LECTURE 02: UNDERSTANDING EXCEL

I.   Basics of Excel
   a. If you want a video to learn the basics of Excel, this video can help you get started.
   b. Microsoft Excel is a spreadsheet program. Rather than a blank page for word processing, a new file is a bunch of blank cells.
      i. These notes use the **_2019_** version of Excel. There may be minor differences between what's here and you see, depending on the version you use.
   c. On the left are row numbers (1, 2, 3, etc); on the top are column letters (A, B, C, etc). Any cell is a combination of columns and letters, e.g. D8 or A1.
   d. At the bottom are sheet numbers (Sheet1, Sheet2, etc). Each of these sheets is a blank spreadsheet, allowing multiple kinds of information in the same file. You can also reference in one sheet data in a different sheet.
      i. Double-clicking the sheet tab highlights the sheet name, allowing you to change it.
      ii. Clicking the icon on the far right (with the orange star) makes a new sheet.

II. Clicking cells
   a. **_Clicking_** a cell highlights it; you can start typing and it will replace whatever was there with what you're typing.
   b. **_Double-clicking_** it creates a cursor icon, allowing you to edit what's in a cell without replacing the whole thing.
   c. Clicking and holding a cell allows you to highlight multiple cells as you move the mouse. This is useful for copying and pasting sections of a worksheet.
      i. You can also highlight whole rows or columns by clicking on the row number or column letter, as appropriate.
      ii. And you can highlight the whole sheet by clicking in the square in the upper-left hand corner of the sheet (where the column and row name panels intersect).

III. Cell Displays
   a. The Number box in the Home tab allows you to change how a cell is displayed.

b. The top bar gives you all the options for this Excel has. Some notable ones:
    i. *Number*. Adds two decimal places.
    ii. *Currency*. Adds two decimals places, a comma separator, and a dollar sign ($). Has options for special display of negative numbers.
    iii. *Accounting*. Adds two decimal places, a comma separator, a left-aligned dollar sign ($), and expresses all negative numbers in a parenthesis.
    iv. *Percentage*. Treats each value as a percent, adding two decimal places and a percent sign (%). Since percents are typically between 0 and 1, the values are multiplied by 100; 5 becomes 500.00%
c. The left three buttons are:
    i. *$*. Change to accounting style with a drop menu to change the currency symbol.
    ii. *%*. Change to percent style.
    iii. *,*. Add comma style to your numbers and changes cell to Accounting (though it doesn't add the currency sign).
d. On the right is a pair of buttons to add or remove decimal places.

IV. The Equal Sign
a. After selecting a cell, you can press the equal sign. The cell will now display the result of an equation you input, rather than what you type. This has two big uses:
    i. Rather than a number, you can use a particular cell by clicking it. This allows you to construct an equation and then easily change the values to see the result of the equation. For example, putting in A1 "=B1*C1" means you can put in any numbers in B1 and C1 and A1 will display the mathematical result.
    ii. Excel has numerous equations built into it, some of which we will discuss in this class. After pressing "=", you can keep typing a particular word and it will display the code for the equation you want. Type the appropriate values or cell references, separated with commas, and it will tell you the answer.
b. When you've referenced another cell and you've copied and pasted the cell (selecting it with single click), Excel will update your cell references relative to the new location.
    i. Suppose you have "=B1*C1" in cell A1. If you copy the whole cell and paste it into A2, A2 will read "=B2*C2". If you copy it into E5, E5 will read "=F5*G5".

      ii.   Note that if you cut—rather than copy—and paste, Excel will keep the old reference.

     iii.   If you add or delete columns and rows, Excel will update all cell references.

  c. =SUM is a useful function. It adds the value of all the cells selected. Like all functions, it has parentheses at the end; this is where the cell references go.

      i.   In A1 type "=SUM(A2:A6)". You can also type "=SUM(" and then click A2 and drag down the mouse to A6. The "A2:A6" formatting will appear automatically. You'll see a blue box appear around those cells. Press ENTER to complete the command.

      ii.   Type numbers in cells A2 to A6; the number at the top will automatically add whatever you typed in. It will update as you change it.

V.   Excel Practice

  a. Open Data Set 0 on my website. This is national and Maryland salary data based on major, taken from Georgetown's Center on Education and the Workforce 2015 report. All reported values are for graduates with only a bachelor's degree.

      i.   Note the descriptions tab; it's good practice to make it easy for people to know where your data came from and what each variable means.

  b. You'll notice one column is missing. What's the percent of all graduates? But we can calculate that easily because we have the number of majors per 10,000. For example, for every 10,000 graduates, there are 463 graduates that majored in accounting.

  c. In D3, type "=C3/10000" and press ENTER. You should get 0.0463.

  d. Double-click the small black box in the bottom right-hand corner of D3 (so the cursor becomes a "+" sign) or drag to expand it.

D3		f_x =C3/10000		
	A	B	C	D
1	Group	Major	Majors per 10K Graduates	% of All Graduates
2				
3	Business	Accounting	463	0.0463
4	Architecture and engineering	Architecture	77	
5	Biology and life sciences	Biology	206	
6	Business	Business management	814	

      i.   Now we have the information for all 49 majors. We can highlight the column and press the % symbol at the top of the page in the

Home tab under the Number group. Increase the decimal places shown, as well.
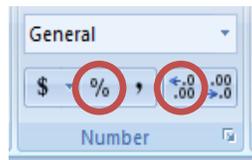
e. Finally, type SUM(D3:D51); you should get 83.2%. Why not 100%?

VI. Printing/Highlighting
    a. When you print, it's useful to figure out what will actually print. By selecting View >>> Page Layout, you'll see how columns and rows fit on pages. You can also adjust column width and row height to allow more or fewer to fit.
    b. Once you know what can fit, you need to highlight. Think of what you want to print as a rectangle composed of cells. Click and hold the cell in the upper left-hand corner of that rectangle and drag down to the lower right-hand corner.
        i. You can also select the whole worksheet by clicking the triangle button in the upper left-hand corner.
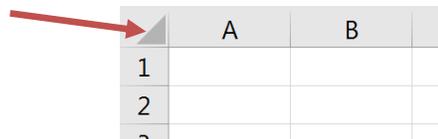
        ii. You can select an entire column or row by selecting the corresponding letter or number, as appropriate.
        iii. You can of course use highlight for other things, such as bolding whole sections of cells or copying/pasting.
    c. By clicking Page Layout >>> Print Area >>> Set Print Area, you select the highlighted area for printing. If you print, you'll print only the cells you included in the highlight.
    d. Sometimes you use formulas to calculate something but you want to print the formulas, not the result. But it's the result that displays on the screen (and will thus be what you print).
        i. To solve this, select Formulas >>> Show Formulas. This will render all your cells visible as what you wrote that began with an equal sign rather than the result (e.g. "=4+4" will display rather than "8").
        ii. It will also, annoyingly, widen all your columns.

VII. Absolute Cell References
   a. Sometimes when you copy/paste, you don't want Excel to change a reference. You want the references to be absolute, not relative.
   b. The dollar sign ($) "locks" a cell reference by column, row, or both. Suppose in C1 you have "=A1". If you copy/paste C1 into D2, D2 will read "=B2". The copied cell when over one column and down one row so the reference does the same. But suppose:
      i. It started with "=$A1". When copied/pasted to D2, D2 will read =$A2". It registered the move to a different row (which was relative) but didn't move to a different column (which was absolute).
      ii. It started with "=A$1". When copied/pasted to D2, D2 will read =B$1". It registered the move to a different column (which was relative) but didn't move to a different row (which was absolute).
      iii. It started with "=$A$1". When copied/pasted, it'll read "=$A$1". You continue to reference the same cell regardless where you copy and paste it to.
   c. As we move forward with the semester, you'll sometimes see Excel automatically add these dollar signs when you select a cell for particular functions. This is totally normal and shouldn't make a difference in your analysis.
   d. Example: Orson's Burgers
      i. Orson runs a burger stand. Each day, he needs to figure out how much he owes the government in sales tax. Consider the following day's business:

	A	B	C	D	E	F	G
1	Item	Price	Quantity	Sales Tax		Tax Rate	6.5%
2	Hamburger	$ 3.99	22				
3	Cheeseburger	$ 4.99	36				
4	Fries	$ 2.99	43				
5	Hot Dogs	$ 2.49	18				
6	Soda	$ 1.19	66				
7							
8	Total						

      ii. In D2, type: =B2*C2*$G$1 and press ENTER. Select D2 as shown. Double-click the small black box in the bottom right-hand corner of D2 (so the cursor becomes a "+" sign) or drag to expand it.

	A	B	C	D	E	F	G
1	Item	Price	Quantity	Sales Tax		Tax Rate	6.5%
2	Hamburger	$ 3.99	22	$ 5.71			
3	Cheeseburger	$ 4.99	36				
4	Fries	$ 2.99	43				
5	Hot Dogs	$ 2.49	18				
6	Soda	$ 1.19	66				
7							
8	Total						

    iii. Note the rows references for B and C columns change, but G1 remains the same. We reference the same tax rate. That's because it's an absolute reference.

	A	B	C	D	E	F	G
1	Item	Price	Quantity	Sales Tax		Tax Rate	6.5%
2	Hamburger	$ 3.99	22	$ 5.71			
3	Cheeseburger	$ 4.99	36	$ 11.68			
4	Fries	$ 2.99	43	$ 8.36			
5	Hot Dogs	$ 2.49	18	$ 2.91			
6	Soda	$ 1.19	66	=B6*C6*$G$1			
7							
8	Total						

    iv. We can now use the SUM function to see how much Orson owes in taxes:

	A	B	C	D	E	F	G
1	Item	Price	Quantity	Sales Tax		Tax Rate	6.5%
2	Hamburger	$ 3.99	22	$ 5.71			
3	Cheeseburger	$ 4.99	36	$ 11.68			
4	Fries	$ 2.99	43	$ 8.36			
5	Hot Dogs	$ 2.49	18	$ 2.91			
6	Soda	$ 1.19	66	$ 5.11			
7							
8	Total			=SUM(D2:D6)			

    v. You should get $33.76.

    vi. Why not just type "=B2*C2*0.065"? What's nice about using a cell reference is that if the tax rate changes, we'll only have to change one cell and everything will update.

VIII. Hotkeys
   a. Hotkeys are a few keys pressed simultaneously to execute a command. This is often faster than opening a menu, searching for the right option, and clicking it. Especially since you're often typing on the keyboard as it is: switching to the mouse slows you down.
   b. Here are some common hotkeys:

Type	*Command*
SHIFT + ARROWS	Highlight cells
CTRL + Z	Undo
CTRL + X	Cut highlighted section
CTRL + C	Copy highlighted section
CTRL + V	Paste cut/copied section
F4 (may press multiple times)	Makes cell reference absolute
CTRL + `	Show formulas