**Week 8 Lab: Permutation Test**

On Canvas or Github, there is an excel sheet called “perm\_test.xlsx” attached with the assignment for this lab. This excel sheet contains data on two groups a control group (assigned the code 0) and a treatment group (1). The treatment group refers to a group of individual who underwent a skills training program. The variable measured is their income after five years. The control group refers to individuals who did not receive this training, and also contains their income after five years. The goal of this question to determine whether the skill training program was effective in increasing incomes. **To answer, first conduct a permutation test, with 100 reshuffles of the group. Provide your answer at the 95% confidence level. Second, compare this with a NHST between two samples (make sure to use the pooled standard error). Finally, compare the two answers you got, provide some intuition for why the two answers might be different, and provide a conclusion with respect to the jobs program.**

Some columns and cells are left empty to guide in you doing this test. In order to reshuffle the groups, there are a few steps we must take.

* In the “random\_seed” column, generate a uniform random variable with the function =RAND()
* In the “rank” column, rank those random seeds you just created (don’t worry if they change when you enter the formula) using the =RANK function
* Finally, in the shuffled group, use the =IF function to divide the ranks you just created into two groups. If the rank is under 31, then assign the observation to the control group (0). If the rank is above 31, assign the observation to the treatment group (1)
* At this point, you should have randomly assigned each observation to a group. Scroll down to find the two empty cells labelled “shuffled differences”. Here, use the =AVERAGEIF command to calculate the two averages. =AVERAGEIF has three arguments. The first takes the columns of your new shuffled groups (E2:E61). The second is the criteria; this should be 0 for control group, and 1 for treatment group. The final argument takes the columns you want to average over, in our case income or B2:B61
* After calculating the averages, you can now take the difference between your newly shuffled groups. Record this instance on a separate sheet to save your results. **Make sure you copy just the value over, not the formula.** You can select only pasting the value by going to “Edit → Paste special” or using the keyboard shortcut Ctrl + Shf + V