Problem Set 11

STAT-S 520

Due on April 10th, 2023

Instructions:

- Submit your answers in Canvas as a single PDF file with answers in proper order.
- Include your R code, graphs, and relevant output.
  - Check that only the relevant output is included in your submission. Pages and pages of output that are not relevant can be penalized.
- You are allowed to collaborate with your classmates as long as you write your own solutions.

Questions

1. A researcher studies the use of color background to enhance online reading. A random sample of people was randomly divided into two groups: 235 individuals were asked to read a nonfiction novel online on a webpage with an orange background color and other 197 individuals were given the same novel online on a webpage with a blue background color. Readability was measured via distance traveled by the mouse while scrolling the page in a fixed amount of time. They found that the average distance for the orange background group was 23.4 feet (sample standard deviation 5.7 feet) versus 21.9 feet (sample standard deviation 7.2 feet) for the blue background group.

   a. Are the distance traveled by readers with orange background approximately Normal? How can we know? Does it really matter whether is normal or not? Explain
   b. Find a 98% confidence interval for the *difference* in average distance traveled by using orange instead of a blue background.
   c. To perform a hypothesis test, would you use Welch's or Student's two-sample t-test? Explain.
   d. Perform a hypothesis test with the method chosen in part c. State the null and alternative hypotheses, conclude, and interpret your result.

2. ISI 11.4. Problem Set D, questions 1 - 4. For question 4, solve it using both the theory-based approach and the simulation based approach.

3. Exercise given in file `S520_040623_R_exercise.R`

Reading Assignments

ISI Chapter 13