Lab 03

Download the `lab03.Rmd` file and open it using RStudio. Then, use the R programming language to help you answer the questions below. **Don't forget to fill out the worksheet form before the next class!**

1. Consider the experiment you devised and collected data for in our last class. Describe the value of following elements in your study: (i) null hypothesis, (ii) alternative hypothesis, (iii) test statistic, (iv) sampling distribution, (v) p-value, and (vi) the statistical significance of the outcome.

2. Imagine a new $2 U.S. coin. Denote the value p to be the probability that the coin comes up heads when flipped. Assume that you run an experiment 300 times in which the coin comes up heads only 165 times. (Note: this set-up is different than the plant/light experiment because we have only *one* proportion). Describe the value of following elements from this study (use the code in the lab to compute elements iv and v): (i) null hypothesis, (ii) alternative hypothesis, (iii) test statistic, (v) p-value, and (vi) the statistical significance of the outcome.

3. Find the Wikipedia page on the Null Hypothesis. Read the page up to and including the Example section. Take note of any new points, inconsistencies, or points of confusion with our description of the null hypothesis today.

4. Consider an experiment to test whether students who wear glasses are taller than students who do not wear glasses. Describe the (i) null hypothesis, (ii) alternative hypothesis, and (iii) a reasonable test statistic. Sketch what you think the sampling distribution of the test statistic might look like.

5. I cannot stress enough how important it is to internalize and understand the concepts discussed today. They are central to our study of statistics during the entire semester. Find a partner and re-explain the five concepts on a piece of paper or a white board without any notes.