EXCEL II WORKSHOP

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Attendance link: https://airtable.com/shrMG4Es6kl87cjPN

Learning Goals:

1. Know excel basics
2. Know how to use excel functions to find out basic statistics such as mean, mix/max, etc
3. Know how to utilize excel for the personal finances (saving/budgeting and investing)

INTRODUCTION(10 min)

Basics to help you with the exercises we will be doing today

- Take about ~3 mins to familiarize yourself with the excel environment. Explore and skim each **tab** within excel:
  - Home, Insert, Page layout, Formulas, Data, Review, View, and Help
- Excel is made up of columns and rows. Every cell within excel has a name for example:
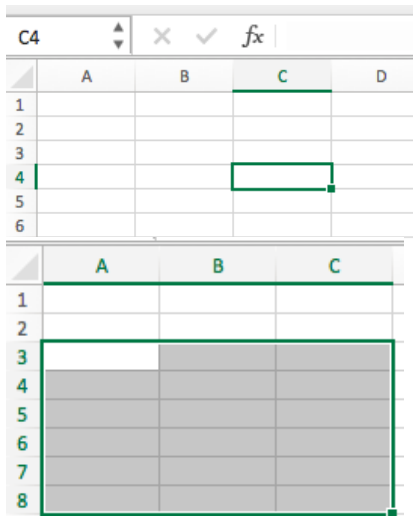
This cell is called C4. The **letter** is the column and **number** is the row where the cell is located.

You can also name a group of cells, this is called **range**. This range is called A3:C8. The colon means thorough, such as regularly signified by this symbol "--".

- Organizing information within excel:
  - The cells are small so often you will need to expand your cells to organize your information. A shortcut for this is hovering over the row or column header until you see your mouse change into a double arrow.

○ You can also double click when you get the double arrow and excel will automatically resize all of the filled out rows within those columns so that all the text is shown.

Before　　　　　　　　　**After**
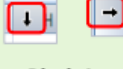
○ Most of the tools you will utilize to organize your data will be in the **Home Tab**. Buttons such as '**merge & center**' and '**wrap text**' are frequently used.

● Overall, when you use excel you want to pay attention to your cursor as each mouse point symbol serves a different purpose.

Mouse Pointers

What it looks like	What it does
Fat Cross	Selects a cell (or a range of cells when you click and drag over the range). In Excel for Mac, the cross is slightly thinner than shown.
Thin Cross	Autofill - fills cells with data, e.g. days of the week, months of the year, a series of numbers or dates, or copies cell contents. Hover the mouse pointer over the small square in the lower right corner of the cell then click and drag to fill or copy data.
Maltese Cross	Moves a cell (or range of cells or objects) to another destination when you click and drag the edge of the cell. On a Mac, look for the shape of a hand on the edge of a cell, then drag. The hand changes to a small black arrow.
Black double-headed Arrow	Resizes columns or rows. Double-clicking the mouse will automatically fit the column or row to the widest contents for the column or to the tallest contents for the row.
Black Arrow	Selects a whole column (vertical arrow) or row (horizontal arrow). You can select multiple columns or rows by clicking and dragging.
Format Painter	Ensure you are on the format you want to copy. Click Home>Clipboard>**Format Painter**. This copies formatting from one item (e.g. a cell, shape , picture border, or format of font) and applies it to another. Click the Format Painter button once to format a single item, or double-click it to format multiple items.

DATA ANALYTICS IN EXCEL (10 min)

Math Concept	Definition	Excel formula
Sum	Adds values	=SUM()
Minimum	The smallest value in a data set	=MIN()
Maximum	Largest numerical values in a data set	=MAX()
Mean	An average of all the data points	=AVERAGE()
Median	The center number in a data set	=MEDIAN()
Mode	Value that appears the most within the data set	=MODE.SNGL *used to find a single mode within the set =MODE.MULT * used when there are multiple modes within a set

- When using excel formulas you can choose individual cell values or cell ranges signified by either a comma (,) or a colon (:)
  - Example: SUM
    - =SUM (B4,C4) *Adding two individual cells*
    - =SUM(B13:D16) *Adding numbers within a cell range*
    - =SUM (B13:C16, B7:C9) *Adding two different cell ranges together*
- Practice using the formulas
  - Open a blank excel workbook
  - Create your own data set!
    - Autofill (make sure it is in 'fill series', not in 'copy cells') two or three different columns with a different range of numbers.
    - Ex: First column has numbers from 30-44, second column has numbers from 70-84
  - With your data set practice each of the formulas !
    - For the =SUM() formula practice adding as follows:
      - =SUM (B4,C4) *Adding two individual cells*
      - =SUM(B13:D16) *Adding numbers within a cell range*
      - =SUM (B13:C16, B7:C9) *Adding two different cell ranges together*

PERSONAL FINANCE MINI-PROJECT (40 mins)

1. Setup and data clean-up

1.1. Download the spreadsheet with the dataset:

https://docs.google.com/spreadsheets/d/1iEGUwErUDdkxIy7BxRg-SFft_88NTLyu/edit?usp=sharing&ouid=10511604744859206924&rtpof=true&sd=true

Note: for the data set we have used actual data such as the average salary in CA for income, the average national student loan monthly payment, etc. in order to make it realistic

1.2. Open a new sheet inside the same file. Here is where we will do our work

1.3. Using the **transpose** option, copy the top cells, originally arranged by columns, and paste them in the new spreadsheet. This will make it easier to work with the data.

1.4. Let's make the spreadsheet look cleaner. Use different colors in order to separate tables and visually categorize income vs expenses. Here is an example:

1.5. Time to fill in missing data. Given the tax rate for this income (24%, write 24 in E9) calculate the money that needs to be put aside for taxes and place it at the bottom of the expenses.
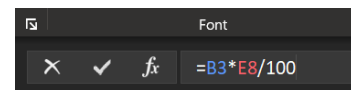
1.6.   Use the data from previous months to estimate the missing expenses. Do so by using the average function over a range of cells

1.7.   Select the full range of expenses and go to the insert function. Experiment with the different graphs and see how they look. You can find them in the *insert* section
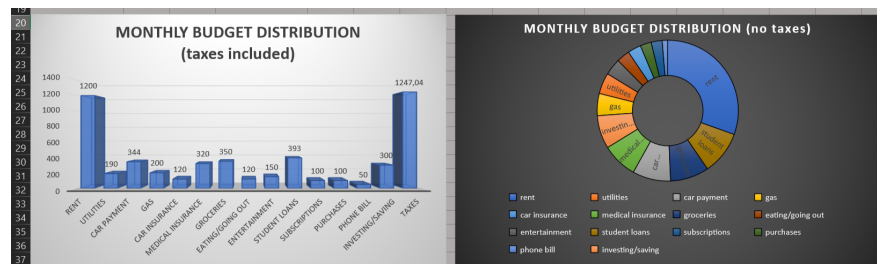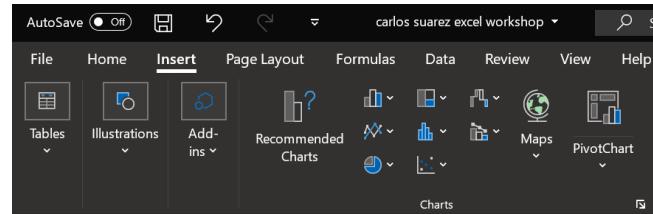
1.8.   In order to obtain cleaner-looking visuals, order the expenses from largest to smallest, using the custom sorting function on Excel. Then graph again.
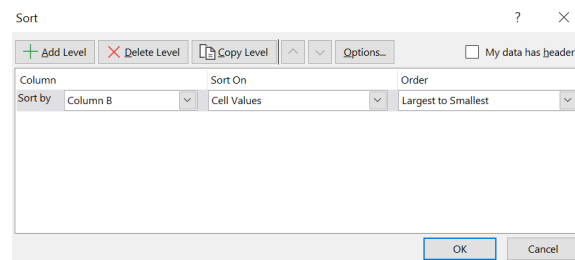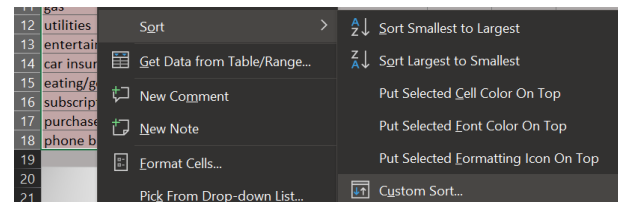
1.9.   Create a new table to compare recurrent vs variable expenses. Find the corresponding values using the sum function of Excel and manually selecting the desired cells.

1.10.   Find the projected balance: the money you will have left after considering all of the expenses

balance	=SUM(B3; -(SUM(B4:B18)))	Back Wall
	SUM(number1; **[number2]**; [number3]; ...)	

2.   Exercises

2.1.   Saving: Imagine your goal is to buy your $2,500,000 dream home some time in the future. Assume you marginally increase your income on a yearly basis: you put that extra money on your savings, resulting in a 20% increase in your monthly savings once a year. Note that there exists an FHA loan for which you only need a 3.5% down payment. Use Excel functions and shortcuts to represent this problem and estimate how long it will take you to save enough money to buy the house

38	SAVINGS EXERCISE	
39		
40	house price	2000000
41	initial monthly savings	300
42	FHA loan	3,5

First we set the values that we know

=B40*B42/100

	C	D	E
	500000	savings goal	=B40*B42/100
	300		

Secondly, we calculate how much we must save for the down payment

Now we create a table that is going to follow a particular structure, allowing us to see how much we have saved and how much more we need (margin) on a yearly basis

=E44*1,2

C	D	E yearly savings	F margin
	year		
	1	3600	83900
	2	4320	79580
	3	=E44*1,2	74396

=F44-E45

C	D	E yearly savings	F margin
	year		
	1	3600	83900
	2	4320	79580
	3	5184	=F44-E45

Now the Excel magic comes into play: select the six-cell pack [E44:F45], go to the bottom right of the green border of the selected, click and extend downwards as much as you want. Something like the following image will appear, telling us that somewhere in our 9th year of saving we will have gathered enough money

year	yearly savings	margin
1	3600	83900
2	4320	79580
3	5184	74396
4	6220,8	68175,2
5	7464,96	60710,24
6	8957,952	51752,29
7	10749,5424	41002,75
8	12899,45088	28103,29
9	15479,34106	12623,95
10	18575,20927	-5951,256

2.2. **Investing:** You decide to start investing $300 a month starting at age 22. The average for the S&P 500 (a very common investing index) is 8-10% annual returns since it started.

- 2.2.1. Be conservative and assume a 6% return. How much money would you have by 60?
- 2.2.2. Now be optimistic and assume a 10% return. How much money would you have by 60?
- 2.2.3. Your friend said he will start investing once he is 30. He claims to be a market expert and tells you he can get a 12% average annual return. How much would he have by 60?

First we introduce the FV function, built-in on Excel and very useful for compound interest calculations. However, this will compound the interest over an initial quantity without considering periodic contributions. Thus, we develop 3 tables and extend them in similar fashion to the savings exercise, one for each question in the exercise

55	INVESTING EXERCISE (1)						INV
56							
57	present value	300		Future value	=FV(B58/B60;B59*B60;0;-B57)		
58	interest rate	3/50			FV(rate; nper; pmt; [pv]; [type])		
59	Terms (years)	38					
60	compounding periods/year	12					

INVESTING EXERCISE (2)		you at 6%			you at 10%			you at 12% (friend)	
year	contribution	accumulated	year	contribution	accumulated	year	contribution	accumulated
1	3600	3600	1	3600	3600	1	3600	3600
2	3600	7416	2	3600	7560	2	3600	7632
3	3600	11460,96	3	3600	11916	3	3600	12147,84
4	3600	15748,6176	4	3600	16707,6	4	3600	17205,5808
5	3600	20293,53466	5	3600	21978,36	5	3600	22870,2505
6	3600	25111,14674	6	3600	27776,196	6	3600	29214,68056
7	3600	30217,81554	7	3600	34153,8156	7	3600	36320,44222
8	3600	35630,88447	8	3600	41169,19716	8	3600	44278,89529
9	3600	41368,73754	9	3600	48886,11688	9	3600	53192,36272
10	3600	47450,86179	10	3600	57374,72856	10	3600	63175,44625
11	3600	53897,9135	11	3600	66712,20142	11	3600	74356,4998
12	3600	60731,78831	12	3600	76983,42156	12	3600	86879,27978
13	3600	67975,69561	13	3600	88281,76372	13	3600	100904,7933
14	3600	75654,23735	14	3600	100709,9401	14	3600	116613,3686
15	3600	83793,49159	15	3600	114380,9341	15	3600	134206,9728
16	3600	92421,10108	16	3600	129419,0275	16	3600	153911,8095
17	3600	101566,3671	17	3600	145960,9303	17	3600	175981,2267
18	3600	111260,3492	18	3600	164157,0233	18	3600	200698,9739
19	3600	121535,9701	19	3600	184172,7256	19	3600	228382,8507
20	3600	132428,1283	20	3600	206189,9982	20	3600	259388,7928
21	3600	143973,816	21	3600	230408,998	21	3600	294115,4479
22	3600	156212,245	22	3600	257049,8978	22	3600	333009,3017
23	3600	169184,9797	23	3600	286354,8876	23	3600	376570,4179
24	3600	182936,0785	24	3600	318590,3763	24	3600	425358,868
25	3600	197512,2432	25	3600	354049,414	25	3600	480001,9322
26	3600	212962,9778	26	3600	393054,3554	26	3600	541202,1641
27	3600	229340,7564	27	3600	435959,7909	27	3600	609746,4238
28	3600	246701,2018	28	3600	483155,77	28	3600	686515,9946
29	3600	265103,2739	29	3600	535071,347	29	3600	772497,914
30	3600	284609,4704	30	3600	592178,4817	30	3600	868797,6636

2.3. **Personal budget**

Now that you have learned a good amount of Excel techniques, it's time to apply them to your own personal finances. We encourage you to modify the model to your liking and adapt it to your own budget, then use it to make smarter decisions about your finances!

🌞**Thank you for coming and participating in this workshop!** 🌞

We hope you enjoyed it.

Please let me know how we can improve future workshops through this link:

https://airtable.com/shrpLVmGGmidsvhtL