Drag fields between areas belo	ow:		
21	México D.FMexico	376.28			-			
22	München-Germany	1'414.64			▼ Filters	Columns		
23	Münster-Germany	745.36			Employee 🔻			
24	Oulu-Finland	138.62						
25	Reggio Emilia-Italy	29.34						
26	Reims-France	216.98						
27	Resende-Bresil	207.12						
28	Rio de Janeiro-Bresil	1'471.02						
29	San Cristóbal-Venezuela	447.96			Rows	Σ Values		
30	São Paulo-Bresil	1'386.00			Location 💌	Sum of Tax on Pri	ce 1	-
31	Seattle-United States	158.46						
32	Strasbourg-France	512.40						
33	Grand Total	17'991.18						
34								

6 Special : MERGE vs APPEND QUERIES

6.1 APPEND

It is mainly a matter of CONSOLIDATION The objective is to avoid fastidious copy-paste to "join" two tables The tables must have the same structure, same labels Some columns can be in one table and not the other one

Example :

	А	В	С	D	E	F		G	Н	1
					Ye	ear 2017				
1										
		Order								
2	Order date 💌	numb 💌	Product 🗾	Code 💌	Branch 💌	Client	-	City 🔽	Country	Total Price
3	04.08.2017	10248	Almonds	AI	Carouge	Vins et alcools Chevalier		Reims	France	490.00
4	04.08.2017	10248	Cashew nuts	Ca	Meyrin	Vins et alcools Chevalier		Reims	France	870.00
5	04.08.2017	10248	Grilled nuts	Gr	Lausanne	Vins et alcools Chevalier		Reims	France	840.00
6	05.08.2017	10249	Assorted biscuits	As	Montreux	Toms Spezialitäten		Münster	Germany	837.00
7	05.08.2017	10249	Grany bars	Gr	Sierre	Toms Spezialitäten		Münster	Germany	8'480.00
8	08.08.2017	10250	Grany bars	Gr	Neuchatel	Hanari Carnes		Rio de Janeiro	Brasil	385.00
9	08.08.2017	10250	Cookies	Co	Meyrin	Hanari Carnes		Rio de Janeiro	Brasil	6'307.00
10	08.08.2017	10250	Cookies	Co	Lausanne	Hanari Carnes		Rio de Janeiro	Brasil	1'071.00
11	08.08.2017	10251	Baked cake	Ba	Neuchatel	Victuailles en stock		Lyon	France	1'111.50
12	08.08.2017	10251	Doo Wap	Do	Montreux	Victuailles en stock		Lyon	France	1'680.00
13	09.08.2017	10252	St-Michel biscuits	St	Sierre	Suprêmes délices		Charleroi	Belgium	5'440.00
14	N9 N8 2017	10252	St_Michel hiscuits	St	Sion	Sunrêmes délices		Charleroi	Relaium	12'312 00

	Α	В	С	D	E		F	G		Н
				,	Year 2018					
1										
2	Order date 💌	Order numb	Salesm 💌	Product 🗾	Client	-	City 🔽	Country	•	Total Price 💌
3	09.09.2018	10277	John	Bread	Morgenstern Gesundkost		Leipzig	Germany		3'640.00
4	09.09.2018	10277	Luke	Butter	Morgenstern Gesundkost		Leipzig	Germany		2'364.00
5	12.09.2018	10278	Claris	Fruit delight	Berglunds snabbköp		Luleå	Sweden		3'300.00
6	12.09.2018	10278	Lucy	Butter	Berglunds snabbköp		Luleå	Sweden		1'404.00
7	12.09.2018	10278	Peter	Butter	Berglunds snabbköp		Luleå	Sweden		1'500.00
8	13.09.2018	10279	Jane	Tomatoes	Lehmanns Marktstand		Frankfurt a.M.	Germany		1'755.00
9	14.09.2018	10280	Kevin	Butter	Berglunds snabbköp		Luleå	Sweden		1'920.00
10	14.09.2018	10280	Luke	Eggs	Berglunds snabbköp		Luleå	Sweden		930.00
11	14.09.2018	10281	Claris	Yogurts	Romero y tomillo		Barcelona	Spain		36.50
12	14.09.2018	10281	John	Emmental	Romero y tomillo		Barcelona	Spain		288.00
13	15.09.2018	10282	Lucy	Milk	Romero y tomillo		Barcelona	Spain		156.00
14	15.09.2018	10282	Luke	Milk	Romero y tomillo		Barcelona	Spain		621.00
4.5	40.00.0040	40000	Olaria	NACH.	LILA Commence and a		D : _ :	V		00 7 70

• Create a query for each table

• From the query table that should start the new appended list or table :

QUERY Tab - EDIT Button

Display the QUERIES & CONNECTIONS Pane - Double-click on the corresponding query

×	₽↓	Ŭ		Data Type: Date/Time 🔻		Aerge Queries 🝷	
	Z↓		\rightarrow	🛄 Use First Row as Headers 🝷	.	ppend Queries 🔻	-8
lemove Rows *		Split Column •	Group By	1 Replace Values		Append Queries	s
Rows	Sort			Transform	3	Append Queries as	New r

APPEND QUERIES AS NEW

Append			
Two tables O Three or more tables	oles		
Primary table			
Exportations 2017	~		
Table to append to the primary table			
Exportations 2018	-		

Power Query is displayed again, showing the merged lists. For the columns that were only in one table and not in the other you will get a series of *null*

Exportations 2017		mber 💌	A ^B _C Product	A ^B _C Code	A ^B _C Branch	A ^B _C Client	A ^B _C City	A ^B _C Country	1.2 Total Price	A ^B _C Salesman	A ^B _C City2
Exportations 2018	32	10263	Fruit delight	Fr	Lausanne	Ernst Handel	Graz	Austria	4657.5	nul	1
Append1	33	10264	Cucomber	Cu	Neuchatel	Folk och fä HB	Bräcke	Sweden	2660	nul	1
	34	10264	Endives	En	Montreux	Folk och fä HB	Bräcke	Sweden	818.12	nul	1
	35	10266	Frozen rasperries	Fr	Sierre	Wartian Herkku	Oulu	Finland	1732.8	nul	1
	36	10267	Parsley	Pa	Sion	Frankenversand	München	Germany	918	nul	1
	37	10267	Potatoes	Po	Meyrin	Frankenversand	München	Germany	3675	nul	1
	38	10267	Tomatoes	То	Sierre	Frankenversand	München	Germany	13090	nul	1
	39	10268	Toilet paper	То	Martigny	GROSELLA-Restaurante	Caracas	Venezuela	4950	nul	1
	40	10268	Toilet paper	То	Martigny	GROSELLA-Restaurante	Caracas	Venezuela	556	nul	1
	41	10269	Potatoes	Po	Carouge	White Clover Markets	Seattle	United States	2641	nul	1
	42	10272	Yogurts	Yo	Sion	Rattlesnake Canyon Grocery	Albuquerque	United States	1944	nul	1
	43	10272	Cheese	Ch	Sierre	Rattlesnake Canyon Grocery	Albuquerque	United States	3336	nul	1
	44	10273	Eggs	Eg	Montreux	QUICK-Stop	Cunewalde	Germany	4189.5	nul	1
	45	10273	Avocado	Av	Lausanne	QUICK-Stop	Cunewalde	Germany	2257.2	nul	1
	46	10274	Maxi Jack	Ma	Neuchatel	Vins et alcools Chevalier	Reims	France	973	nul	1
	47	10275	Maxi Jack	Ma	Carouge	Magazzini Alimentari Riuniti	Bergamo	Italy	1254	nul	1
	48	10276	Bread	Br	Sierre	Tortuga Restaurante	México D.F.	Mexico	240	nul	1
	49	10277	Bread	null	nu	// Morgenstern Gesundkost	null	Germany	3640	John	Leipzig
	50	10277	Butter	null	nu	// Morgenstern Gesundkost	null	Germany	2364	Luke	Leipzig
	51	10278	Fruit delight	null	nu	II Berglunds snabbköp	null	Sweden	3300	Claris	Luleå
	52	10278	Butter	null	nu	II Berglunds snabbköp	null	Sweden	1404	Lucy	Luleå
	53	10278	Butter	null	nu	II Berglunds snabbköp	null	Sweden	1500	Peter	Luleå
	54	10279	Tomatoes	null	nu	// Lehmanns Marktstand	null	Germany	1755	Jane	Frankfur
	55	10280	Butter	null	nu	II Berglunds snabbköp	null	Sweden	1920	Kevin	Luleå
	56	10280	Eggs	null	nu	II Berglunds snabbköp	null	Sweden	930	Luke	Luleå
	57	10281	Yogurts	null	nu	// Romero y tomillo	null	Spain	36.5	Claris	Barcelon
	58	10281	Emmental	null	nu	// Romero y tomillo	null	Spain	288	John	Barcelon

- Generate the table as usual
- Now you can use this new table to create a pivot table

What is the difference between APPENDING TABLES and LINKING TABLES ????

Append ==> it is to avoid a long COPY-PASTE to merge 2 or more tables that have a similar but not identical structure

Link ==> it is not a matter of merging lists, it is to make a link to a TABLE OF CORRESPONDENCES in order to populate columns related to the source table and create pivot tables

6.2 MERGE

• Here below two tables

	Α	В	С						
1	Name 💌	Employee II 💌	Status	Ψ.					
2	Puneet	B1	Full Time			Α	В	С	
3	Graham	B13	Full Time		1	Extensi 🔻	Emp ID 💌	Office 💌	
4	Avril	B26	Full Time		2	184	· -	North	
5	Ту	B4	Part Time		3		B26	East	
6	Mitsuru	B5	Full Time		4		G19	Central	
7	Lawrence	F2	Full Time		5	362		North	
8	Linda	F9	Part Time		-				
9	Moses	G19	Part Time		6	456	K2	Central	
10	Angel	К2	Temp		7	789	K7	Central	
11	Davide	К7	Temp		8	963	L14	North	
12	Rhonda	L14	Full Time		9	852	M3	East	
13	Mel	M3	Temp		10	741	T20	Central	
14	Erin	M5	Full Time		11	654	F2	North	

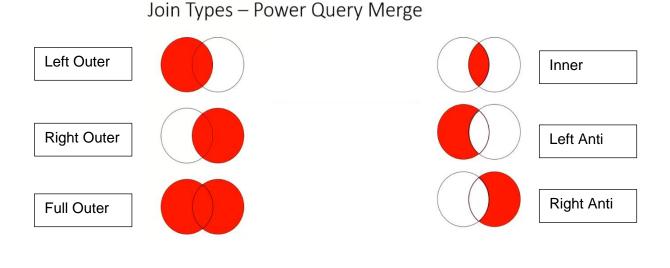
There is one common column to both tables : Employee ID and Emp ID (If the column label is different no problem – The data must be the same)

There are info on both sides of this common column We want to merge the two tables

- Create 2 queries from the 2 tables
- Start from Query 1
- QUERY Tab COMBINE Group MERGE Button (also from Query Editor window : HOME Tab – COMBINE Group)
- Select Query 2 to merge
- Select the common column in both tables This is why a difference in labels is not a problem

• Select the kind of merge you want

That is the whole issue about the merge command !!! To help : here a drawing showing the various choices more clearly



| Special : MERGE vs APPEND QUERIES

Merge

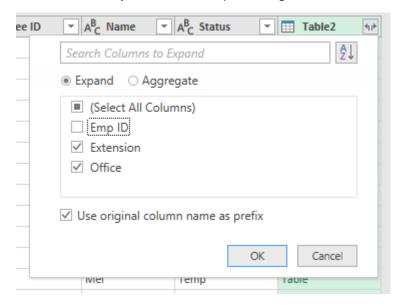
Query 1			*										
Name E	mployee ID	Status											
Puneet B	31	Full Time											
Graham B	313	Full Time											
Avril B	326	Full Time											
Ту В	34	Part Time	2										
Mitsuru B	5	Full Time											
Query 2		rui ime]		Join Kind							
		rui ime	.]		Join Kind							
	EmpID	Office	•]		Left Oute							
Query 2	Emp ID		•]	 	Left Outer	r (all fro	om fi	rst, ma	tching	g fror	n sec	ond)
Query 2 Extension	Emp ID 4 B1	Office North East	•]		Left Outer Left Outer Right Out	r (all fro ter (all fr	om fi from	rst, ma secon	tching d, mat	g fror	n sec	ond)
Query 2 Extension 184	Emp ID 4 B1 5 B26	Office North	v]		Left Outer Left Outer Right Out Full Outer	r (all fro ter (all fr r (all rov	om fi from ws fro	rst, ma secon om bo	tching d, mat	g fror	n sec	ond)
Query 2 Extension 184 125 255	Emp ID 4 B1 5 B26	Office North East]	 _	Left Outer Left Outer Right Out Full Outer Inner (onl	r (all fro ter (all fr r (all row ly match	om fi from ws fro hing	rst, ma secon om bo rows)	atching d, mat th)	g fror	n sec	ond)
Query 2 Extension 184 125 255 362	Emp ID 4 B1 5 B26 9 G19	Office North East Central	•]		Left Outer Left Outer Right Out Full Outer	r (all fro ter (all fr r (all row ly match (rows or	om fi from ws fro hing nly ir	rst, ma secon om bo rows) n first)	atching d, mat th)	g fror	n sec	ond)

The selection has matched 8 out of the first 13 rows.

- •
- The result in the Query Editor Click on the icon located at the right of the TABLE2 to expand it content •

	A ^B _C Employee ID	A ^B _C Name	A ^B _C Status 👻	📰 Table2 🔤
1	81	Puneet	Full Time	Table
2	B13	Graham	Full Time	Table
3	B26	Avril	Full Time	Table
4	В4	Ту	Part Time	Table
5	85	Mitsuru	Full Time	Table
6	F2	Lawrence	Full Time	Table
7	F9	Linda	Part Time	Table
8	G19	Moses	Part Time	Table
9	K2	Angel	Temp	Table
10	К7	Davide	Temp	Table
11	L14	Rhonda	Full Time	Table
12	M3	Mel	Temp	Table
13	M5	Erin	Full Time	Table

• Select what you want to keep. It is logical to tick off the common column



• The result in the Query Editor

	A ^B _C Employee ID	A ^B _C Name 🔄	A ^B _C Status 👻	1 ² 3 Table2.Extension	A ^B _C Table2.Office
1	81	Puneet	Full Time	184	North
2	B13	Graham	Full Time	null	null
3	B26	Avril	Full Time	125	East
4	G19	Moses	Part Time	259	Central
5	B4	Ту	Part Time	null	null
6	B5	Mitsuru	Full Time	null	null
7	К2	Angel	Temp	456	Central
8	F2	Lawrence	Full Time	654	North
9	K7	Davide	Temp	789	Central
10	F9	Linda	Part Time	null	null
11	L14	Rhonda	Full Time	963	North
12	M3	Mel	Temp	852	Esas
13	M5	Erin	Full Time	null	null

The various results

А	В	с	D	E
LEFT O	UTER			
Name 💌	Employee ID 🔽	Status 💌	Table2.Extension 💌	Table2.Office 💌
Puneet	B1	Full Time	184	North
Graham	B13	Full Time		
Avril	B26	Full Time	125	East
Moses	G19	Part Time	259	Central
Ту	B4	Part Time		
Mitsuru	B5	Full Time		
Angel	К2	Temp	456	Central
Lawrence	F2	Full Time	654	North
Davide	К7	Temp	789	Central
Linda	F9	Part Time		
Rhonda	L14	Full Time	963	North
Mel	M3	Temp	852	East
Erin	M5	Full Time		

RIGHT OUTER Name - - Employee ID - Status - - Oueny 2 Extension - Oueny 2 Office

Name 💌	Employee ID 💌	Status 💌	Query 2.Extension 💌	Query 2.Office	
Puneet	B1	Full Time	184	North	
Avril	B26	Full Time	125	East	
Moses	G19	Part Time	259	Central	
Angel	К2	Temp	456	Central	
Lawrence	F2	Full Time	654	North	
Davide	К7	Temp	789	Central	
Rhonda	L14	Full Time	963	North	
Mel	M3	Temp	852	East	
			362	North	
			741	Central	

FULL OUTER

FULL U	OTEN			
Name 💌	Employee ID 💌	Status 💌	Query 2.Extensior	Query 2.Office
Puneet	B1	Full Time	184	North
Graham	B13	Full Time		
Avril	B26	Full Time	125	East
Moses	G19	Part Time	259	Central
Ту	B4	Part Time		
Mitsuru	B5	Full Time		
Angel	К2	Temp	456	Central
Lawrence	F2	Full Time	654	North
Davide	К7	Temp	789	Central
Linda	F9	Part Time		
Rhonda	L14	Full Time	963	North
Mel	M3	Temp	852	East
Erin	M5	Full Time		
			362	North
			741	Central
INNER				

INNER

ININER				
Name 💌	Employee ID	 Status 	Query 2.Extension	r 💌 Query 2.Office 🔽
Puneet	B1	Full Time	e 1	184 North
Avril	B26	Full Time	e 1	125 East
Moses	G19	Part Time	2	259 Central
Angel	K2	Temp	4	456 Central
Lawrence	F2	Full Time	e (654 North
Davide	K7	Temp		789 Central
Rhonda	L14	Full Time	e <u>e</u>	963 North
Mel	M3	Temp	Į	852 East
LEFT A	ITI			
Name 💌	Employee ID 💌	Status 💌 🤇	Query 2.Extensior 💌	Query 2.Office
Graham	B13	Full Time		
Ту	B4	Part Time		
Mitsuru	B5	Full Time		
Linda	F9	Part Time		
Erin	M5	Full Time		
RIGHT	ANTI			
Name 💌	Employee ID 💌	Status 💌	Query 2.Extensior 💌	Query 2.Office
			362	North
			741	Central

POWER PIVOT

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1 What is Power Pivot

Power Pivot is an Excel add-in you can use to perform powerful data analysis and create sophisticated data models.

Power Pivot has 2 strong points

1. Dealing with large complex data sets (Big Data)

- a. Excel has a limit of 1'048'576 rows for each of its sheets. Power Pivot enables you to bypass this limitation and import massive data from practically any external source (it can be millions of rows)
- b. Power Pivot is particularly fast when managing this massive data.
- c. Power Pivot heavily compresses the data which in turn produces a rather manageable Excel final file.
- d. The data is saved inside the Excel workbook, which ensures its portability

2. Data models with relationships

A standard pivot table usually relates to a list of records that can be a simple list or a table. But in real, the information that relates to the pivot table are scattered among lots of separate tables, some of which that can be very voluminous : *the table 1 provides information on the client and what has been ordered but it is the table 2 that contains the product code, color, price etc … and finally the table 3 that contains the category to which the product belongs…*

In Power Pivot you can link the table 1 (usually the largest and longest one) with one or more of what we would call tables of correspondences. The set will be called a *data mode*l..

True to say, you could get the same result by using VLOOKUP function but this proves to be very long and fastidious. Moreover, the VLOOKUP function *counts* the columns which makes it rather "rigid" if you end up moving columns around in the source table.

And if you are *an expert in working with data models* (using DAX functions, SQL, SharePoint), Power Pivot offers a wide range of advanced modelling functionalities.

2 Where is Power Pivot

Excel 2010

You need to download and activate the Power Pivot add-in

Excel 2013 and 2016 It is *natively* installed but not activated

Here after how to active it : (check if you have the right to do so or if you need to go through your IT dpt)

FILE - OPTIONS – Section ADD-INS

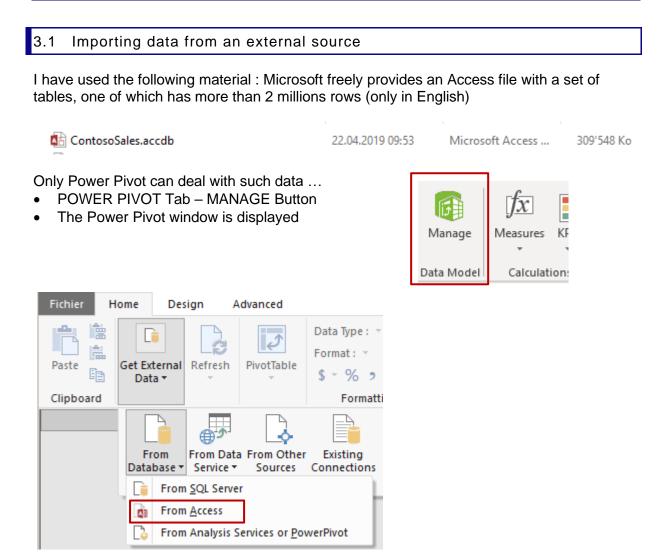
	Analysis ToolPak - VBA	C:\e1
Add-ins	Date (XML)	C:\icr
	Euro Currency Tools	C:\ot'
Trust Center	Microsoft Actions Pane 3	
	Microsoft Data Streamer for Exc	el C:\so
	Document Related Add-ins	
	No Document Related Add-ins	
		Maker Office COM Add
	-	ns, Incorporated
	Compatibility: No compatib	ility information availa
	Location: C:\Program F	iles (x86)\Adobe\Acrol
	Description: Acrobat PDFN	Maker Office COM Add
	Manage: Excel Add-ins	▼ <u>Go</u>
	Excel Add-ins	
	COM Add-ins	
	Actions	
0	XML Expansion Pack	s
1	Disabled Items	

COM Add-ins	?	×
Add-ins available:	Ca <u>A</u> c	DK ncel Id nove
Location: C:\Program Files (x86)\Microsoft Office\Root\Office16\ADDINS\PowerPivot Excel Add Load Behavior: Load at Startup	l-in\Pow	verPivot

Tick the option and re-run Excel A POWER PIVOT Tab is added to the ribbon and displays the following commands :



3 Working with massive data



Comment : go round a little bit among the other possibilities and you will notice that the choice of external sources is large : SQL Server, SQL Azure, Oracle, Teradata, Sybase, IBM etc ...

And for those who have worked a little bit with Power Query : the import options are rather similar.

- A dialog box will let you select the required Access file (if necessary with a user ID and password)
- A second dialog box will give you the opportunity to choose from a direct importation or one through an SQL query (advanced feature)

Select from a list of tables and views to choose the data to import

Write a query that will specify the data to import

• Y	ou :	are then prompted to	select the tables			
Table	Impo	ort Wizard		?	×	
Sele	ct Ta	bles and Views				
		the tables and views that you wa	nt to import data from.			
		se: C:\Users\Jael\OneDrive Entre	orise\@-Cloud-Ateliers Thématiqu	ies\3.5 - XL-Gestion	des don	
Tal	bles a	nd Views:				
		Source Table	Friendly Name	Filter Details		
		DimChannel	DimChannel			
		Dim Date	DimDate			
		DimEntity DimProduct	DimProduct			
		DimProductSubcategory	DimProductSubcategory			
		DimPromotion	Dim Toddetodbeategory			
		FactSales	FactSales			
		£				
						The source table
			Select Related T	ables Preview 8	Filter	displays its columns and you can tick on/off
						as required
		< E	Back Next >	Finish Can	cel .	
		the table is really lor			y rapidly	
(inde	eu	the FactSales table h	as more than 2 millio	n rows)		
Table	e Imn	oort Wizard			?	×
10.51						
	orting					
		mport operation might take se ation, click the Stop Import but		o stop the import		
Γ				Total: 5	Cancelled: 0	
	Ľ	Success		Success: 5	Error: 0	
	Detail		-			1
		Work Item	Status		Message	-
	-	DimChannel	Success. 4 rows transferred			-
	-	DimDate	Success. 2'556 rows transfe			
		DimProduct	Success. 1'690 rows transfe	erred.		-
	9	DimProductSubcategory	Success. 44 rows transferre	ed.		-
	>	FactSales	Success 2'282'482 rows tra	ansferred.		
	9	Data preparation	Completed		<u>Details</u>	
				Stop Import	Close	

| Working with massive data

💵 🛃 🕤	- 🔿 - = Pow	er Pivot for Exc	el - Boo	k1					- 🗆	×
chier Home	Design	Advanced								\sim
	External Refresh	PivotTable	Data Typ Format \$ • %		2↓ ↓ Clear All Sort by Filters Column →	Find	∑ AutoSum → (Create KPI)	Data S	Diagram View how Hidden Calculation Area]
ipboard			Fo	rmatting	Sort and Filter	Find	Calculations	V	ïew	
[SalesKey]	 <i>f</i>_X 									
SalesKey	🛛 Dat 🔹 🖬	channe	🔹 🔽	StoreKey 🔽	Produc 👘 🔽 P	romotior	iKey 🔽 Curre	ncyKey 🔽	UnitCost 🔽	lυ
220:	1 07.05.2007		1	76	375		1	1	CHF 321.44	
2652	7 22.05.2009		1	26	375		1	1	CHF 321.44	
2670	2 30.09.2009		1	298	375		1	1	CHF 321.44	
3312	5 31.10.2008		1	264	375		1	1	CHF 321.44	
5230	5 26.06.2009		1	98	375		1	1	CHF 321.44	
6723	28.10.2008		1	194	375		1	1	CHF 321.44	
7924	5 12.05.2008		1	230	375		1	1	CHF 321.44	
8721	0 17.04.2009		1	84	375		1	1	CHF 321.44	
9112	9 26.05.2009		1	215	375		1	1	CHF 321.44	
10914	8 06.04.2009		1	93	375		1	1	CHF 321.44	
14007	9 20.04.2007		1	160	375		1	1	CHF 321.44	
150342	2 12.06.2009		1	99	375		1	1	CHF 321.44	
15512	1 05.06.2009		1	287	375		1	1	CHF 321.44	
17529	9 23.06.2009		1	41	375		1	1	CHF 321.44	
18580	2 12.05.2009		1	92	375		1	1	CHF 321.44	
189564	4 24.10.2007		1	265	375		1	1	CHF 321.44	
19022	1 30.04.2009		1	37	375		1	1	CHF 321.44	
19183	14.06.2009		1	23	375		1	1	CHF 321.44	
19640	29.05.2008		1	140	375		1	1	CHF 321.44	
20734	3 17.09.2009		1	301	375		1	1	CHF 321.44	
20897	31.10.2009		1	27	375		1	1	CHF 321.44	
23765	9 18.10.2008		1	26	375		1	1	CHF 321.44	
										>
mChannel Dir	nDate DimProd	uct DimPro	ductSub	category Fact	Sales					

• The Power Pivot window displays all the tables. They "live" inside the Power Pivot add-in

- It you get out of this window, the Excel file shows an empty sheet. You can revert to the Power Pivot window any time to manage the tables. Simply click again on the MANAGE Button.
- What is the weight of the Excel file once you have saved it ?

ContosoSales.xlsx	22.04.2019 09:58	Feuille de calcul	59'351 Ko

3.2 Working with the imported tables

The Power Pivot window provides a nice selection of commands to work the imported columns. A faire number of them are similar to the Power Query commands (but true to say Power Query has more commands)

Here after a few interesting ones

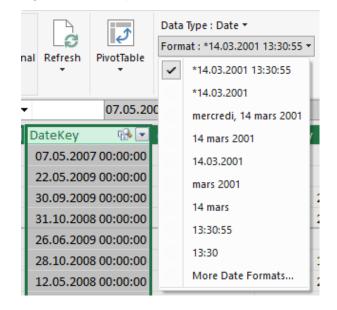
| Working with massive data

HOME Tab

- Sort and Filter as in Excel (the triangle located at the right of the column label)
- Refresh

Any modification done to the source file can generate the update of the data model

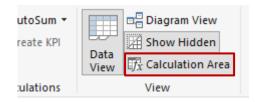
• **Type of column and column format** (for instance date without the time)



 Standard functions such as (SUM, AVERAGE, MAX, MIN etc...) that you can add to the bottom of a column and that will be displayed in the bottom section (point or enlarge the column for a full view)

	SalesAmount 🔄	ETLLoadID 🔽	LoadDate 🔽	U
40	CHF 6'990.00	1	01.01.2010	0
.40	CHF 6'990.00	1	01.01.2010	0
.40	CHF 6'990.00	1	01.01.2010	0
40	CHF 6'990.00	1	01.01.2010	0
.40	CHF 6'990.00	1	01.01.2010	0
40	CHF 6'990.00	1	01.01.2010	0
.40	CHF 6'990.00	1	01.01.2010	0
.40	CHF 6'990.00	1	01.01.2010	0
.40	CHF 6'990.00	1	01.01.2010	0
40	CHF 6'990.00	1	01.01.2010	0
40	CHF 6'990.00	1	01.01.2010	0
	Sum of SalesA			
	Sum of	SalesAmount: CHF	8'341'224'364.83	1

 This bottom section can be displayed or hidden



DESIGN Tab

- Add or delete columns
- Freeze

Moves the selected column(s) to the left as first position and sets them as frozen columns

• Width

Can be manually set for the selected column

• Standard calculations and Insert Function Button

You can add a column that will contain a standard calculation Type the = sigh and build the formula as you would in Excel with this special characteristic : you do not select a cell you select the whole column

		Formatting	Find						
fx	f_{χ} =Products[Price / unit]+(Products[Price / unit]*0.08)								
ry 🗖	Price / unit 🔽	With VAT tax 💽	Add Column						
	1.75	1.89							
	3.85	4.158							
nd	0.9	0.972							
	2.91	3.1428							
	1.5	1.62							

You can also insert a function into the first cell of a new column as you would in Excel (again select columns and not cells)

Note : functions are always in English

	actoristings	Carer						
f_{χ} =IF(Products[With VAT tax]>=10;"move out of list")								
🔹 Price / unit 🔹	With VAT tax 🛛	Analysis 🗹 A						
1.75	1.89							
3.85	4.158							
. 0.9	0.972							
2.91	3.1428							
1.5	1.62							
1.36	1.4688							
2.38	2.5704							
4.95	5.346							
11.85	12.798	move out of						
3.15	3.402							

3.3 Adding an existing Excel list or a table to the data model

You can add to the data model any list or table that is inside the Excel workbook

- Active cell inside the list or the table
- POWER PIVOT Tab TABLES Group ADD TO DATA MODEL Button
- If it is only a list, you will be prompted to turn it into a table
- The table is added into the Power Pivot window and has its own tab

4 Data model and relationships

You can create various relationships between tables usually in order to create a pivot table

4.1 A sample of tables to connect

• The main list (exported food items) :

	А	В	С	D	E	F	G	Н
		Order						
1	Order date 🛛 💌	numb 💌	Product 🗾	Branch 🗾 💌	Client 🗾	City 🗾	Country 🗾 💌	Total Price 💌
2	04.08.2017	10248	Almonds	Carouge	Vins et alcools Chevalier	Reims	France	490.00
3	04.08.2017	10248	Cashew nuts	Meyrin	Vins et alcools Chevalier	Reims	France	870.00
4	04.08.2017	10248	Grilled nuts	Lausanne	Vins et alcools Chevalier	Reims	France	840.00
5	05.08.2017	10249	Assorted biscuits	Montreux	Toms Spezialitäten	Münster	Germany	837.00
6	05.08.2017	10249	Grany bars	Sierre	Toms Spezialitäten	Münster	Germany	8'480.00
7	08.08.2017	10250	Grany bars	Neuchatel	Hanari Carnes	Rio de Janeiro	Brasil	385.00
8	08.08.2017	10250	Cookies	Meyrin	Hanari Carnes	Rio de Janeiro	Brasil	6'307.00
9	08.08.2017	10250	Cookies	Lausanne	Hanari Carnes	Rio de Janeiro	Brasil	1'071.00
10	08.08.2017	10251	Baked cake	Neuchatel	Victuailles en stock	Lyon	France	1'111.50
11	08.08.2017	10251	Doo Wap	Montreux	Victuailles en stock	Lyon	France	1'680.00
12	09.08.2017	10252	St-Michel biscuits	Sierre	Suprêmes délices	Charleroi	Belgium	5'440.00
13	09.08.2017	10252	St-Michel biscuits	Sion	Suprêmes délices	Charleroi	Belgium	12'312.00
14	10.08.2017	10253	Mikado	Meyrin	Hanari Carnes	Rio de Janeiro	Brasil	3'024.00
15	11.08.2017	10254	Mikado	Sierre	Chop-suey Chinese	Bern	Switzerland	1'713.60
16	15.08.2017	10256	Mikado	Martigny	Wellington Importadora	Resende	Brasil	1'965.00
17	15.08.2017	10256	Digestives	Martigny	Wellington Importadora	Resende	Brasil	624.00
18	16.08.2017	10257	Digestives	Carouge	HILARIÓN-Abastos	San Cristóbal	Venezuela	4'387.50
19	16.08.2017	10257	Strawberry Candy	Sion	HILARIÓN-Abastos	San Cristóbal	Venezuela	432.00
20	16.08.2017	10257	Strawberry Candy	Sierre	HILARIÓN-Abastos	San Cristóbal	Venezuela	780.00
21	17 08 2017	10258	Oasis iuires	Montreux	Frnst Handel	Graz	Δustria	3'040.00

0 et 6 Tables adding co-related information

	А	В		А	В		C
5	Branch 🚽 🚽	Canton 🚽	5	Product 🚽	Category 🔽	Pric	e / ui 🝸
6	Carouge	GE	6	Almonds	Nuts	€	1.75
7	Meyrin	GE	7	Assorted biscuits	Bakery	€	3.85
8	Lausanne	VD	8	Avocado	Fruits and veg	€	0.90
9	Montreux	VD	9	Baked cake	Biscuits	€	2.91
10	Sierre	VS	10	Bread	Bakery	€	1.50
10			11	Butter	Dairy	€	1.36
11	Neuchatel	NE	12	Cashew nuts	Nuts	€	2.38
12	Sion	VS	13	Cheese	Dairy	€	4.95
13	Martiony	VS		0111	14 (~	11.00

Important : each list has been defined as a named data table (Exportations - Branches -Products)

* Very important. Power Pivot can only create relationship in the following structure : 1 to several and nothing else. Consequently, the table of correspondences provides the 1: Carouge corresponds to GE and it is a unique entry. Then, the connection with work for it several part for the Branch column in the first table as Carouge can well appear several times.

Create PivotTable	?	×	
Choose the data that			
Select a table or	range		
<u>T</u> able/Range		Ť	
○ <u>U</u> se an external	lata source		
Choose Co	nnection		
Connection	name:		
O Use this workbo	ok's <u>D</u> ata Model		
Choose where you w	int the PivotTable report to be pla	ced	
New Worksheet			
<u>Existing Worksh</u>	eet		
Location:			Ť
Choose whether you	want to analyze multiple tables		
Add this data to	the Data <u>M</u> odel		
	ОК	Car	ncel

Important : tick this option to start straight away with separate tables. If you forget, you can do it later.

The FIELD LIST :

PivotTable Fields	≁ ×
Choose fields to add to report:	-∯ ▼
Exportations Order date	
Order number	
Product	
Branch	
Client	
City	
Country	
Total Price	

ACTIVE : the main list or main table. You cannot use the fields from the other tables to build a pivot table.

ALL : all tables are list with their fields but no real use at this stage (you may drag a field but no calculation will be done).

If you have forgotten to tick the ADD ... option : The field list shows the following option \rightarrow Caution : this automatically creates a new blank worksheet and you will need to delete the old one. Country

Total Price

MORE TABLES...

PivotTable Fields ACTIVE ALL Choose fields to add to report:			tomatically retrieved e (it was a good idea eading !)
Branches Branch			
Canton Exportations P III Products	-	T Filters	Canton
Here below the structure we want to generate :		Rows Category V	∑ Values Sum of Total ▼

Excel can show the pivot structure but there are no formulas behind !

Sum of Total Price	Column	Labels 💌			
Row Labels	GE		NE	VD	VS
Bakery		234695.64	234695.64	234695.64	234
Beverages	2	234695.64	234695.64	234695.64	23
Biscuits		234695.64	234695.64	234695.64	23
Cheese		234695.64	234695.64	234695.64	23
Dairy		234695.64	234695.64	234695.64	23
Eggs		234695.64	234695.64	234695.64	23
Fish	2	234695.64	234695.64	234695.64	23
Flour		234695.64	234695.64	234695.64	23
Fruits and veg	2	234695.64	234695.64	234695.64	23

Consequently, the tables must be linked. Two possibilities : let Excel detect the links or create them manually.

Excel detects the links automatically (Power Pivot is invisible in the background)

Try to create the pivot table as if you could do it directly from the n sheets (in our example the 3 sheets). At one point in the process, Excel will automatically display the following message at the top of the *Field List* :

Pivo Active	Table Fields	* ×			
Choose	fields to add to report:	\$ •			
Relatio	nships between tables may be needed. Auto-Detect	CREATE			
Auto-De	tect Relationships			?	×
	ting and Creating Relation ght take several minutes dependir	-	ty of the data.		
	Relationship detection: done 2 new relationships created				
			<u>M</u> anage Relationships	Clo	ose
Manage R	elationships		*	?	×
Status	Table 🔺	Related Lool	kup Table	<u>N</u> ev	N
Active	Exportations (Branch)	Branches (Br		A <u>u</u> to-D	etect
Active	Exportations (Product)	Products (Pro	oduct)	<u>E</u> di	
You car	h check and edit if necessary	the links			

Manually

• ANALYZE Tab

∏Fields, Items, & Sets ▼
f _X OLAP Tools −
¤¦ Relationships
Calculations

Status Table ▲		Related Lookup Table	<u>N</u> ew A <u>u</u> to-Detect
			<u>E</u> dit
			<u>A</u> ctivate
			Deac <u>t</u> ivate
			<u>D</u> elete
Create Rela Pick the tab	ationship ples and columns you want to use fo	r this relationship	? ×
Table:		Col <u>u</u> mn (Foreign):	
Table.		Product	\sim
-	del Table: Exportations		
-		Related Co <u>l</u> umn (Primary):	

Read : in the main *Exportations* table, the *Product* column needs a link This link is in the *Products* table where the *Product* can be found (the link is set and all fields from the Products table are recognized)

You set the second link the same way. CLOSE. Excel displays the links :

Manage F	Relationships		? ×
Status	Table 🔺	Related Lookup Table	<u>N</u> ew
Active	Exportations (Branch)	Branches (Branch)	
Active	Exportations (Product)	Products (Product)	A <u>u</u> to-Detect
			<u>E</u> dit

The two links you have created are exactly the same as when Excel did it ...

And the result (figures have been rounded to the whole number)

Sum of Total Price (Column Labels 💌				
Row Labels	GE	NE	VD		VS Grand Total
Bakery	15'918	6'308	2'517	31'987	56'729
Beverages			7'460		7'460
Biscuits	6'307	1'112	2'406	1'482	11'307
Cheese			288	186	474
Dairy	9'761	6'171	2'844	15'637	34'413
Eggs			14'630		14'630
Fish			7'200		7'200
Flour			3'773		3'773
Fruits and veg	14'099	6'735	11'033	23'541	55'407
Fruits et légumes	1'128		840	3'094	5'061
Household products				5'506	5'506
Meat	8'603	7'880	2'240	12'653	31'376
Nuts	1'360				1'360
Grand Total	57'175	28'205	55'230	94'086	234'696

COMMENTS

In this example, the two columns to link bear the same name. This is quite logical and makes the reading clear but it is not a compulsory rule. They can have different names and you simply link them.

MANAGE THE LINKS / THE DATA MODEL

REMOVE THE LINKS : button RELATIONSHIPS(ANALYZE Tab)

These links manage the calculations in the pivot table. It you remove them, it does not affect the data model that links the sheets in the background

REMOVE THE DATA MODEL : button QUERIES & CONNECTIONS (DATA Tab)

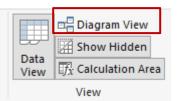
If you remove all the sheets links in the dialog box, the data model is removed and also the pivot links (in the RELATIONSHIPS dialog box)

4.2 Using Power Pivot to link the tables

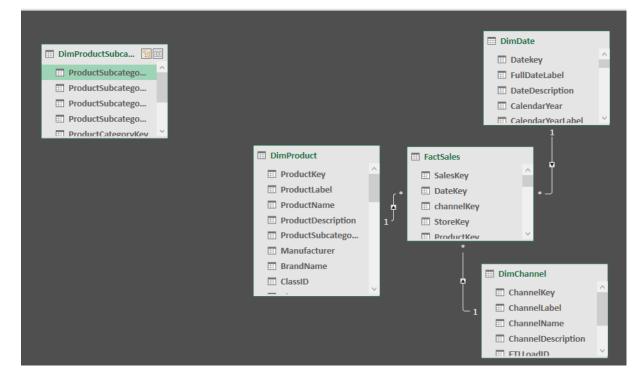
In the previous example the source tables were already in Excel and they are light ... but how to connect tables when the source data is external or lost in a massive set ? Let us use the Microsoft Access data base again.

4.2.1 <u>Diagram View to display and create the relationships</u>

The Power Pivot displays visually the various connections between the tables if you click on the DIAGRAM VIEW button (HOME Tab)



For any unknown reason, the left link has been deleted



Activate one of the two tables and click on the CREATE RELATIONSHIP (DESIGN Tab) Button

Or

Right click one of the two tables and option CREATE RELATIONSHIP

The following dialog box is displayed :

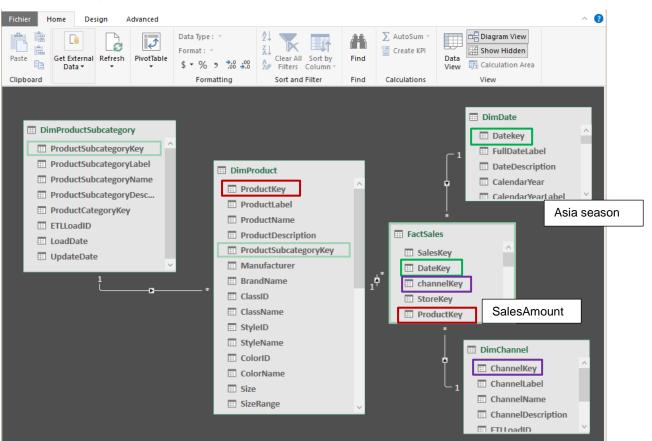
Create	Relationship							?	×
0-1	•	ns that relate to one another.							
Select	tables and columi	ns that relate to one another.							
DimProc	luctSubcategory		~						
	ProductCategoryKey	Product Subcategory Description	ProductSubcategoryKe	y ProductSubcategoryL	abel Produc	:tSubcate	egoryName	•	ateDate
00:00 1		MP48MP3	1	0101	MP4&M	IP3		07.07	.2009 0
00:00 1		Recorder	2	0102	Record	er		07.07	.2009 0
00:00 1		Radio	3	0103	Radio			07.07	.2009 0
00:00 1		Recording Pen	4	0104	Record	ing Pen		07.07	.2009 0
00:00 1		Headphones	5	0105	Headph	nones		07.07	.2009 0
<									>
DimProc	luct		~						
		D 1 11				0	<u> </u>	0	11 - 14
Produc 873	tKey ProductLabel 0308131	ProductName		ProductSubcategoryKey 22	ProductURL	Size	SizeRange	Size	UnitMea
		Contoso Wireless Laser Mouse E							
874	0308132	Contoso Wireless Notebook Optic		22					
875	0308133	Contoso Wireless Notebook Optio		22					
880	0308138	Contoso Optical Wheel OEM PS/		22				_	
884	0308142	Contoso Bluetooth Notebook Mor	use X305 White	22					
<				_					>
Ľ									*
						_		-	
Active	•						ОК	Ca	ncel

Select each table and the required columns The order has no importance

On the other hand, you must respect the 1 to several rune : here it is the first table that provides the correspondence

You can also simple click and drag the column to the other one by its label to create the relationship.

The relationship is created :



Simply click on the connection line and the connected columns are circled in green You can revert to the normal view by clicking on the DATA VIEW Button

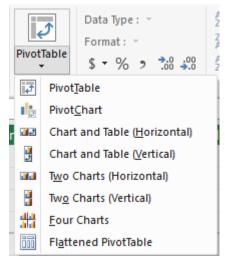
4.2.2 Pivot table that you can create once the tables are linked

Row Labels 🔹	Sum of SalesAmount					
Catalog		The labels AsiaSeason and ChannelDescription				
Holiday	CHF 207'704'286.56	are not in the same table as SalesAmount				
None	CHF 280'840'359.44	→ No	link no pivot table			
Spring/Back to School	CHF 154'358'610.90	2				
Tax Time/Summer	CHF 53'001'698.85					
Online						
Holiday	CHF 424'018'801.51					
None	CHF 731'181'310.10	T Filters	Columns			
Spring/Back to School	CHF 380'880'793.87	1 Filters	Columns			
Tax Time/Summer	CHF 149'990'204.41					
Reseller						
Holiday	CHF 276'425'193.05					
None	CHF 476'784'148.94					
Spring/Back to School	CHF 255'772'226.35					
Tax Time/Summer	CHF 95'567'132.53					
Store						
Holiday	CHF 1'216'205'191.43					
None	CHF 2'122'007'845.90	Rows	Σ Values			
Spring/Back to School	CHF 1'071'489'972.33	ChannelDescription	▼ Sum of SalesAmount ▼			
Tax Time/Summer	CHF 444'996'588.66					
Grand Total	CHF 8'341'224'364.83	AsiaSeason	▼			

To create the pivot table :

HOME Tab - PIVOT TABLE Button.

Some additional choices if you compare to what Excel offers. *Interesting :* you can create a pivot chart without having to create a pivot table first.



Pivot tables are always created in the Excel workbook and never in Power Pivot

4.3 The DAX language (Data Analysis Expression)

It is not a programming language but a function or formula language. In Excel we use the words *functions or formulas, calculated column or field*. It is not wrong to use them in Power Pivot but the word associated with Power Pivot is rather *function or* DAX <u>mesure</u>.

Some characteristics :

- Building a DAX function is relatively similar to an Excel function. But some Excel functions are missing from the list of DAX functions such as VLOOKUP for instance. And vice and versa : some DAX functions have no correspondence in Excel
- The result of the mesure will be displayed inside a cell but it can be preceded by a label. The syntax to respect is the following : Sales Total = SUMor Sales Total := SUM
- When the required calculation needs a column that belongs to another table than the active one you cannot simply click the column to refer to it in the formula. You need to retrieve it through a DAX function called RELATED (in Excel you would use the VLOOKUP function)
- A mesure can be used when creating a pivot table
- As data models often contain several tables, some quite heavy and usually connected via relationships, DAX functions often enable an analysis that would simply be either impossible in Excel or too complicated to implement.

Here after an easy example to illustrate what we would do in Excel and what Power Pivot allows to do in the same situation.

Going beyond is far more complicated and would require a proper training on the subject ...

4.3.1 In EXCEL : using VLOOKUP

How to calculate the total amount of sales for a client in table 1 when the product price unit is actually in table 2 ?

	Н	- I	J	K	L	М
-	Quantity 🔽	Total 🚽 👻				
	35	=[@Quantit	y]*VLOOKU	P([@Produ	ct];Products	[#All];3;0)
	65	154.7				
	45	63.9				

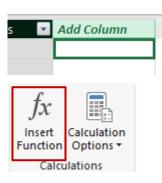
Characteristics :

- 1. No need to link the tables
- 2. Although you click on cells to build the formula, because you work with tables, the function automatically converts a E12 into a syntax showing the label of the column
- 3. No need to drag to fill the column, it is automatically filled in

4.3.2 In POWER PIVOT : using DAX RELATED

Here after an interesting DAX function that will replace the VLOOKUP (incidentally missing from the list of functions ...)

Active cell in the column to add (right end of the table)



- DESIGN Tab CALCULATIONS Group
- Select the RELATED function. A drop-down list will automatically display the column of the connected table(s). Select the required column lable and then carry on as usually to multiply by the ordered quantity.

:=RELATED(·	
RELATED(ColumnName)	
Total	Products[Analysis]	-
	Products[Category]	1
	Products[Price / unit]	F
its	Products[Product]	1
	Products[With VAT tax]	
S	247.55 Sierre Tom5 Sp	••••

The formula is validated and the column is automatically filled

f_{χ} =RELATED(Products[Price / unit])*Exportations[Quantity]							
Pro 🔒 🔽	Т. 💌	Branch 🔽	Client 🔽	City 🔽	Country 🔽	Quantity 🔽	Total sales 🛛 💌 🗚
Almonds	61	Carouge	Vins et	Reims	France	35	61.25
Cashew n	15	Meyrin	Vins et	Reims	France	65	154.7
Grilled nuts	63.9	Lausanne	Vins et	Reims	France	45	63.9
Assorted	33	Montreux	Toms Sp	Münst	Germany	87	334.95
Grany bars	24	Sierre	Toms Sn	Münst	Germany	85	247 35

| Data model and relationships

You may use RELATED to simply retrieve a data that you would need to use VLOOKUP if you were in Excel instead of Power Pivot

	f_{χ} =RELATED(Products[0	Category])			
. 💌	Product 👘 🔽	Retrieve category			
248	Almonds	Nuts			
248	Cashew nuts	Nuts			
248	Grilled nuts	Fruits et légumes			
249	Assorted biscuits	Bakery			
249	Grany bars	Bakery			
250	Grany hars	Bakery			

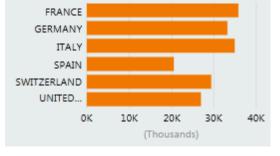
Do not forget the last parenthesis. Power Pivot is not as "gracious" as Excel !

Only in Office 2016 Professional Plus : POWER VIEW

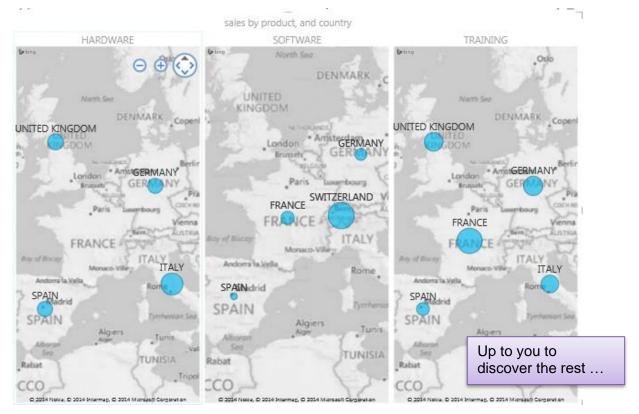
It is an add-in that goes with Power Query and Power Pivot because it is part of Microsoft Power BI. Its main interest is essentially to provide the creation of tables or charts with nice visual effects (partial – with segments – filtered …) or to use geolocated maps.

Each element is called a *view* and creating one is really very simple ... Some examples :

EA	ST	NORT	Ή S	OUTH	WEAST		country	EAST	17600 sales	
invoice	date prod	uct	salesman	free-lance	country		FRANCE	SOUTH	10000	
	1.2014 TRAI 1.2014 TRAI			NO NO	FRANCE ITALY		country	2722	sales	
	1.2014 SOFT 1.2014 TRAI			YES NO	SPAIN UNITED KINGDOM	1	FRANCE	WEAST	8200 sales	
	1.2014 SOFT 1.2014 SOFT			YES NO	SWITZERLAND FRANCE					
30.0	1.2014 TRAI	NING	KEITH	NO	GERMANY		GERMANY	EAST	8600 sales	
							GERMANY	SOUTH	19800	



Specific to POWER VIEW : geolocation to create maps :



| Data model and relationships