Course Manual:

Excel Expert

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Excel Expert

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1 LINK

A link is a connection to a WEB page or another file or location in the same document or workbook.

1.1 Link to a location in the same workbook

1. Open "**Outline-Protection-Link**", SHEET "**Annual Sale**"
2. Create a link in cell E12 to the "**Chocolate**" sheet

12	Create a link in the E12 cell to the "chocolate" sheet	

3. Return to ➤ **Insert** ➤ **Links** ➤ **Place in this document** ➤ In ➤ Type the cell reference, if you want to reach a particular cell, type it: **Example R26**
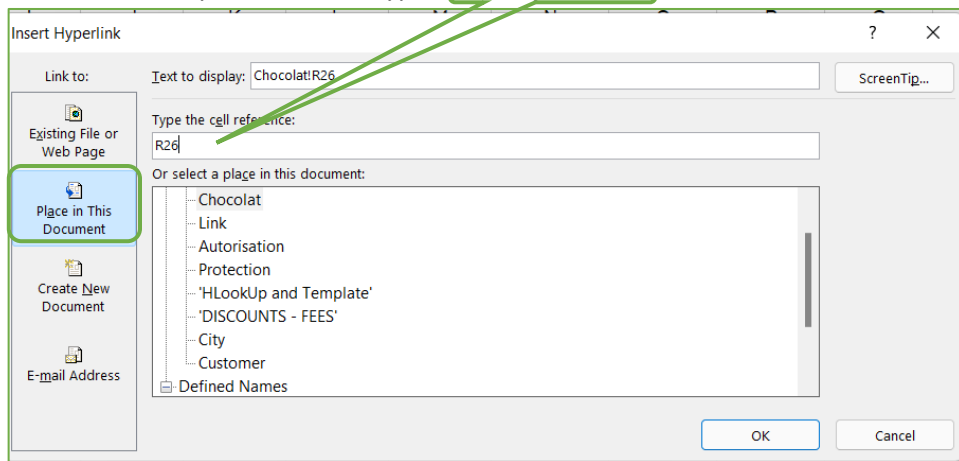
1.2 Watch Window

WATCH WINDOW is also a LINK to one or more cells, here's how to do it?

1. Open the file ➤ **Outline-Protection-Link** ➤ Sheet➤ **Chocolate**
2. Click in **cell R26** which represents the net profit grand total
3. Click in ➤ Formulas➤ Watch Window ➤Add Watch

   130 454,82 $
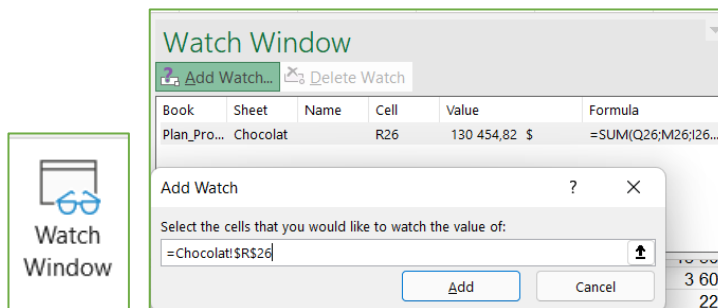
4. Return to the sheet ➤ **Annual Sale**

5. You want to see the Net Profit ➤ click in ➤ **Formulas** ➤ **Watch Window** and ➤ double-click on the watch

1.3 Remove a link or watch Window

1. To remove a link, click in the cell, and right-click ➤ Remove Hyperlink

2. Or go back to ➤ **Insert** ➤ **Links** ➤ click ➤ **Remove Link**
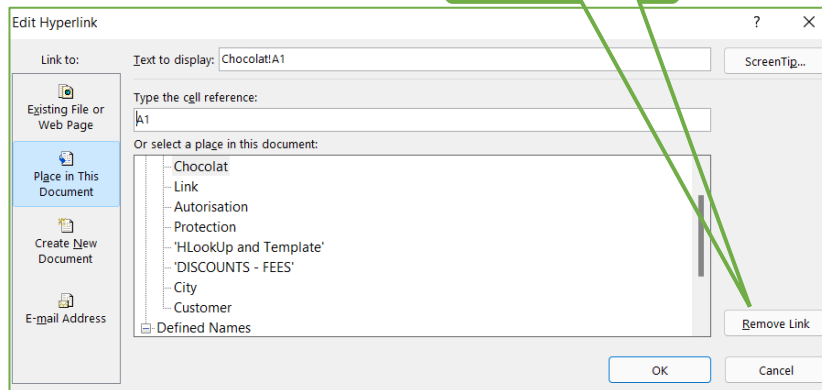
3. To remove "Watch Window" ➤ go back to ➤ **Formulas** ➤ **Watch Window** ➤ Select and ➤ Delete Watch
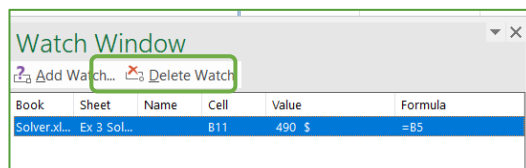
2 COPY AND PASTE WITH LINK

Copy and paste can be interesting when we always want our values up to date, that is to say that you modify one or more values in EXCEL, and they update. This can be done in EXCEL or WORD or PowerPoint or another file.

1. Re-Open ➤ **Outline-Protection-Link** as needed

2. Select cells A1 to E8 of the " **Link** " sheet

3. Copy (CTRL + C)

4. Open the " **Past Link** " document and click where the data should be pasted

5. Press ➤ Paste Special from the "**Paste**" menu
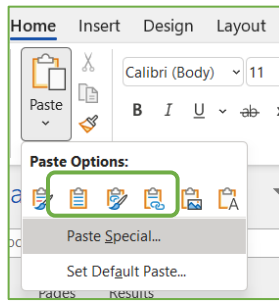
6. In ➤ **Paste Special** ➤ choose ➤ **Paste Link** and press OK
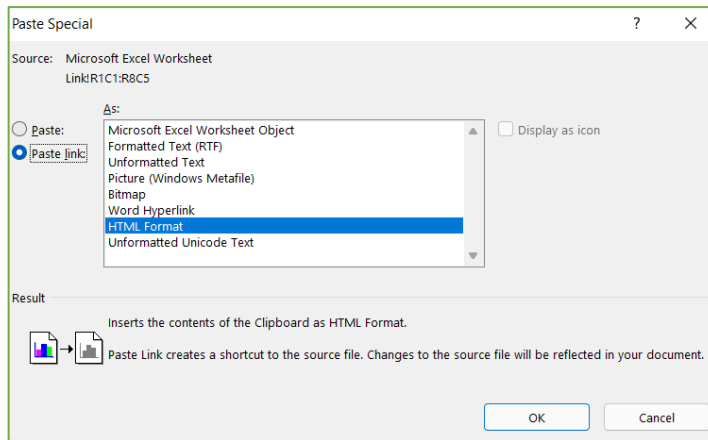
7. If you accidentally deleted or modified data, in the table or chart, right-click and ➤ **UPDATE HYPERLINKS.**
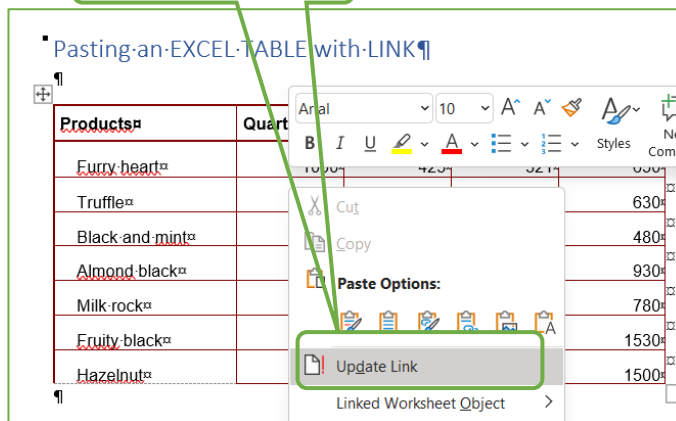
IF you send Excel data to Word, it is better that you change the format of Number for **CURRENCY** RATHER THAN LEAVING IT IN **ACCOUNTING** FORMAT

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8. Repeat the same exercise with the chart to another linked file.

3 OUTLINE MODE

The outline allows a grouping of rows and columns that you want to show at the same time on the same level.

An outline mode can be created manually or automatically. Excel creates styles attached to an outline according to the levels. You can assign them to your outline during creation or later.

Worksheet before creating an OUTLINE

3.1 Automatic creation of an outline

Excel is based on the components of the formulas contained in the selection.

1. Open the file: **Outline-Protection-Link**
2. Activate the sheet: **Annual Sale**
3. Select the range of cells you want to outline or a single cell to affect the entire sheet.
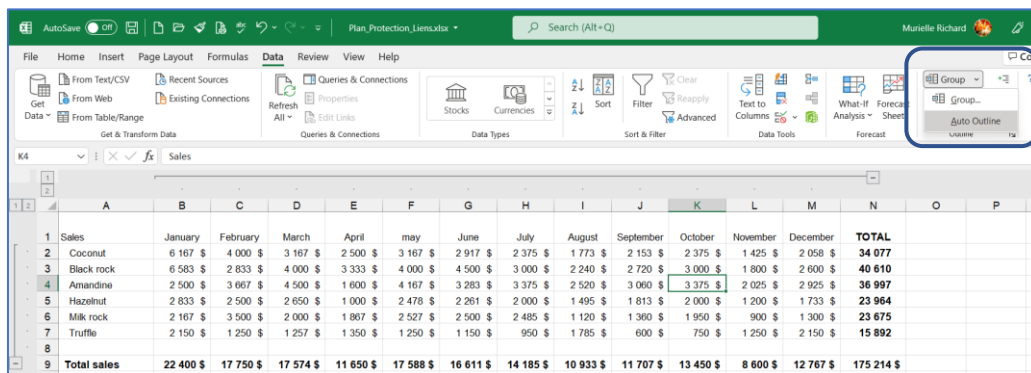
4. On the **Data** tab, select **Outline** and from the **Group menu** select ➤**Auto Outline.**
5. Excel displays the outline symbols at the top left and bottom of the workbook frame.

3.2   The symbols of the outline

Each symbol in the outline has a meaning.
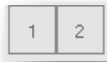
Displays the specified level of detail

Hides the detail for this level

Displays the detail for this level.

3.3   Manually creating an outline

1. Ungroup the Outline view you just made
2. Creating an outline is done through the **Group menu**
3. Select the rows or columns you want to group
4. Select Data, Group, and ➤ **Group**
5. Excel displays the outline symbols at the top left and bottom of the workbook frame.
6. Use the Repeat button (F4) to complete the outline by repeating the grouping operation after selecting rows or columns.
7. Use the same method to group rows or columns inserted after the outline has been created.
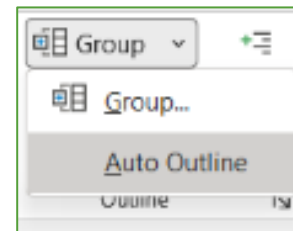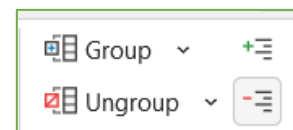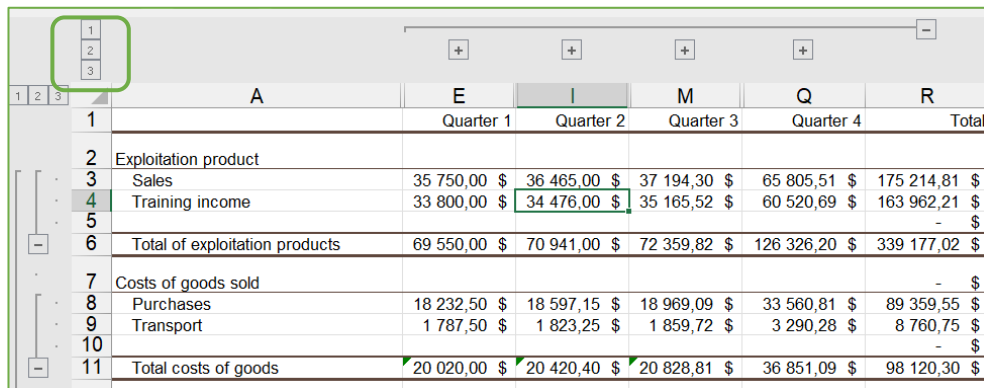
3.4   Why create outline mode

> We will create an outline to create a Custom View. Also, to prepare the formatting of the cells. We will see 2 methods

3.4.1   Method 1

The first method will aim to reach visible cells to change the style, size and color of FONT

1. Open the file: **Outline-Protection-Link**
2. Activate the sheet: **Chocolate**
3. Choose **AUTO OUTLINE** IN ➢ **DATA**➢ **OUTLINE**
4. Click in number 2 to collapse the columns and keep the totals (Quarter) only

5. In ➢ **Home Tab**➢ Group ➢ **Editing** ➢ **Find and select** ➢ **Go To**
6. Click in ➢ **Special.**
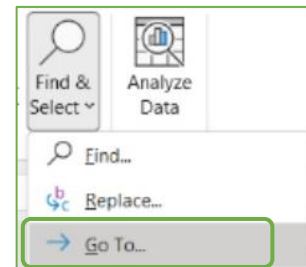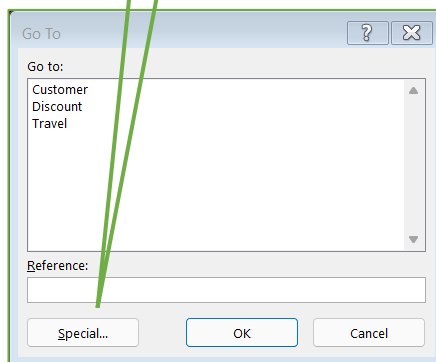
7. Choose: "**Visible cells only**"
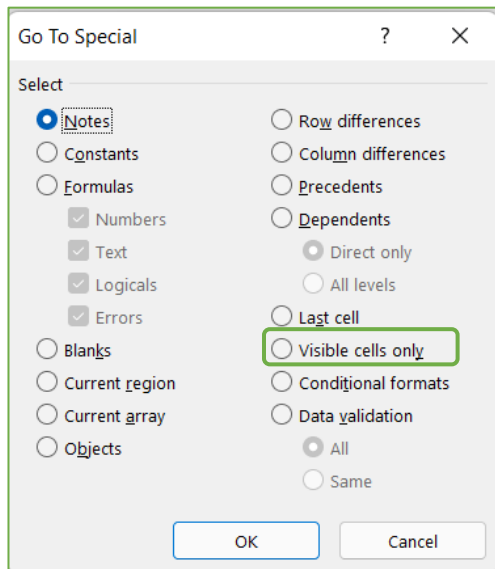
8. Change the **"font color**" and apply the "**BOLD**"
9. Ungroup Oultine mode and OBSERVE YOUR RESULT, do not close your file

3.4.2   Method 2

The second method will aim **to reach formulas** to change the style, size and color of FILL. In the previous exercise, we did not have all the formulas, obviously, this one would not touch the data in the first column.

Do not forget to "**Ungroup**" or "**Clear Outline**"

1. Make a copy of your sheet if you want to keep it TO COMPARE.

2. Activate the sheet: **Chocolate**

3. In ➢ **Home Tab** ➢ Group **Editing** ➢ **Find and select** ➢ **Go To** ➢**Choose** ➢ **Formulas**

4. Create a "**Fill**" color, bold as needed and **ungroup**

5. OBSERVE the difference between the two methods used
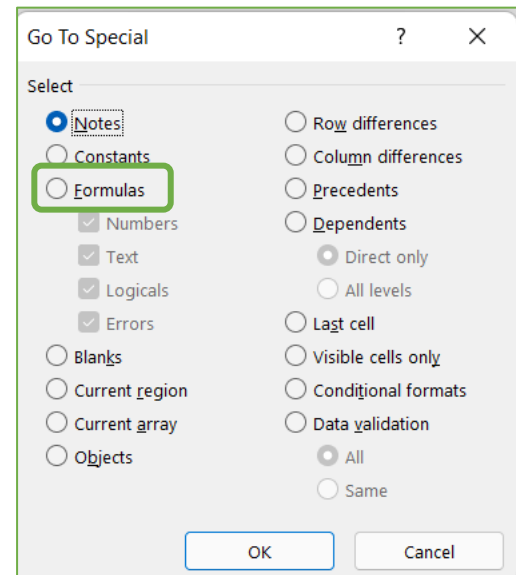
4 NUMBER FORMAT

Sometimes we want to see text in a number cell, example by talking about age, see **4 years** instead of the value **4**

1. Open the file: **Outline-Protection-Link**
2. Activate the sheet: **Authorization**
3. Select all cells in "**Column E**" from E2 »
4. Open the "**Number Format**" dialog box
5. Click in "**Custom**"
6. Whether you are in "**Standard**" **or ## or 0.00**, go to Type and type **" Hours"**
7. Press OK and observe your result
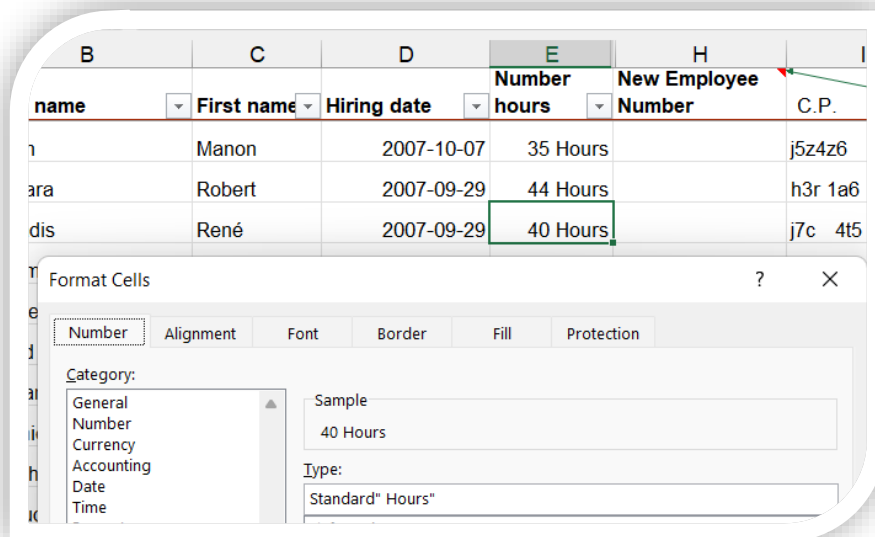
5 FLASH FILL

What does FLASH Fill mean

We learned in Excel Advanced to create "**Formulas**", example; UPPERCASE, RIGHT, LEFT, CONCAT, ETC… These extremely useful formulas to fix ugly or corrupted databases

Let us see now this option "**FLASH FILL**"

1. Open the file: Outline-Protection-Link
2. Activate the sheet: **Authorization**
3. Click in cell H2
4. Enter the first three letters of the last name (Uppercase)

5. Make a hyphen

6. Enter the last two2 digits of the employee's number

7. Make a hyphen again

8. And enter the first letter of the first name in capital letters

9. Example: for Veronique Enrico: ENR-47-V

10. From **DATA Tab ➤ DATA TOOLS ➤** Click: FLASH FILL

11. Repeat the same exercise with the postal code

12. In cell ➤ J2 ➤ Type H2C do a space then type 1R5

13. And click FLASH FILL

14. See the nice result

	A	B	C	D	E	H	I	J
1	No Empl.	Last name	First name	Hiring date	Number hours	New Employee Number	C.P.	C.P.
2	1047	Enrico	Véronique	2016-10-04	25	ENR-47-V	h2c1r5	H2C 1R5
3	1008	Caron	Paul	2016-10-02	40	CAR-08-P	h1n3l4	H1N 3L4
4	1063	Doyon	Maurice	2016-10-02	44	DOY-63-M	h7p-5t6	H7P 5T6
5	1115	Cole	Marie	2016-04-21	44	COL-15-M	j6z1w9	J6Z 1W9

15. Keep a single column.

6   PROTECTION

6.1   What can we protect?

1. A workbook

2. Sheet

3. Cells

4. Formulas

5. The structure of a workbook

6.2 Can we allow data entry while maintaining protection?

1. We can free up cells to allow data entry to everyone

2. We may also allow certain users to enter data with password

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The password is optional; however, if you do not provide a password, all users will be able to unprotect the worksheet and edit the protected items. Be sure to choose a password that you will remember, because if you forget it, you will be unable to access the protected items on the spreadsheet.

6.3 Protect worksheet items from all users

1. Open the workbook and position yourself on the worksheet you want to protect.

On the Format Cells menu, click **Protection** command, or right-click in the "**Protection**" sheet

Be careful, if you want total protection, you must uncheck the box "Select locked cells"
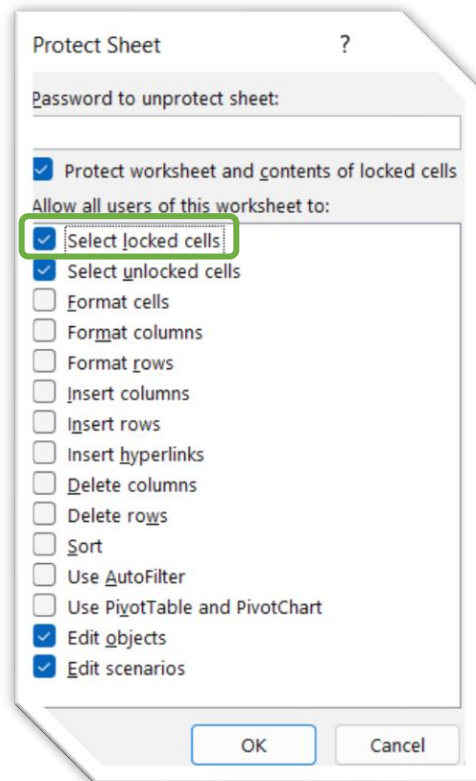
6.4   Allow modification to certain people
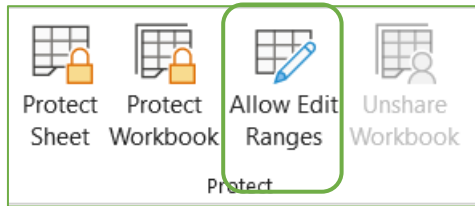
1. You want to allow data entry to a specific person
2. Sheet ➤ **Authorization** of the file ➤ **Outline-Protection-Link**
3. Tab ➤ **Review** ➤ **Allow Edit Ranges**
4. Select column E ➤ tape ➤ Hours in Title

5. Tape a password if necessary

6. Do not forget to protect your sheet

6.5   Protect the structure

Protecting the structure will prevent users from moving, deleting, or inserting sheets. This option is effective when we want to protect our formulas.
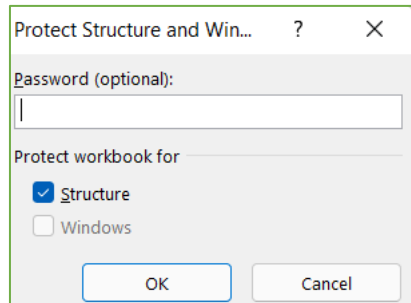
6.6   Unlock cells that users will be able to edit and enter data

Select each cell or range, click in group ➤ Cells ➤ Format, click the **Protect Sheet** tab, and then click to clear the Locked check box**.**
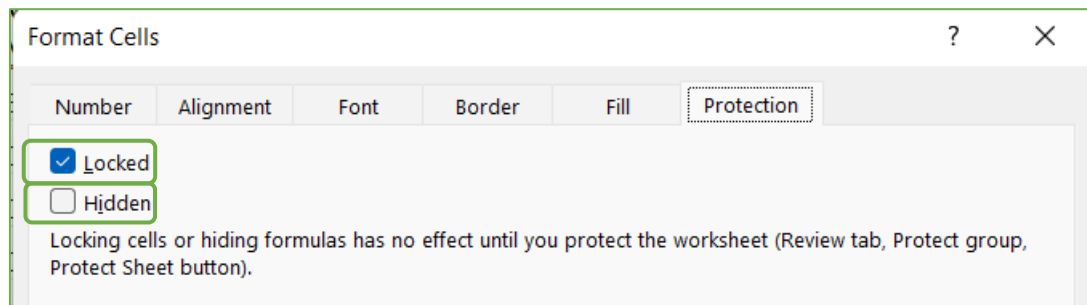
6.7   Hide formulas

Sometimes we do not want users to see our formulas, the reason: where the data comes from or simply to keep a certain copyright on a formula, then our formulas must be invisible.

You select the cells that contain the formulas, click in the group ➤ Cells ➤ Format, click the **Protect Sheet** tab, and then click to clear the Hidden check box.

1. Open the workbook: **Outline-Protection-Link**, Sheet: **HLookUp and Template**

2. Click in cell F17 and hide this formula

3. Delete the formula and we will reproduce it together

4. We give a discount according to the price, but unlike the VLOOKUP or H of the previous exercises in the Excel Advanced course, we can not go looking for an EXACT value, hence the need to replace the value 0 by 1

5. Active the Formula ➤ HLookUp, LookUp_value is F16 ➤ Table_Array is ➤ Discount ➤ Row_Index_lookup is ➤ 2 and **Range_lookup is ➤ 1**
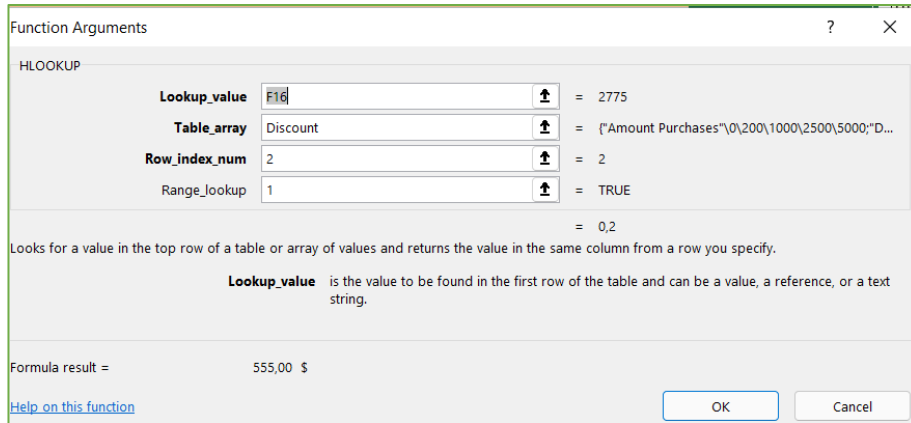
6. Then multiply the value by the subtotal which is F18

=HLOOKUP(F16;Discount;2;1)*F16

	C	D	E	F
e amount indicated on the table "Discount"				555,00 $
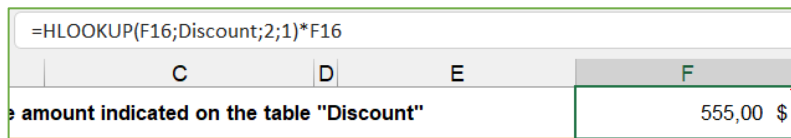
7. Protect the sheet and observe that the formula is invisible, remove the protection, do not close, we will create a template together.

6.8   Create a template

1. Open the workbook: **Outline-Protection-Link** ➤ Sheet: **HLookUp and Template** if needed

2. Select the color cells, from the tab ➤ Home➤ Group Cells➤ Format➤ click the lock to unlock the cells. What you just did: You just released the cells to allow data entry after it is write protected.

3. Hide formulas as needed, the goal of hiding formulas is to prevent people from seeing where the data comes from

4. Protect the sheet

5. In File ➤ Export ➤ Save as "**Template**"

6. And rename it: **Invoice** »

7. Close and open the invoice to enter data

8. If you have made a mistake and need to correct the "**Template**", you must open EXCEL, and from "**Open**" to make the changes to your file.

9. Do not forget to re-protect your file.
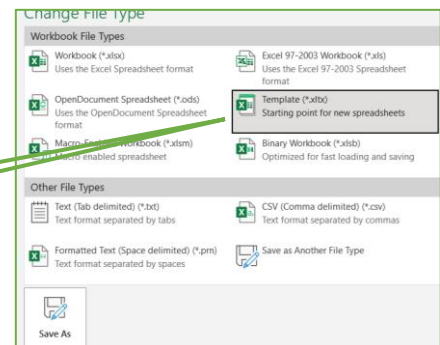
7   PROTECT WORKBOOK

7.1   Password protection

1.   Open the file: **Password**

2.   Click in File, then INFO and Encrypt with password.
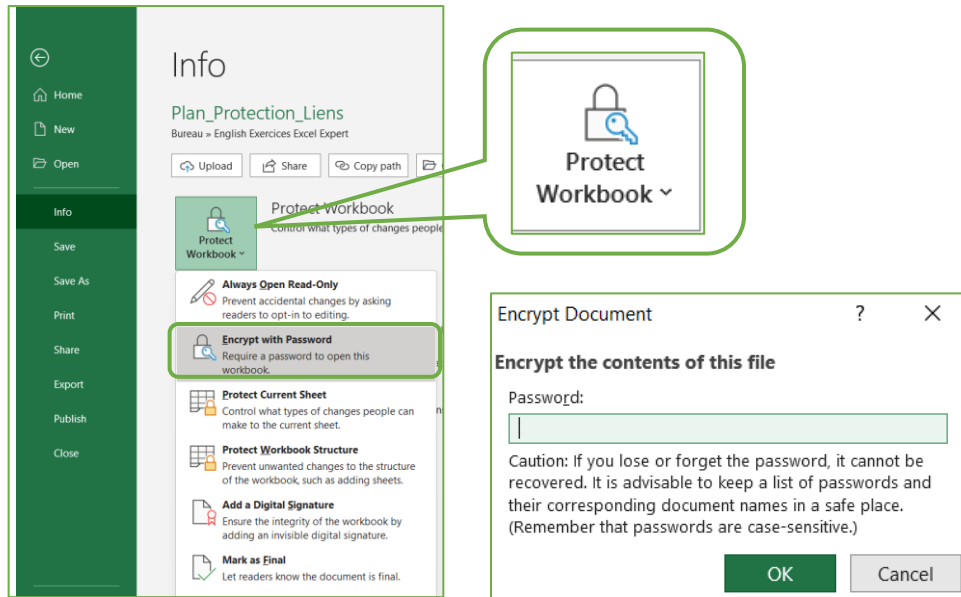
3.   Close the file and reopen it, it will ask you for the password.

7.2   Read-only or Final

Open the file: **Outline-Protection-Link**

Click in **File**, then **INFO** and explore **"Always open read-only"**
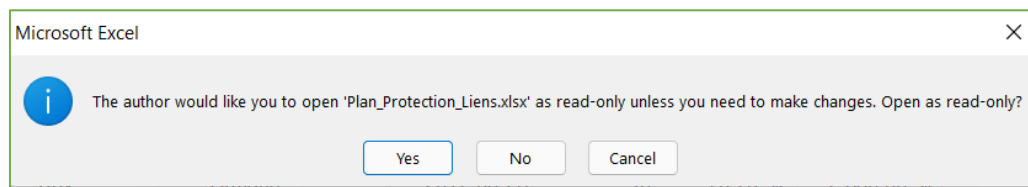
7.3 Mark as Final

Click in File, then INFO and explore **"Mark as Final"**
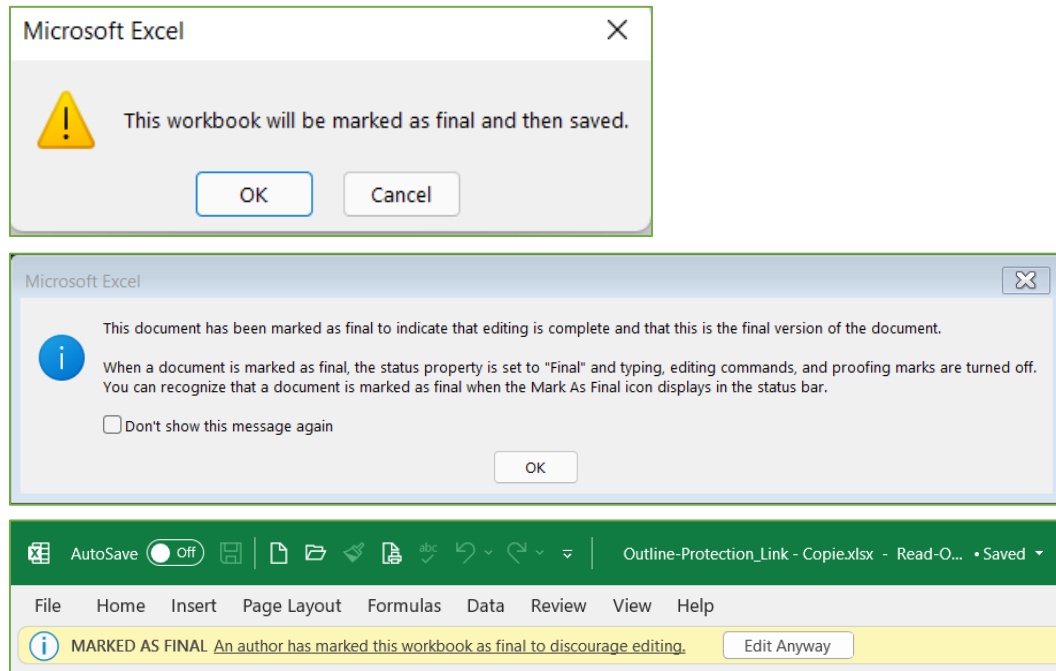
7.4 Inspect the document

You may need to inspect the document for several reasons:

1. Remove headers and footers
2. Hidden cells
3. Hidden rows and columns
4. Document Ownership
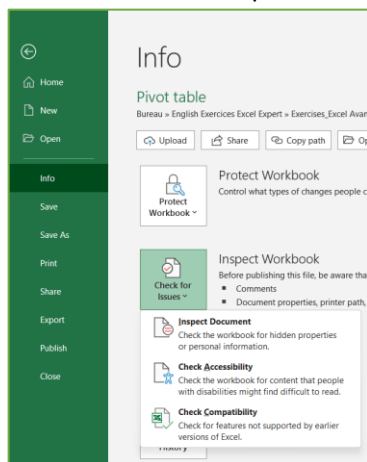
8 WHAT-IF ANALYSIS – GOAL SEEK

The GOAL SEEK command is a tool for solving a single-variable equation.

Let's take the following example: you want to save an amount each month that will allow you to carry out a specific project. You know how much you want to save. You also know how long you want to accumulate the amount. Finally, you know the interest rate on savings. You have already entered the PMT function (calculates the value of a payout), and you have found the value of the payout required to reach your goal. After analyzing your budget, you realize that you could spend a higher amount on your project, and you want to know how much money you could accumulate. You have two methods: you guess the value of the accumulated amount until you get the desired payment. You can also use the GOAL SEEK command that will make the necessary changes to the constant used by the PMT function.

In order to use the GOAL SEEK command, you must enter the different elements of the equation to be solved in separate cells. If you consider the previous example, the amount to accumulate and the PMT function that allows you to calculate the amount of the payment should be entered in separate cells:
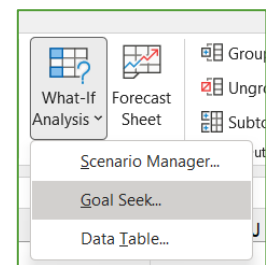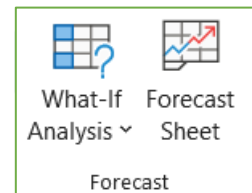
Here are examples of a goal seek

8.1 Example: Accumulated 100 000 after 25 years with an interest rate of 5%

1. Open: **Analysis** ➤ Sheet: **Goal Seek**
2. Click in cell **B6**

	A	B	
1	**FV(B4;B3;-B5)**		
2	(Amount accumulated according to the number of years, the rate and the amount invested annually)		
3	Years (duration)	25	
4	Interest rate	5%	
5	Annual investment	2 000 $	
6	Accumulated amount	95 454 $	
7			
8	Formula	=FV(B4;B3;-B5)	
9			
10	Objective:	100 000 $	
11			
12	Click in B6		
13	Change the amount of the investment for 100000		
14			

Goal Seek

Set cell: B6
To value: 100000
By changing cell: $B$5

OK   Cancel
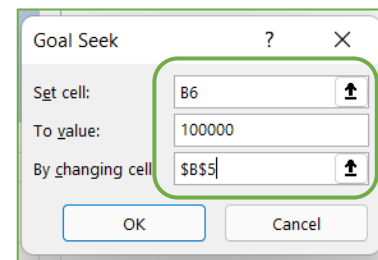
3. Click in **Goal Seek** of the Group **What-If Analysis**

4. Cell to be change **B5**
5. To value **100 000**
6. Click OK and see the answer ➤ cell **B5**

Years (duration)	25
Interest rate	5%
Annual investment	2 095 $
Accumulated amount	100 000 $

8.2 Example: Payment of maximum 2 000 per month to buy a property

1. Open: **Analysis** ➤ Sheet: **Goal Seek**
2. Click in cell **G6**

F	G	H	I
PMT(G4/12;G3*12;-G5)			
(Monthly payment to be repaid per month)			
Years (duration)	25		
Interest rate	5%		
Purchase of a property	350 000 $		
Amount to repay per month	2 046 $		
Formula	=PMT(G4/12;G3*12;-G5)		
Objective:	2 000 $		
Click in G6			

Goal Seek ? ✕
Set cell: G6
To value: 2000
By changing cell: $G$5
OK Cancel

3. Click in **Goal Seek** of the Group **What-If Analysis**
4. Cell to be change **G5**
5. Type 2000 for "Value to reach and $G$5 for cell to edit and press **OK**

(Monthly payment to be repaid per month)	
Years (duration)	25
Interest rate	5%
Purchase of a property	342 120 $
Amount to repay per month	2 000 $
Formula	=PMT(G4/12;G3*12;-G5)
Objective:	2 000 $

9   WHAT-IF ANALYSIS - SCENARIO MANAGEMENT

The development of scenarios allows, from the same spreadsheet: to study or analyze a situation from different angles. You have already budgeted or tried to make projections. In this type of project, it is common not to have accurate data and to hesitate between "optimistic", "pessimistic" or "realistic" data. You could create, on separate sheets, a table illustrating each of the possibilities, but this solution involves a lot of work. Using the SCENARIO MANAGER allows you to perform the same task on a single sheet.

9.1   Creating scenarios
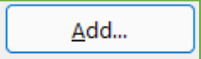
Before you begin creating scenarios, you must have designed the skeleton of the workbook and have the different possible values for the variable cells on hand. You can define up to 32 variable cells for each scenario.

You want to create scenarios for all three situations. You have two choices: you create the scenarios from the selected data, or you create the scenarios by entering the data in the SCENARIO VALUES dialog box.
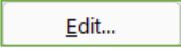
1.   Open ➤ **Analysis** file ➤ sheet ➤ **Scenario Manager**

2.   Select cell ➤ **B2 and B3**

3.   Choose the Scenario Manager command located in the Forecast group. The following dialog box appears:
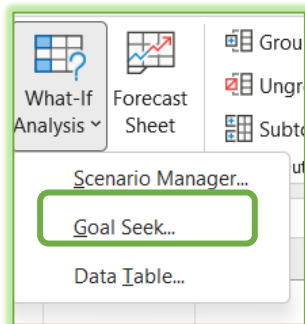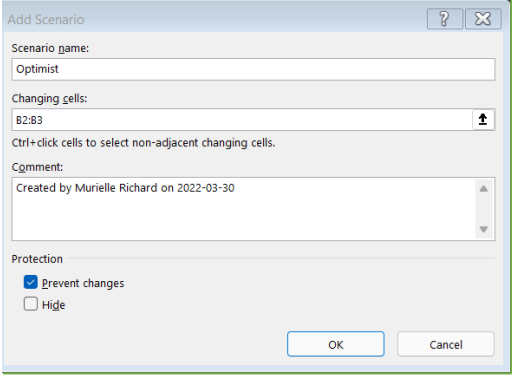
4.   Click the button to access the Add Scenario dialog box:
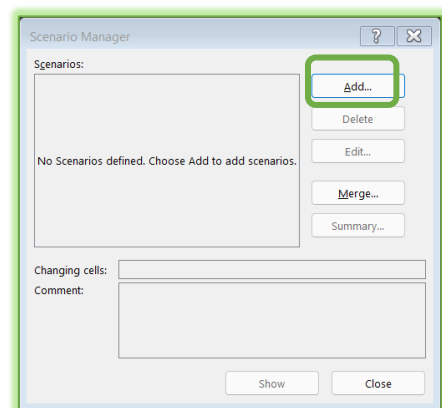
5. Enter, in the "Scenario name" box, the name **Optimist.**
   Note that the "Changing cells" box already contains the address of the cells to be defined.

6. Click on Edit... if you would like to change the amount

7. Click the button to access the Scenario Values dialog box where the values of the selected cells are reported.
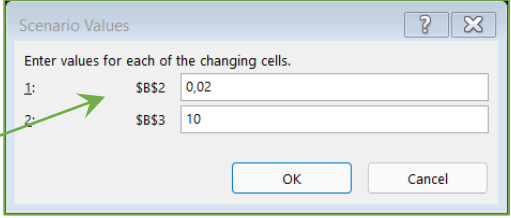
8. Click the button Add... to add the following scenarios:

9. **Optimist:** 2% for 30 years
   Realist: 5% for 25 years, then add: **Pessimist:** 18% for 20 years

10. Click the button to access the Scenario **SUMMARY** dialog box

11. Report Type: **Scenario summary**

12. Click OK

See result page 22

RESULT OF SCENARIO SUMMARY

10   WHAT-IF ANALYSIS - DATA TABLE

The purpose of Data Table is to get a result in the same objective as the Goal Seek with the difference that we go there in a table, rather than a single cell.

Here is an example

1. Open the file: **Analysis**, sheet: **Table with 2 variables**
2. Select the table **(B4 to J13),** in "**What-If analysis**", then "**Data table"**
3. Click in cell **B2** for "Row Input" and **B1** "Column Input"

4. Press OK and observe the result

3 200 $	43 000 $	46 000 $	49 000 $	52 000 $	55 000 $	58 000 $	61 000 $	64 000 $
6,0%	2 580 $	2 760 $	2 940 $	3 120 $	3 300 $	3 480 $	3 660 $	3 840 $
6,5%	2 795 $	2 990 $	3 185 $	3 380 $	3 575 $	3 770 $	3 965 $	4 160 $
7,0%	3 010 $	3 220 $	3 430 $	3 640 $	3 850 $	4 060 $	4 270 $	4 480 $
7,5%	3 225 $	3 450 $	3 675 $	3 900 $	4 125 $	4 350 $	4 575 $	4 800 $
8,0%	3 440 $	3 680 $	3 920 $	4 160 $	4 400 $	4 640 $	4 880 $	5 120 $
8,5%	3 655 $	3 910 $	4 165 $	4 420 $	4 675 $	4 930 $	5 185 $	5 440 $
9,0%	3 870 $	4 140 $	4 410 $	4 680 $	4 950 $	5 220 $	5 490 $	5 760 $
9,5%	4 085 $	4 370 $	4 655 $	4 940 $	5 225 $	5 510 $	5 795 $	6 080 $
10,0%	4 300 $	4 600 $	4 900 $	5 200 $	5 500 $	5 800 $	6 100 $	6 400 $

11   SOLVER

Using the what-if analysis tools, you can test the different value sets in one or more formulas to explore the various results.

For example, you can perform scenario analyses to create two budgets, each of which assumes a certain level of revenue. You can also specify a result that you want a formula to produce, and then determine that sets of values will produce that result. Excel provides several tools to help you perform the right type of analysis for your needs.

11.1   Install the solver

Go to **File ➤ Options**

Click Add-ins, and then in the Mange box, select **Excel Add-ins.** Clicks Go
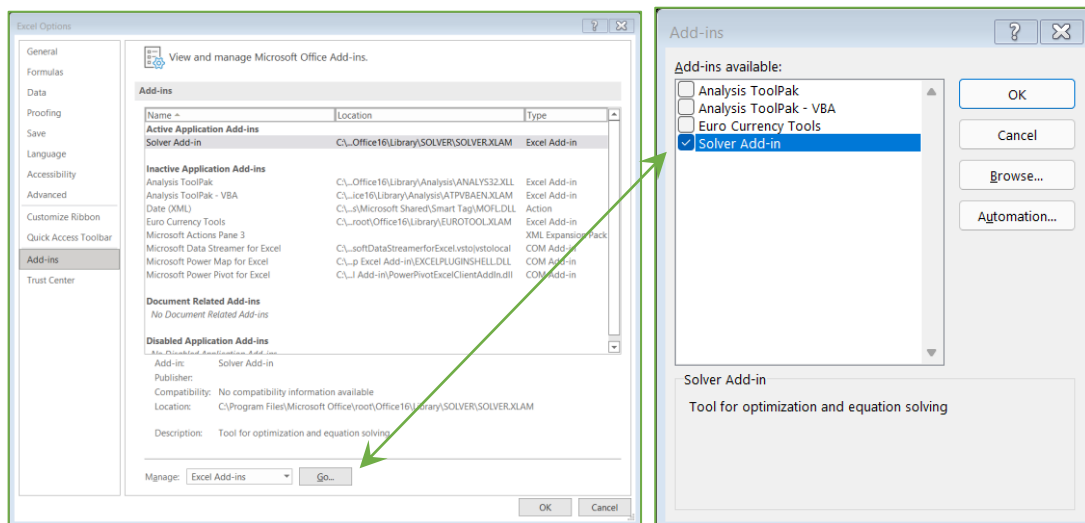
Choose **Solver Add-in ➤** click OK.

11.2   When to use the solver

We use solvers when we want to analyze several variants, unlike the goal seek which can only change one value.

Example:

You want your monthly profit to increase to $1,000 instead of $490. You choose the cells that could be modified. You do not want to increase the unit price and also can't change the fixed costs and the unit cost will soon increase to $12.

How many units you have to sell to get a profit of $1,000.

1.   Open the file: **Analysis**, sheet: **Ex 3 Solver - 2 variables**

	A	B
1	Unit price	27,75 $
2	Cost per unit	10,30 $
3	Units sold	200
4	Fixed costs	3 000 $
5	**Profits**	490,00 $
6		
7		
8	OBJECTIVE	1 000 $

2.   Select data from **B11 to J19**, observe the formula in Cell B11 representing the value: $490

3.   First step is work **Data Table**

4. Result

490 $	200	225	250	275	300	325	350	375
25 $	(60) $	308 $	675 $	1 043 $	1 410 $	1 778 $	2 145 $	2 513 $
26 $	140 $	533 $	925 $	1 318 $	1 710 $	2 103 $	2 495 $	2 888 $
27 $	340 $	758 $	1 175 $	1 593 $	2 010 $	2 428 $	2 845 $	3 263 $
28 $	540 $	983 $	1 425 $	1 868 $	2 310 $	2 753 $	3 195 $	3 638 $
29 $	740 $	1 208 $	1 675 $	2 143 $	2 610 $	3 078 $	3 545 $	4 013 $
30 $	940 $	1 433 $	1 925 $	2 418 $	2 910 $	3 403 $	3 895 $	4 388 $
31 $	1 140 $	1 658 $	2 175 $	2 693 $	3 210 $	3 728 $	4 245 $	4 763 $
32 $	1 340 $	1 883 $	2 425 $	2 968 $	3 510 $	4 053 $	4 595 $	5 138 $

?→ Solver

Analyze

5. Keep your selection and ➤ Click **Solver** in **Data Tab** ➤ **group Analyze**

11.3 Target: Value 1,000 per month instead of 490

1. Variable cells: choose **B2 and B3** since you need to increase the unit cost and quantities to sell.

2. First constraint: Click in Add to determine which values to change.

3. Click in B2, the unit cost will increase to $12, so the reference is B2, choose the = sign and the value is $12.

STEP 2: SOLVER	
Variable cells:	B2 et B3
Constraint 1:	B2 = 12
Constraint 2:	B3 >=200

Change Constraint

Cell Reference:
$B$2   ▲   =   ∨   Constraint: 12   ▲

OK   Add   Cancel

4. Click [Add...]

5. 2nd constraint: obviously, it is necessary to increase the quantities to be sold. B3 - > = 200

Change Constraint

Cell Reference:
$B$3   ▲   >=   ∨   Constraint: 200   ▲

OK   Add   Cancel

6. If you make a mistake, click edit or add constraint as needed

7. Click **SOLVE**

8. **Observe your result**

1 000 $	200	225	250	275	300	325	350
25 $	(400) $	(75) $	250 $	575 $	900 $	1 225 $	1 550 $
26 $	(200) $	150 $	500 $	850 $	1 200 $	1 550 $	1 900 $
27 $	- $	375 $	750 $	1 125 $	1 500 $	1 875 $	2 250 $
28 $	200 $	600 $	1 000 $	1 400 $	1 800 $	2 200 $	2 600 $
29 $	400 $	825 $	1 250 $	1 675 $	2 100 $	2 525 $	2 950 $
30 $	600 $	1 050 $	1 500 $	1 950 $	2 400 $	2 850 $	3 300 $
31 $	800 $	1 275 $	1 750 $	2 225 $	2 700 $	3 175 $	3 650 $

9. If Excel cannot find a solution, a message will appear

12 CONDITIONAL FORMATTING

File: Conditional Formatting

12.1 Even and odd line of different colors

1. **CAR SALES** ➤ SHEET

2. Select the table

3. In the Home tab ➤ Click in ➤ "**Conditional formatting**" ➤ Manage rules

4. New Rule

5. Use a formula
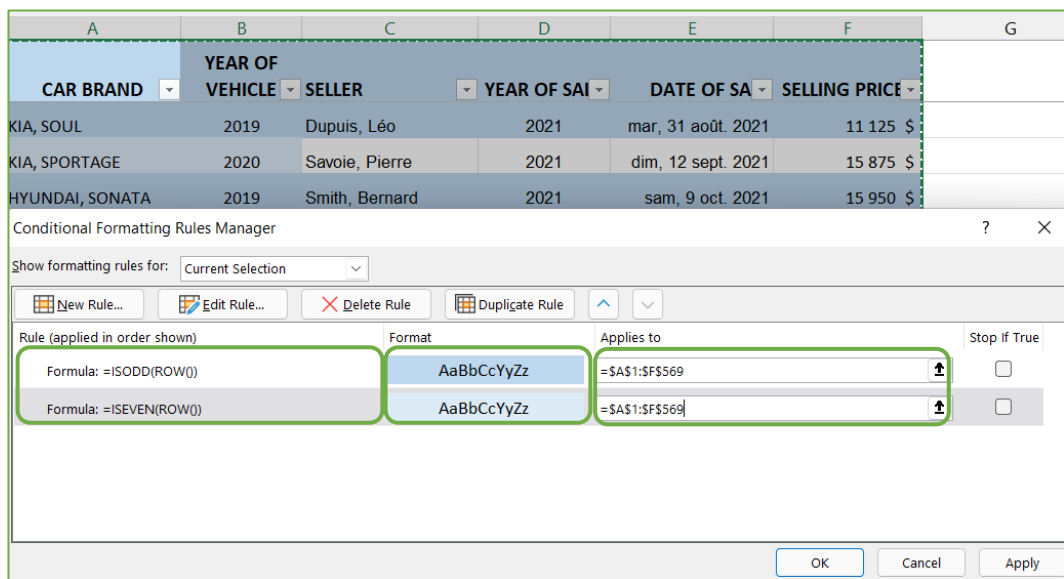
6. Type the formula: **=ISODD(ROW())**
   =ISEVEN(ROW())

7. Choose your format (Fill and Font)

8. Increase the list as needed (Applies to)

Note

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12.2 Date (Example Sunday or Saturday of different colors)

1. SHEET "**Weekday Sunday or Saturday**"

2. Select cells from C2 to C 569

3. **Manage rules ➤ New rule ➤ Use a formula**

4. The value 1 for Sunday and 7 for Saturday

Sunday = 1	Monday = 2	Tuesday = 3
Wednesday = 4	Thursday = 5	
Friday = 6	Saturday = 7	

5. Here are the formulas if you want to see Sunday or Saturday with color

   =WEEKDAY(C1)=1 ➤ Choose your fill color

   =WEEKDAY(C1)=7 ➤ Choose your fill color

12.3 OBJECTIVE: Saturday and Sunday of the same color

1. SHEET " **Weekday Sunday & Saturday**"

2. Select cells from C2 to C 569

3. Manage rules ➤ New rule ➤ Use a formula

4. Formula: =OR(WEEKDAY(C1)=1; WEEKDAY(C1)=7)

   Do not forget, in French, we use**";"** instead of **","**

12.4   Apply a color for an entire row instead of a single cell

1.   SHEET ➤ **Row CF**

2.   Select the table **(Not with CTRL + A),** with CTRL + SHIFT + RIGHT AND LEFT ARROW keys

3.   Use a formula: **=$F1="July"**
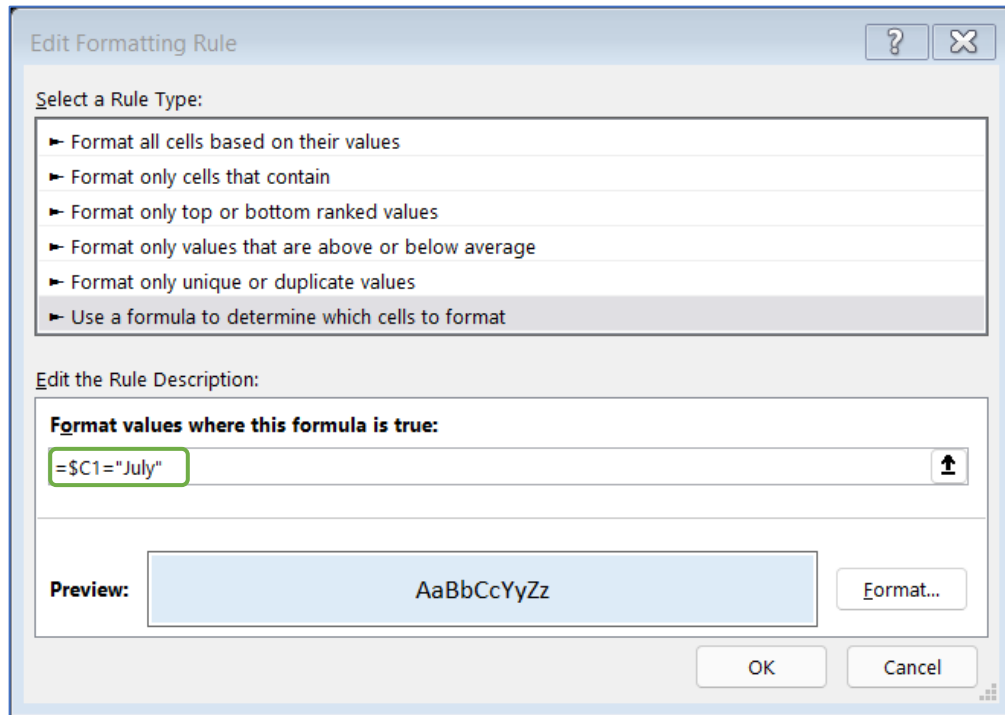
13   PIVOT TABLE

Here are the CONCEPTS we will see today

1.   Text groupings with Chart

2.   More complex calculated fields with formulas ➤ IF

3.   Calculated items

13.1   Group

The "**Group Selection**" button creates a set from the items you select in the report.

▪   The "**Group field**" button allows you to summarize elements of **numeric type** or **Date** or **Text** in the report. For example, select a date in the PT and then click on the "Group field" button: Choose the type of grouping (by month).

▪   You can select multiple group options at the same time. Click the "**Ungroup**" button to delete the groups.

- Numeric elements can be grouped in the same way. Example to group values by ten or 20
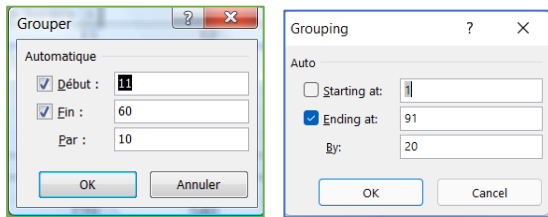
- Group by date
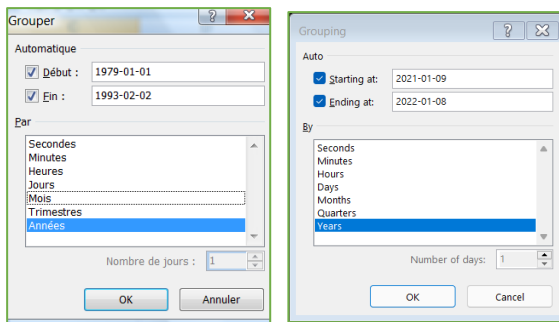
We will work with the TEXT grouping

13.2   Text grouping

we want to have the sum of sales by vehicle brand;
bring together the FORD, KIA, HYUNDAI AND HONDA

1. Open the workbook: **Pivot Table 1**➤ Sheet: **Car sales**

2. Insert a PivotTable to drag "**CAR BRAND**" into **Row** and **"SELLING PRICE"** into **Value**
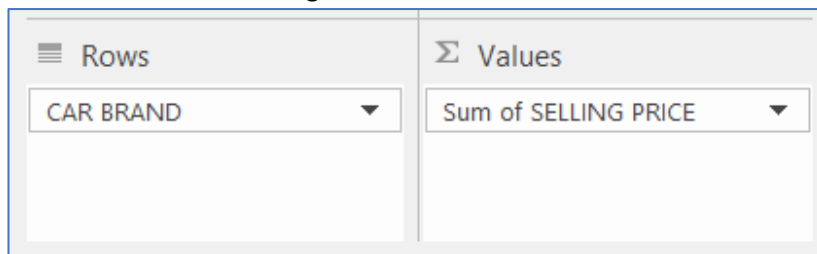
3. Insert the Monetary Format in Value

4. Insert a "**3D Pie**" graphic

Note

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5. Here is the result below

Row Labels	Sum of SELLING PRICE
FORD, BRONCO	422 375,00 $
FORD, ESCAPE	344 150,00 $
FORD, EXPLORER	1 113 625,00 $
FORD, FOCUS	453 100,00 $
HONDA, ACCORD	1 311 000,00 $
HONDA, CIVIC	1 679 750,00 $
HYUNDAI, ELANTRA	749 525,00 $
HYUNDAI, SONATA	282 425,00 $
KIA, SORENTO	930 450,00 $
KIA, SOUL	939 450,00 $
KIA, SPORTAGE	648 050,00 $
Grand Total	8 873 900,00 $
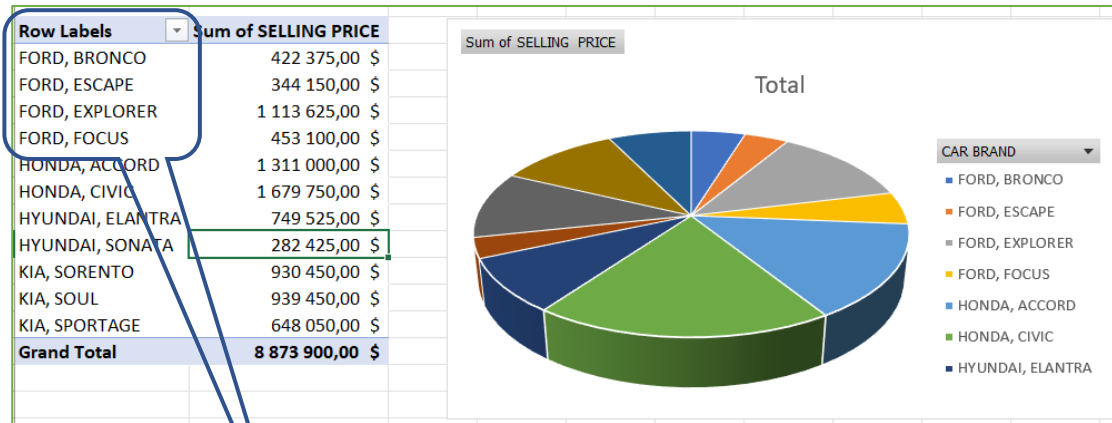
6. To group the "**Ford**" together, select the 4 vehicle brands

7. Click on "**Group Selection**"

→ Group Selection

Ungroup

Group Field

Group

8. Rename Group 1 to "**Ford**"

Row Labels	Sum of SELLING PRICE
Group1	2 333 250,00 $
FORD, BRONCO	422 375,00 $
FORD, ESCAPE	344 150,00 $
FORD, EXPLORER	1 113 625,00 $
FORD, FOCUS	453 100,00 $
Honda	2 990 750,00 $
Hyundai	1 031 950,00 $
Kia	2 517 950,00 $
Grand Total	8 873 900,00 $
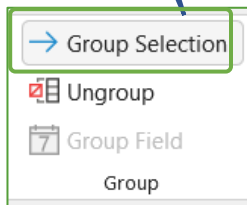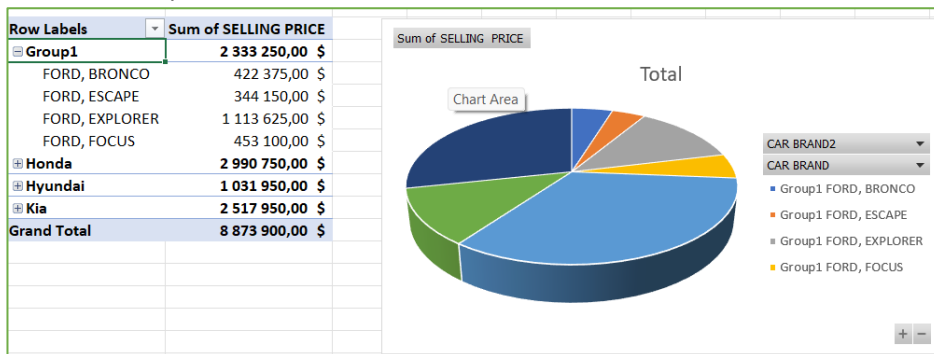
9. Repeat for other vehicle brands.

Note

_____

_____

_____

_____

_____

10. Click the Hide or Show button to view or collapse all the details: from the "**Active Field**" group

To view more details

To hide details
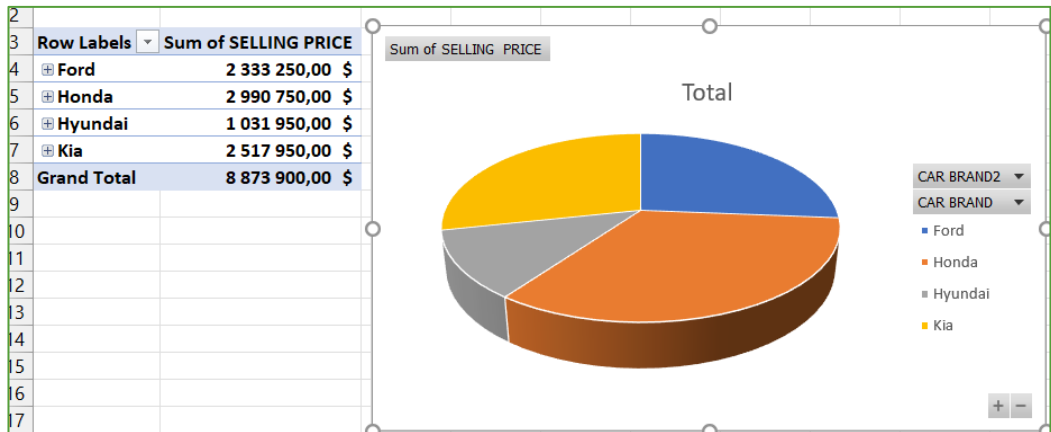
13.3 Calculations

The "**Calculations**" button manages: "Calculated fields" and "Calculated items".

- Resolution order (used to set the calculation order when using multiple calculated elements in the Pivot Table).
- The formula list (lists and details all the calculated fields and items, in a new worksheet).
- The "**OLAP Tools**" button is used to manipulate a PivotTable connected to an OLAP data source (cube).

13.4 Calculated field

If the predefined formulas are not sufficient to summarize the value fields, you have the possibility to create personal functions adapted to your project. These formulas are called calculated fields and calculated elements.
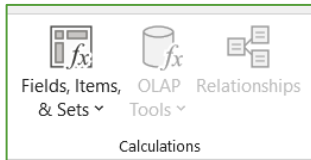
The calculated fields are based on the data of the other fields. To create the formula, select the "**Pivot Table Analysis**" tab on the ribbon. Click on the "**Fields, items and sets"** button in the "**Calculations**" group. Choose the "**Calculated field"** option. Enter a name for your formula in the "Name" box. It is also from this drop-down menu that you select an existing calculated field to modify or delete it.
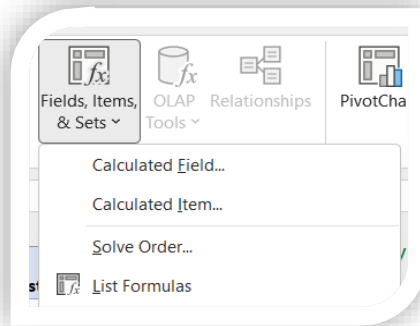
Create the personal function in the "Formula" area. You can refer to the other fields in the report by selecting them from the list and then clicking the "Insert Field" button. Example 5% to salary

13.5   Let us start with a simple little calculation

Objective : 5% employee bonus

1. Open the workbook: **Pivot Table 1 ➤** Sheet: **Calculated field**

2. Enter the "**Last name**", "**First name**" and "**Weekly salary**" fields in "**Rows**"
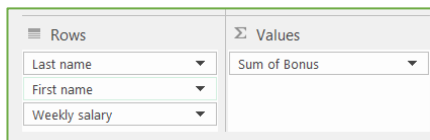
3. Click in "**Calculated field**" in the "**Calculations**" group

4. Type "**Bonus**" in NAME

5. In "**Formula**", remove the zero and insert the "**Weekly salary**" field,
    then *** to multiply by 5%**
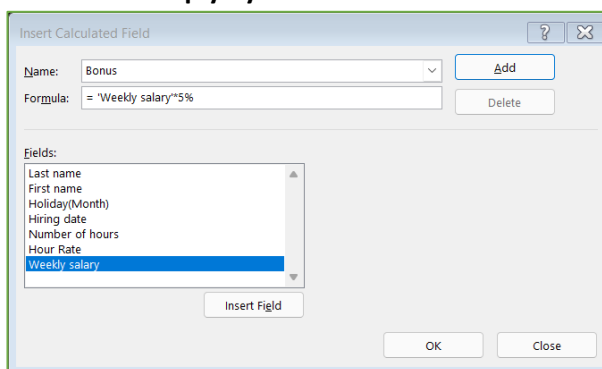
6. Click the "Add" button to have the calculated field integrated into the list of fields. Click the OK button to validate

Last name	First name	Salary week	Sum of Bonus
⊟Beaulieu	⊟Aliette	1 347,50 $	134,75 $
⊟Berger	⊟Alvin	1 240,00 $	124,00 $
Berger	⊟Brian	1 188,00 $	118,80 $
⊟Dumas	⊟Camillia	700,00 $	70,00 $
⊟Houde	⊟Bernard	595,00 $	59,50 $
⊟Laroche	⊟Andrea	1 600,00 $	160,00 $

13.6   Calculated field with " FORMULA - IF"

Objective:

- $5,000 bonus to sellers so sales are over $1,000,000 for the previous year
- $2,500 bonus to sellers so sales are over $500,000 for the previous year
- No bonuses will be given to sales under $500,000. Value if FALSE or 0

1. Open the workbook: **Pivot Table 1 ➤** Sheet: **Car sales**

2. Insert the fields: Sellers in Line, Sale Price in Value and YEAR OF SALE in "REPORT", then select the year 2021

	A	B	C
1	YEAR OF SALE	2021	
2			
3	Row Labels	Sum of SELLING PRICE	Sum of Bonus
4	Barbeau, France	1 322 175,00 $	5 000,00 $
5	Bédard, Jérôme	402 000,00 $	- $
6	Chagrin, Denise	945 675,00 $	2 500,00 $
7	Desbiens, Michel	1 353 675,00 $	5 000,00 $
8	Dupuis, Ginette	801 600,00 $	2 500,00 $
9	Dupuis, Léo	765 575,00 $	2 500,00 $
10	Larose, François	450 900,00 $	- $
11	Martin, Luigi	355 425,00 $	- $
12	Savoie, Pierre	293 450,00 $	- $
13	Smith, Bernard	1 930 075,00 $	5 000,00 $

Filters: YEAR OF SALE

Columns:

Rows: SELLER'S NAME

Values: Sum of SELLING PRICE

3. See the formula at the bottom and the result above:

=IF('SELLING PRICE'>1000000,5000,IF('SALE PRICE'>500000,2500,0))

Insert Calculated Field

Name: Bonus

Formula: = IF('SELLING PRICE' >1000000;5000;IF('SELLING PRICE' >500000;250

Modify

Delete

13.7 Field calculated with "a little more complex" IF FORMULA

Objective: GIVE A BONUS TO MY BEST SELLERS ON SALES 2021

- $10,000 bonus to sellers so sales are over $1,500,000 for the previous year
- $5,000 bonus to sellers so sales are over $1,000,000 for the previous year
- $2,500 bonus to sellers so sales are over $800,000 for the previous year
- $1,000 bonus to sellers so sales are over $400,000 for the previous year
- No bonuses will be given to sales under $400,000. Value if FALSE: 0

FORMULA: (CALCULATED FIELD)
=IF('SELLING PRICE'> 1 500 000; 10 000; IF('SELLING PRICE'> 1 000 000; 5 000;IF('SELLING PRICE'> 800 000; 2 500; IF('SELLING PRICE'> 400 000; 1 000; LESS THAN $400,000 - VALUE IF FALSE: 0)))) "CLOSE 4 PARENTHESES"

FORMULA: = IF('SELLING PRICE'> 1 500 000; 10 000; IF('SELLING PRICE'> 1 000 000; 5 000; IF('SELLING PRICE'> 800 000; 2 500; IF('SELLING PRICE'> 400 000; 1 000;0))))

13.8 Calculated item

Unlike calculated fields, calculated items are not based on data from other fields, but on the actual content of a field.

Here's an example: You'll see a 25% increase in sales for the current year

1. Open the file " **Pivot Table 2**", sheet " **Car sales**"
2. Create a Pivot Table as follows:
3. Insert "**VEHICLE BRAND**" in row field, "**YEAR OF SALE**" in the column field and "**SELLING PRICE**" in Value
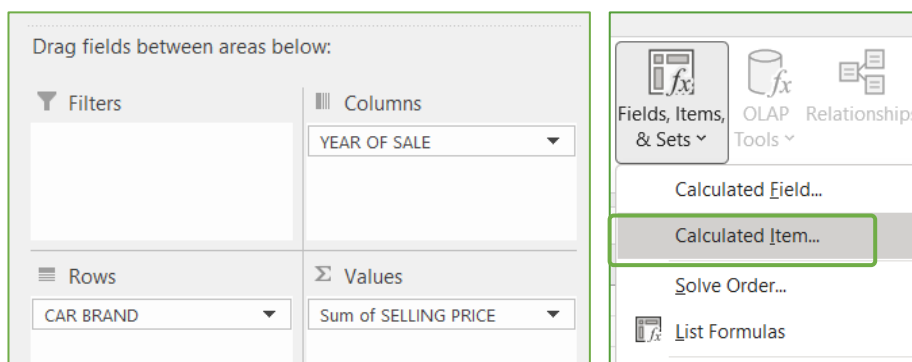
4. Choose "**Calculated Item**" located in "**Fields, Items and Sets**"

5. Type "**Forecast 2022**" in "Name"

6. In "Formula", keep the **= sign**, double-click in the year (Example: 2021) and multiply by the desired value. (Example: 25% more than the previous year) so "**1.25**"

7. Click **OK** or "**Add**". **Here is the result:**

Forecast 2022 ='2021' *1.25

Calculate the difference between now and the end of the year

8. Create a new formula in "**Calculated Item**"

9. Type "**Balance to reach**" in "Name"

10. In "Formula", keep the equal, subtract the 2022 Forecast and the year 2022

11. Click **OK** or "**Add**".

FORMULA = Forecast 2022 - '2022'

12. **Here is the result**

Sum of SELLING PRICE	Column Labels				
Row Labels	2021	2022	Forecast 2022	Balance to reach	Grand Total
FORD, BRONCO	407 875,00 $	14 500,00 $	509 843,75 $	495 343,75 $	1 427 562,50 $
FORD, ESCAPE	310 850,00 $	33 300,00 $	388 562,50 $	355 262,50 $	1 087 975,00 $
FORD, EXPLORER	1 113 625,00 $		1 392 031,25 $	1 392 031,25 $	3 897 687,50 $
FORD, FOCUS	439 025,00 $	14 075,00 $	548 781,25 $	534 706,25 $	1 536 587,50 $
HONDA, ACCORD	1 248 000,00 $	63 000,00 $	1 560 000,00 $	1 497 000,00 $	4 368 000,00 $
HONDA, CIVIC	1 643 875,00 $	35 875,00 $	2 054 843,75 $	2 018 968,75 $	5 753 562,50 $
HYUNDAI, ELANTRA	725 675,00 $	23 850,00 $	907 093,75 $	883 243,75 $	2 539 862,50 $
HYUNDAI, SONATA	255 575,00 $	26 850,00 $	319 468,75 $	292 618,75 $	894 512,50 $
KIA, SORENTO	905 325,00 $	25 125,00 $	1 131 656,25 $	1 106 531,25 $	3 168 637,50 $
KIA, SOUL	922 675,00 $	16 775,00 $	1 153 343,75 $	1 136 568,75 $	3 229 362,50 $
KIA, SPORTAGE	648 050,00 $		810 062,50 $	810 062,50 $	2 268 175,00 $
Grand Total	**8 620 550,00 $**	**253 350,00 $**	**10 775 687,50 $**	**10 522 337,50 $**	**30 171 925,00 $**

14   ADVANCED FUNCTION

Here are some formulas that we will explore together. The formulas are in the file: **Advanced Functions**

14.1   SUMIFS

SUMIFS IS A Maths and trigonometry FUNCTION

Sheet: " SUMIFS. "

The sum of arguments that meets several criteria. See the example below

- Sum of products (VALID OR REFUSE OR NON-ANALYSIS)
  for the months (JUNE OR JULY OR AUGUST)

MONTH	NOMBRE	VALID
JUNE	10	VALID
JUNE	12	VALID
JUNE	8	VALID
JUNE	1	NO ANALYSIS
JUNE	7	VALID
JUNE	15	VALID
JUNE	9	VALID
JUNE	11	VALID
JUNE	10	NO ANALYSIS
JUNE	7	NO ANALYSIS
JUNE	8	NO ANALYSIS

Function Arguments   ?   ×

SUMIFS

Sum_range	$B:$B	= {"NOMBRE";10;12;8;1;7;15;9;11;10;7;8;13;18;13;8;14
Criteria_range1	$A:$A	= {"MONTH";"JUNE";"JUNE";"JUNE";"JUNE";"JUNE...
Criteria1	$F2	= "JUNE"
Criteria_range2	$C:$C	= {"VALID";"VALID";"VALID";"VALID";"NO ANALYSIS...
Criteria2	G$1	= "VALID"

= 153

Adds the cells specified by a given set of conditions or criteria.

Criteria2: is the condition or criteria in the form of a number, expression, or text that defines which cells will be added.

Formula result = 153

Help on this function   OK   Cancel

- Formula: **=SUMIFS($B:$B;$A:$A;$F2;$C:$C;G$1)**

NUMBER OF ANOMALIES	VALID	REFUSED	NO ANALYSIS	TOTAL
JUNE	153	23	34	210
JULY	62	13	1	76
AUGUST	21	0	22	43
TOTAL	236	36	57	329

Note

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_____

14.2   SUMPRODUCT

SUMPRODUCT is a MATH AND TRIGONOMETRY FUNCTION

Sheet: "SUMPRODUCT"

This formula multiplies the cells in column B and F, C and G, D AND H, given the SUM of all columns

=SUMPRODUCT(B2:D17; F2:H17) ANSWER: **$34,658.71**

	A	B	C	D	E	F SALE FOR MAY	G SALE FOR JUNE	H SALE FOR JULY
1	Code	Price MAY	Price JUNE	Price JULY	Description			
4	1003	1,17 $	1,17 $	2,03 $	Piment vert	750	955	950
5	1004	2,03 $	2,03 $	2,50 $	Piment rouge	678	659	654
6	1005	2,50 $	2,50 $	0,99 $	Oignons	950	859	458
7	1006	0,99 $	0,99 $	1,29 $	Lettuce	654	255	780
8	1007	1,29 $	1,29 $	1,40 $	Broccoli	458	350	658
9	1008	1,40 $	1,40 $	0,27 $	Mushrooms	780	755	478
10	1009	0,27 $	0,27 $	0,18 $	pear	658	663	255
11	1010	0,18 $	0,18 $	0,20 $	Peach	478	483	350
12	1011	0,20 $	0,20 $	1,25 $	Kiwis	1250	1255	859
13	1012	1,25 $	1,25 $	1,69 $	Cucumber	678	683	255
14	1013	1,69 $	1,69 $	0,20 $	Pineapple	315	955	350
15	1014	0,20 $	0,20 $	1,25 $	Apple	950	659	755
16	1015	0,17 $	0,17 $	1,69 $	Tomato	654	463	667
17	1016	0,16 $	0,16 $	0,20 $	Orange	854	785	

Function Arguments

SUMPRODUCT

Array1	B2:D17	⬆	=	{2,33\2,33\3,55;0,99\0,99\1,17;1,17\1,17\2,03;2,0...
Array2	F2:H17	⬆	=	{250\456\750;345\320\678;750\955\950;678\659...
Array3		⬆	=	array

= 34658,71

Returns the sum of the products of corresponding ranges or arrays.

Array1: array1;array2;... are 2 to 255 arrays for which you want to multiply and then add components. All arrays must have the same dimensions.

Formula result =   34 658,71 $

Help on this function   OK   Cancel

14.3   Single MATRIX

OBJECTIVE: MULTIPLICATION BETWEEN COLUMNS A AND C

Sheet: "Single matrix"

1. Select cells **E1 to E3**
   Type =

2. Select cells A1 to A3

3. **Type *** (Multiplied sign)

4. Select C1 to C3

5. Press **CTRL + SHIFT + ENTER**

6. Edit a cell in column A or C, observe the result:
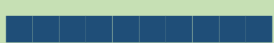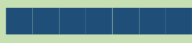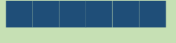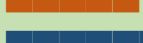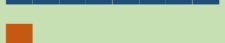
14.4   REPT

The REPT formula is a "Text" function
This formula repeats text, a number of times.

Sheet: "REPT"

A	B	C
Participants	**Average**	**Evaluation**
Corinne Paris	100	
Pierrette Paquin	70	
André Dupuis	69	
Martine Gendron	25	
Pascal Dubois	52	
Louise Loiselle	89	
Stéphane Robert	10	

14.5   Let us try to understand this formula

1. We have participants who have averages on a certain result located in the next column B

2. In the cells in column C, we want to have the number of times I can repeat text with a formula.

3. Observe "Corinne Paris", her result is 100

4. The formula is to take cell B2/10

5. The problem is to define the cell "TEXT"

6. Look at your answers in column C

7. The value is **"g"** in Webdings

8. How to find out:
   Go to Webdings, choose a symbol you like

9. Insert your symbol and replace the font "Webdings" with "Arial"

10. At this point you will have the text value to insert into the formula.

11. Click in C2 to insert the formula

12. Type = REPT ("g",B4/10)
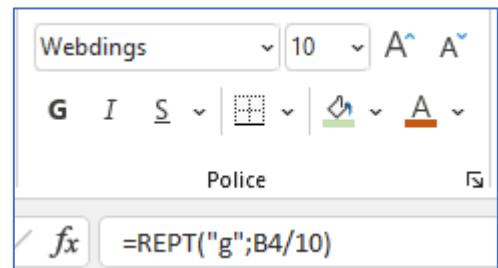
14.6   Now, let us see the conditional formatting

1. Select the data in column C

2. You want to have the cells of a different color if the result is greater than or equal to 60

3. Create a new rule (Conditional Formatting)

4. Cell value must be greater than "ggggg"
   Each "g" represents the value of "10"

Rule (applied in order shown)	Format	Applies to	Stop If True
Cell Value > "ggggg"	AaBbCcYyZz	=$D$4:$D$10	
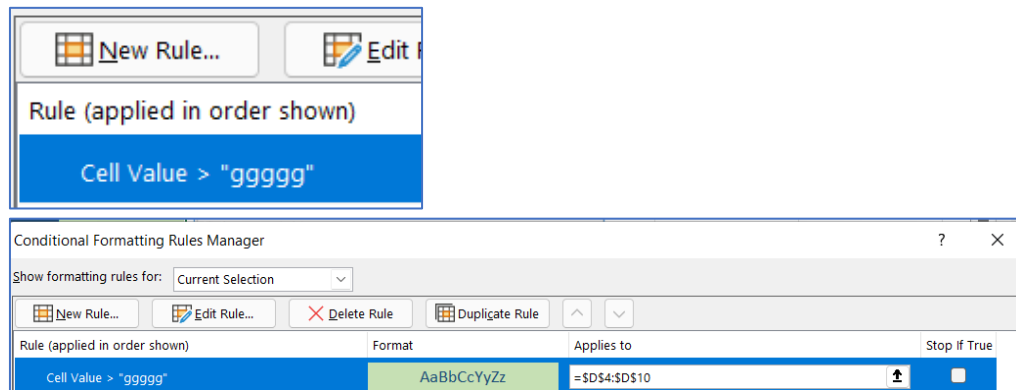
14.7   Number of days per month or quarter

Sheet: "Nb Days_Month_Quarter"

Here we want to know how many days there are in a quarter depending on the year. How to build formulas

1. Type the year 2022 in cell A1

2. Type Quarter 1 – 2 – 3 – 4 in column A

3. Click in cell B4. Here is the formula to get the first day of the year 2022:
   `=DATE(A1,1;1)`

4. Now, how to have the last day of the month of March

   click in cell C4

5. Type **=**, then **DATE(**Type **Year(**and click in cell **B4**, close the parenthesis and type**","** repeat with month **(B4) + 3,** type **1** for the first day of the month

6. Close the parenthesis, the formula would give me April 1st, but we want the last day of the month, so, continue the formula with **-1**

   Your formula is in cell A3
   `=DATE(YEAR(B4); MONTH(B4)+3;1)-1`

7. The result is 31 Mar 2022

8. In cell B5, the formula is cell **C4** plus **+ 1**
   `=C4+1`

9. Copy the formulas (B5 to B7) and (C4 to C7)

10. In cell **D4**, subtract column C minus B, plus **+ 1**
    `=C4-B4+1`

11. See result below

	A	B	C	D
1	**2022**			
2	**NUMBER OF DAYS PER QUARTER FOR THE YEAR (CELL A1)**			
3	=DATE(YEAR(B4);MONTH(B4)+3;1)-1			=C4-B4+1
4	Quarter 1	2022-01-01	2022-03-31	90
5	Quarter 2	2022-04-01	2022-06-30	91
6	Quarter 3	2022-07-01	2022-09-30	92
7	Quarter 4	2022-10-01	2022-12-31	92

14.8   FORMULA: DATEIF

Calculation of seniority with "Year", "Month", "Day"
Here is a formula that does not exist in the formula library. The
formula "DIFFDATE" exists in ACCESS, obviously, there is English
in some formulas, in EXCEL, this formula can be used, but the
translation is **"DATEDIF**"

Sheet: "Seniority"

Our goal is to calculate the number of years between a date and TODAY

1.   Type a few dates in column A
2.   In cell B2, type **=DATEIF(A2; TODAY();" y")**
      A2 is the cell in column A, formula TODAY AND "Y" represents the year
3.   Close the parenthesis and your answer is 6
4.   Continue the formula to get "6 years", type &" Years " and validate, the result is 6 years

	B	C	D	E	F	G
Hiring date	Year-Month-Days	Nb. Vacation days				
2015-04-24	6 year(s) 11 month(s) 16 Days	2 Weeks				
2010-06-15	11 year(s) 9 month(s) 25 Days	3 Weeks				
2015-03-05	7 year(s) 1 month(s) 4 Days	2 Weeks				
2021-04-05	1 year(s) 0 month(s) 4 Days	No Day				
2015-02-11	7 year(s) 1 month(s) 29 Days	2 Weeks				
1985-05-15	36 year(s) 10 month(s) 25 Days	Proposed retirement				

formula bar: =DATEDIF(A2;TODAY();"y")&" year(s) "&DATEDIF(A2;TODAY();"ym")&" month(s) "&DATEDIF(A2; TODAY();"md")&" Days"

5.   To get the year, month and number of days, the codes are:
      Year "y"
      Month "ym"
      Day: md"
6.   Here is the final formula:
      =DATEDIF(A2; TODAY();" y")&" Years "&DATEDIF(A2; TODAY();" ym")&" Month "&DATEDIF(A2; TODAY();" md")&" Days"

14.9   FUNCTION IF - formula with a date
Sheet: "Seniority"

Our goal is to calculate the number of vacation weeks according to seniority

1.   Read the formula before you start, the difference with the TODAY() formula,
      And if you type DATE(YYYY; MM; JJ) which presents a fixed date. **CELL 17 and 20**

2. Objective: if over 30 = retirement proposed
   If more than 10 years = 3 weeks
   If more than one year = 2 weeks
   IF FALSE = No day

3. Here is the formula below:

**=IF(DATEDIF(A2,DATE(2022,12,31);" y")>=30;" retirement proposed";
IF(DATEDIF(A2;DATE(2022;12;31);" y")>=10;" 3 weeks";
IF(DATEDIF(A2;DATE(2022;12;31);" y")>=1;" 2 weeks";" No day")))**

14.10 FREQUENCY

The "FREQUENCY" function counts the number of values in a range. The FREQUENCY formula must be typed as a array formula.

Here's an example: how many values do we have that are bigger than 8 and smaller than 12

Sheet: "Frequency"

1. Select cells from E1 to E3
2. Type =FREQUENCY (
3. Select cells A1 through A10
4. Type **" , "**
5. Select cells C1 through C2
6. Close parenthesis
7. Press CTRL + SHIFT + ENTER

A	B	C	D	E	F
9		8			Value <=8
15		12			Value >8 and <=12
9					Value >12
10					
2					
17					
8					
12					
16					
11					

{=FREQUENCY(A1:A10;C1:C2)}

2
5
3
ANSWER

14.11 ARRAY FORMULA

Array formula means that the formula performs several calculations. We use the sum function because in an array formula it COUNTS the number of rows meeting the criteria.

The peculiarity when typing is as follows: Type the formula and instead of doing ENTER, do **CTRL + SHIFT + ENTER**

This puts **{ }** before and after the formula. The **;1;0 at the end** means Excel add one if it is true and zero if it is false so will only count if it is true.

Sheet: "Matrix"

NAME	RESULT	AGE
Robert	20	25
Simon	15	32
André	18	60
Michel	16	25
Luc	13	26
Manon	19	18

Simple formula:

Number of numerical values found in column B

=COUNT(B2:B7) ANSWER: 6

Second formula:

Sum if the value is greater than 18 in column B

=SUMIF(B2:B7;" >18"; B2:B7) ANSWER: 39

14.11.1 Now here is our array formula

What is the number of people with the result between 15 and 20 in column B and whose age is between 20 and 40 years (column C):

=SUM(IF(B2:B7>=15;IF(B2:B7<=20;IF(C2:C7>=20;IF(C2:C7<=40;1;0))))) ANSWER: 3

Do not forget to press **CTRL + SHIFT + ENTER**

=SUM(IF(B2:B7>=15;IF(B2:B7<=20;IF(C2:C7>=20;IF(C2:C7<=40;1;0)))))

14.12   Convert text to DATE

How to convert numbers to "DATE AND TIME" format

Sheet: "Conversion_Date_Hours "

1.   In cell B2, type =CNUM et open the parenthesis

2.   Type (Formula) MID(A2;type 1;4 to choose 4 numbers from the first

3.   Close the parenthesis

4.   Here is the year, type &"-"&, to get a hyphen

5.   Continue to pick up the month: MID(A2;5;2)

6.   Another hyphen &"-"& then the day MID(A2;7;2)

7.   Continue for hours, minutes and seconds: Space between date and time and 2 points between hour: minutes: SECONDS

YYYY-MM-DD HH:MM:SS

20220115142534000

Answer 2022-01-15 14:25:34

	A	B
1	**Date and time**	**Answer: convert to date**
2	20200228083346	2020-02-28 08:33:46
3	20190215083054	2019-02-15 08:30:54
4	20180216082712	2018-02-16 08:27:12
5	20210430052410	2021-04-30 05:24:10
6	20200822092115	2020-08-22 09:21:15
7	20191013104526	2019-10-13 10:45:26
8	20200516101500	2020-05-16 10:15:00

COMPLETE FORMULA:

=CNUM(MID(A2,1,4)&"-"&MID(A2;5;2)&"-"&MID(A2;7,2)&" "&MID(A2;9;2)&":"&MID(A2;11;2)&":"&"&MID(A2;13;2))