Activity 1-3

February 9, 2012

Task 1: Practice with the `OFFSET()` function

1. Download and save `ACT1-3_starter.xlsx`. Open it in Excel and go to the `OffsetExample` sheet.

2. Change the contents of cell `B10` and notice that cells `A11` and `B11` automatically update to display the average of the homework number you specify. Verify that it works for a number of homeworks.

3. Look at the formula in cell `B11`. This is a combination of two formulas, AVERAGE and OFFSET. Notice how the OFFSET formula refers to cell "`B10`−1". "`B10`−1" is how many "steps" to the right to take from the starting cells (`B2:B7`) to get to the homework you're interested in.

   If `B10` is 9, then (`B2:B7`) is offset by 0 cells down and 8 cells to the right. This gets us all the scores for HW9, which is what we want to input into the AVERAGE function. Make sure you understand how this works before moving on.

4. Now we want to enter a name in `B13` (such as Barry) and then see the student's average for all homeworks in cell `B15`. First off, you need to determine what row is Barry's row. Write a formula (using the MATCH function) in cell `B14` that identifies the row of the student who's name is in `B13`.

5. The formula for cell `B15` is similar to the formula in cell `B11`. Copy the formula in cell `B11` into cell `B15`. Modify it to find the average of the student mentioned in cell `B13`. Remember that we found the student's row number for a reason.

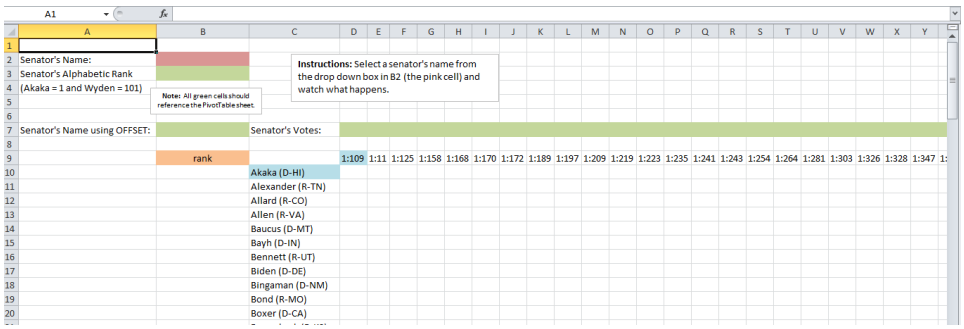
6. What happens when you mistype a name in `B13`? To avoid this, we can have the user select a name from a list of possibilities. For Windows select `Data...Data Validation...Data Validation`. For Macs, select `Data...Validate...Data Validation`. Select to allow a `List` and specify a data range of names that we want. This option is listed under "Data Validation" because it verifies what *kind* of data can be put in the cell.

Task 2: Compare Any Senator

1. Open the spreadsheet from last class. You should have three sheets: `PivotTable`, `RawData`, and `KennedyCompare`.

2. Copy the sheet `GeneralCompareTemplate` from `ACT1-3_starter.xlsx` to your spreadsheet. Right click on the sheet and select `Move or Copy...`. Rename it `GeneralCompare`.

3. **New Rule** We want to reference as many cells as possible (using functions). This helps you (and us!) understand where everything is coming from. Use functions (like `=PivotTable!A5`) to fill the row and column headers (starting in the blue boxes). Your spreadhsheet should now look like this:



4. Use `Data Validation` to allow a list of names in cell `B2`. These names can be referenced from the same sheet (`C10:C110`).

5. In cell `B3`, use the MATCH function to get the senator's alphabetic rank. Reference cells from `PivotTable` because other sheets might be sorted differently. In this rank, we want Akaka to be 1 and Wyden to be 101.

6. In cell `B7`, use the OFFSET function to display the senator's name.

7. In cells `D7:AY7`, modify the function in `B7` to display the senator's votes. You will need to use an absolute reference (`$`) to make sure you always use cell `B3`.

8. We can now fill the table. Copy the function from cell `KennedyCompare!B2` to cell `D10` and modify it. Remember that the row we want to compare to is in row 7 on *this* sheet.

9. Use the COUNTIF function to again compute `num_agree`,`num_disagree`,and `num_not_voting` in columns `AZ:BB` (the orange cells).

10. Finally, compute the `rank` of each senator in column `B` (purple cell) by using the formula

$$\frac{\text{num\_agree} - \text{num\_disagree}}{\text{num\_agree} + \text{num\_disagree}}.$$

11. For this sheet, we won't sort by decreasing order (there is a way to do dynamic sorting - you can Google it). Select Kennedy from the list and verify by eye that some of the ranks are the same on `GeneralCompare` and `KennedyCompare`.

We're done with this activity. Keep a few things in mind:

1. We didn't have to have the green cells in this sheet. We could have entered a VERY large and complicated function in cell `D10`. But doing it step-by-step is a good idea because (1) it breaks the large problem into manageable pieces and (2) it will be easier to figure out what we did later.

2. Nice formatting with cells and text boxes also help with understanding and readability.

3. This is an **interactive** spreadsheet - people can mess with it and make their own conclusions about the data.