MICROSOFT EXCEL: TYPES OF DATA, FORMULAS AND FUNCTIONS

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LEARNING OBJECTIVES:

- Create folders (Exercise 1)
- Formating columns according to the type of data (Exercise 3)
- Identify the type of variables (Exercise 3)
- Using formulas in Excel: operators and order of operations (Exercise 1 - 3)
- Writing equations using relative and absolute cell references (Exercise 1 - 3)
- Using predefined functions: COUNT, COUNTIF, IF and SUM (Exercise 2 & 3)

REQUESTS

Exercise 1. Fill Down.

1. Rename the Sheet 1 as Exercise 1(right click on Sheet1, choose Rename) and introduce the following text, and similar values, different than in this table:

2. Resize the column A (Format – Column Weight):

3. Compute for each material the Cost using the following formula (with relative reference):

$$COST = Quantity \cdot Price$$

The formula for the first line will be: =B2*C2

where B2 is the relative reference meaning the content of the cell in column B row 2,

C2 is the content of the cell in column C row 2,

a formula start always with "=". Introduce the formula in the cell D2:

C2			✕ ✓ fx	=B2*C2				
	A	B	C	D	E	F	G	
1	Used materials	Quantity	Price	Cost				
2	Amalgam	50	90	=B2*C2				
3	Composite Resins	70	120					
4	Cast gold	80	110					
5	Ceramix	85	140					

! Instead of Quantity (which is a column name in the table) someone should put the cell where the first value is in that column: B2, in the same way instead of Price (which is another column name in the table) someone should put the cell where the first value is in that column: C2

3. Use **Fill Down** to fill the column with the same formula

D2			✕ ✓ fx	=B2*C2				
	A	B	C	D	E	F	G	
1	Used materials	Quantity	Price	Cost				
2	Amalgam	50	90	4500				
3	Composite Resins	70	120					
4	Cast gold	80	110					
5	Ceramix	85	140					
6	Glass Ionomer	90	160					
7	Bis-GMA	95	150					
8	Bis-EMA	75	140					
9	Silorane	70	130					
10	Ethoxylated Bis-GMA	80	120					
11	UDMA	85	150					
12	Filtek-Silorane	60	110					
13	Premise Composite	70	140					
14								

Drag and drop this square

Exercise 3. **Absolute and relative references. SUM and IF functions.**

Introduce a new sheet (the + buton near the name of the page). Rename the Sheet 2 as Exercise 2 and introduce the following text, but different values:

	A	B	C	D
1		Cost of consultation	300	
2				
3	Patient Id	No. of consultations in 2015	Consultations Cost (RON)	
4	1	15		
5	2	5		
6	3	3		
7	4	7		
8	5	5		
9	6	3		
10	7	5		
11	8	3		
12	9	7		
13	10	9		
14	11	15		
15	12	3		
16				
17		SUM		

1. Compute for each patient the Consultations Cost using the following formula (using absolute references):

$$\text{Consultations\_Cost} = \text{No.\_of\_consultation\_in\_2015} \cdot \text{Cost\_of\_consultation}$$

The formula for first line will be: =B4*C$1

where B4 is the relative reference of the cell in column B row 4, C$1 is the absolute reference of the cell in column C row 1. Introduce the formula in the cell C4:

EXP		X ✓ *fx*	=B4*C$1		
	A	B	C	D
1		Cost of consultation	300	
2				
3	Patient Id	No. of consultations in 2015	Consultations Cost (RON)	
4	1	15	=B4*C$1	
5	2	5		
6	3	3		
7	4	7		
8	5	5		
9	6	3		

2. Use Fill Down to fill the column with the same formula. Verify the effect of the fill Down on a relative reference (C4 become C5, C6,…,C15 at fill down) and on an absolute one (C$1 remain C$1 at fill down):

3. Use the predefine function SUM to compute the total cost of consultations in 2015:

The formula will be: =SUM(C4:C15)

where C4:C15 are all the cells between C4 to C15, SUM is the name of the function. Introduce the formula in the cell C17:

4. Insert a new column name GIFT to decide the patients who should receive Gift for Christmas. Display the GIFT status of each patient using the following criterion:

A patient will receive GIFT (yes in the column) IF No_of_Consultations_in_2015 is >=5

The formula for the first line will be: =IF(B4>=5,"Yes","No")

where IF is the name of the function, B4>=5 is the condition. When the condition it is true, in the cell D4 will be display Yes, else, when the condition is false, in the cell D4 will be display No. Introduce the formula in the cell D4:

	A	B	C	D	E	F
EXP			=if(B4>=5,"Yes","No")			
1		Cost of consultation	300			
2						
3	Patient Id	No. of consultations in 2015	Consultations Cost (RON)	Gift		
4	1	15	4500	=if(B4>=5,"Yes","No")		
5	2	5	1500			
6	3	3	900			
7	4	7	2100			
8	5	5	1500			
9	6	3	900			

! Instead of No_of_Consultations_in_2015 (which is a column name in the table) someone should put the cell where the first value is in No_of_Consultations column, here is B4

5. Use Fill Down to fill the column with the same formula.

Exercise 3.

1. Introduce a new sheet. Rename the Sheet 3 as *Data* and type the following text, different values:

	Gender (F/M)	Age (years)	HR /min	SBP (mmHg)	DBP (mmHg)	Glycemia (mg/dl)	Hospitalization (days)
1	Cost of hospitalization per day						300
2							
3	Gender (F/M)	Age (years)	HR /min	SBP (mmHg)	DBP (mmHg)	Glycemia (mg/dl)	Hospitalization (days)
4	F	75	92	90	60	160	4
5	M	84	97	140	90	78	5
6	M	71	85	110	70	179	6
7	F	79	61	100	60	210	7
8	F	65	82	90	60	170	13
9	F	27	100	90	60	71	3
10	M	62	92	110	80	187	10
11	F	89	92	120	80	181	13
12	M	51	72	120	80	175	5
13	F	58	66	150	90	150	9

The significance of abbreviation used in above table are as follow: HR = the number of heartbeats per unit of time, usually per minute; SBP = Systolic Blood Pressure (the pressure exerted on the bloodstream by the heart when it contracts, forcing blood from the ventricles of the heart into the pulmonary artery and the aorta); DBP = Diastolic Blood Pressure (the pressure in the bloodstream when the heart relaxes and dilates, filling with blood)

2. Format the titles in the table with Wrap text:


3. Resize the column width or the row high if it is neccesary (Format button from the menu-Column width).

4. Fill the background with colour:
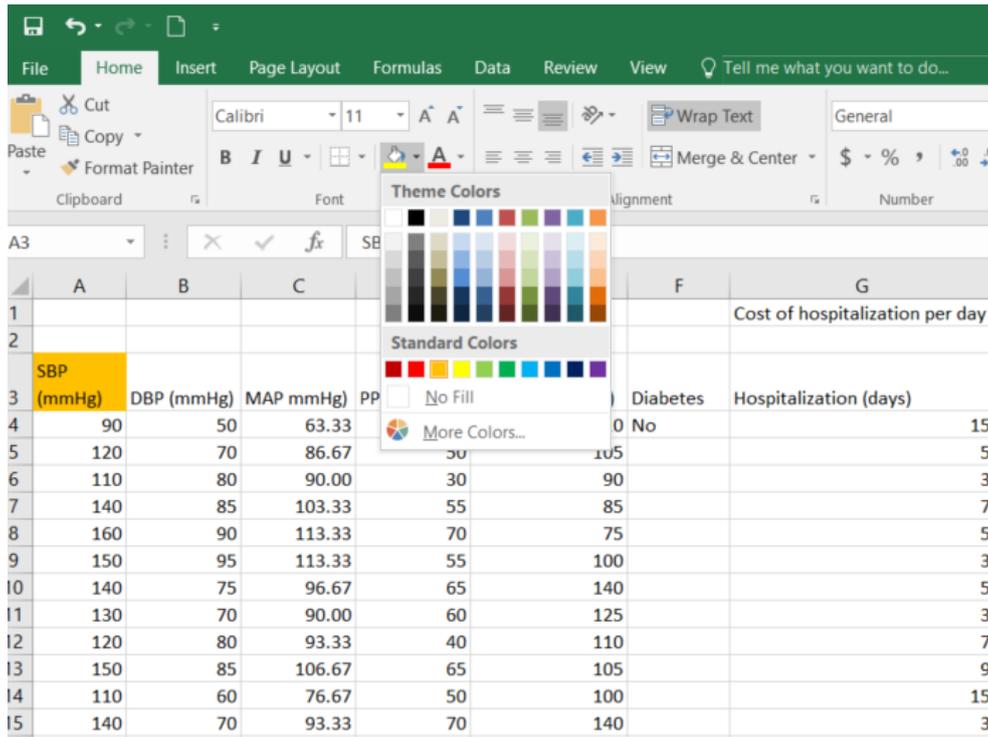
5. Change the colour of the Font.

6. Change the alignment from left to the center
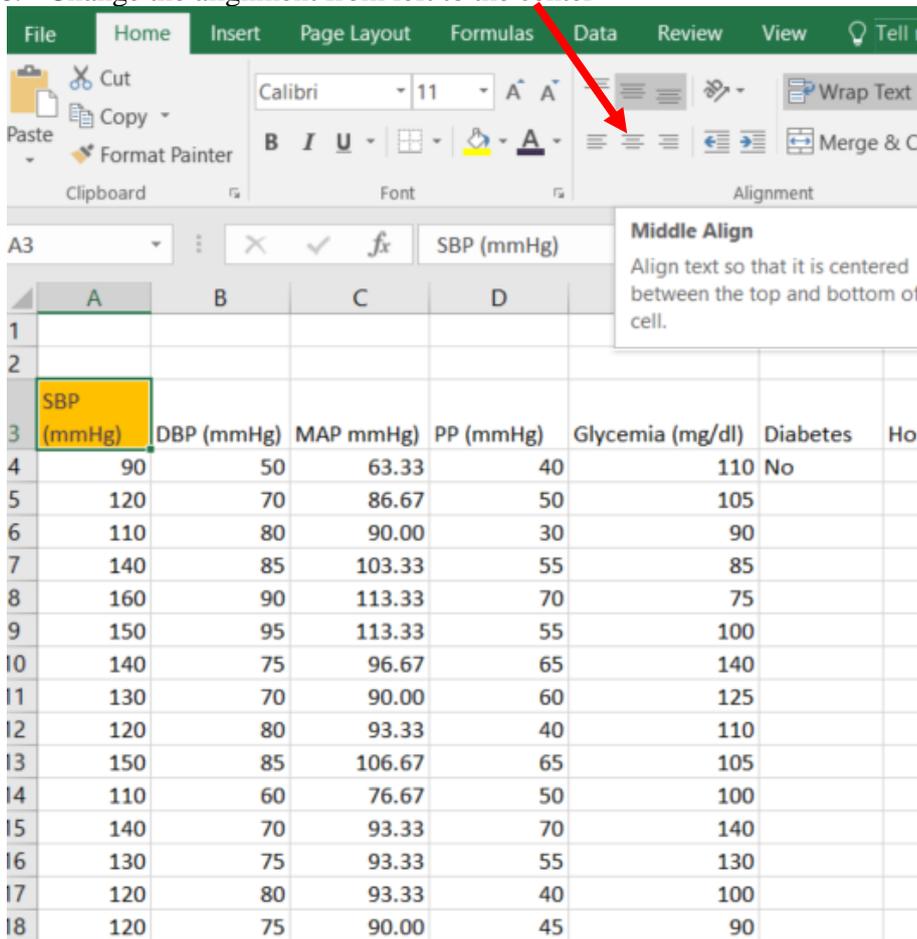
7.

8. Choose the Border type and make some borders with it (click right on the cell – Format Cells – Border):
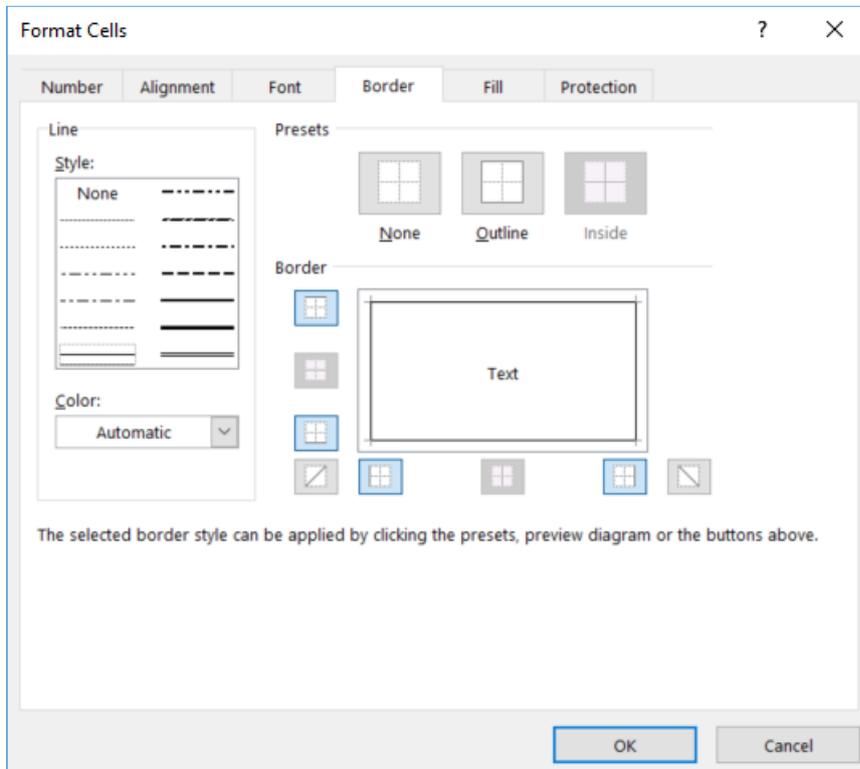
9.

10. Formatting the columns according with the type of data:

    a. The cell with the cost of hospitalization per day (cell G1): currency, RON

11. Insert to the right of *DBP* column a new column (click on F1, click right - Insert – Insert Sheet column) named *MAP1* (Mean Arterial Pressure). Compute <u>for each patient</u> the MAP1 using the following formula (building formula using relative reference):

$$MAP1 = DBP+1/3*(SBP-DBP)$$

MAP is the perfusion pressure in the organs of the body; normal values from 70 to 110 mmHg.

The formula for the first patient is (formate this colums as Number without decimals):

12. Insert to the right of *MAP1* column a new column named *PP* (Pulse Pressure). Compute <u>for each patient</u> the PP using the following formula (building formula by using relative references):

$$PP = SBP-DBP$$

13. Insert to the right of *PP* column a new column named *MAP2* (Mean Arterial Pressure) [1] Compute for each patient the MAP2 using the following formula (building formula by using relative references of the cells):

$$MAP2 = DBP+(0.33+(HR*0.0012))*PP$$

14. Insert to the right of *MAP2* column a new column named *MAP3* (Mean Arterial Pressure). Compute for each patient the MAP using the following formula (building formula by using relative references of the cells):

$$MAP3 = DBP+40\%*PP$$

The formula for the first patient will be:

15. Insert to the right of the *Hospitalization* column a new column named *CH* (RON) where (CH = Cost of Hospitalization). Compute for each patient the CH using the following formula (building formula using relative and absolute references):

CH = (Hospitalization)*(Cost of one hospitalization per day)

The formula for first patient will be:

16. Using the predefine function SUM compute the total cost of hospitalization for the whole sample:

17. Using COUNT function, count how many values we have in the column Age. Display the result to the bottom of column Age after one empty cell.

18. Using COUNTIF predefined function, create the frequency table for gender:

=CountIF(A4:A13,"F") where CountIF is the name of the function, A4:A13 are all the cell from A4 to A13, "F" is what should be count from the range of the given cell.

	A	B	C	D	E	F	G	H	I	J	K	L
	SUM				=countif(A4:A13,"F")							
1	Cost of hospitalization per day										RON 300.00	
2												
3	Gender (F/M)	Age (years)	HR /min	SBP (mmHg)	DBP (mmHg)	MAP1	PP	MAP2	MAP3	Glycemia (mg/dl)	Hospitalization (days)	CH
4	F	75	92	90	60	70	30	73	72	160	4	RON 1,200.00
5	M	84	97	140	90	107	50	112	110	78	5	RON 1,500.00
6	M	71	85	110	70	83	40	87	86	179	6	RON 1,800.00
7	F	79	61	100	60	73	40	76	76	210	7	RON 2,100.00
8	F	65	82	90	60	70	30	73	72	170	13	RON 3,900.00
9	F	27	100	90	60	70	30	74	72	71	3	RON 900.00
10	M	62	92	110	80	90	30	93	92	187	10	RON 3,000.00
11	F	89	92	120	80	93	40	98	96	181	13	RON 3,900.00
12	M	51	72	120	80	93	40	97	96	175	5	RON 1,500.00
13	F	58	66	150	90	110	60	115	114	150	9	RON 2,700.00
14												
15	Count Age	10									SUM	RON 22,500.00
16												
17	Frequency table: gender											
18	F	=countif(A4:A13,"F")										
19	M											

19. Insert a new column named *Diabetes* to the right of the column *Glycemia*. Display the Diabetes status of each patient using the following criterion:

A patient is considering to be with diabetes (yes in the column) IF glycemia is >=100

The formula for the first patient will be:

	A	B	C	D	E	F	G	H	I	J	K	L	M
	SUM				=if(J4>=100,"yes","no")								
					IF(logical_test, [value_if_true], [value_if_false])								
1	Cost of hospitalization per day											RON 300.00	
2													
3	Gender (F/M)	Age (years)	HR /min	SBP (mmHg)	DBP (mmHg)	MAP1	PP	MAP2	MAP3	Glycemia (mg/dl)	Diabetes (yes/no)	Hospitalization (days)	CH
4	F	75	92	90	60	70	30	73	72	=if(J4>=100,"yes","no")		4	RON 1,200.00
5	M	84	97	140	90	107	50	112	110	78		5	RON 1,500.00
6	M	71	85	110	70	83	40	87	86	179		6	RON 1,800.00
7	F	79	61	100	60	73	40	76	76	210		7	RON 2,100.00
8	F	65	82	90	60	70	30	73	72	170		13	RON 3,900.00
9	F	27	100	90	60	70	30	74	72	71		3	RON 900.00
10	M	62	92	110	80	90	30	93	92	187		10	RON 3,000.00
11	F	89	92	120	80	93	40	98	96	181		13	RON 3,900.00
12	M	51	72	120	80	93	40	97	96	175		5	RON 1,500.00
13	F	58	66	150	90	110	60	115	114	150		9	RON 2,700.00

20. Save the file and close the document.

REFERENCES

[1] Razminia M, Trivedi A, Molnar J, Elbzour M, Guerrero M, Salem Y, Ahmed A, Khosla S, Lubell DL. Validation of a new formula for mean arterial pressure calculation: the new formula is superior to the standard formula. Catheter Cardiovasc Interv. 2004 Dec;63(4):419-25.