Application exercise 1.4: Randomization testing

Team name: _____

Lab section: 8:30   10:05   11:45   1:25   3:05

Write your responses in the spaces provided below. WRITE LEGIBLY and SHOW ALL WORK! Only one submission per team is required. One team will be randomly selected and their responses will be discussed and graded. Concise and coherent are best!

Student-to-faculty ratio data collected from random samples of public and private four-year colleges:

type	mean	SD	n
private	13.84	7.28	85
public	17.60	4.57	57
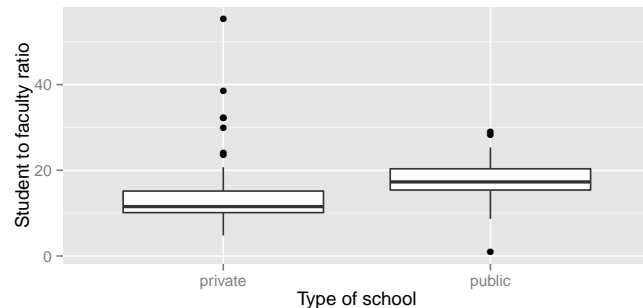
1. We would like to test if there is a *difference* between the average student-to-faculty ratio between public and private four-year colleges using a randomization test. What are the hypotheses?

2. Fill in the blanks below for the appropriate set up for this test:

   We write the student-to-faculty ratio of each public and private college in this sample on a total of

   _____ index cards. Then, we shuffle these cards and split them into two groups: one group

   of size _____ representing public colleges, and another group of size _____ representing

   private colleges. We calculate the difference between the average student-to-faculty ratios in the

   public and private colleges ($\bar{x}_{public} - \bar{x}_{private}$) and record this value. We repeat this many times

   to build a randomization distribution, which should be centered at _____ . Lastly, we cal-

   culate the p-value as the proportion of simulations where the simulated differences in means are

   _____.

3. The dot plot below is created using 100 simulations. What is the p-value?

Distribution of simulated differences (public – private)
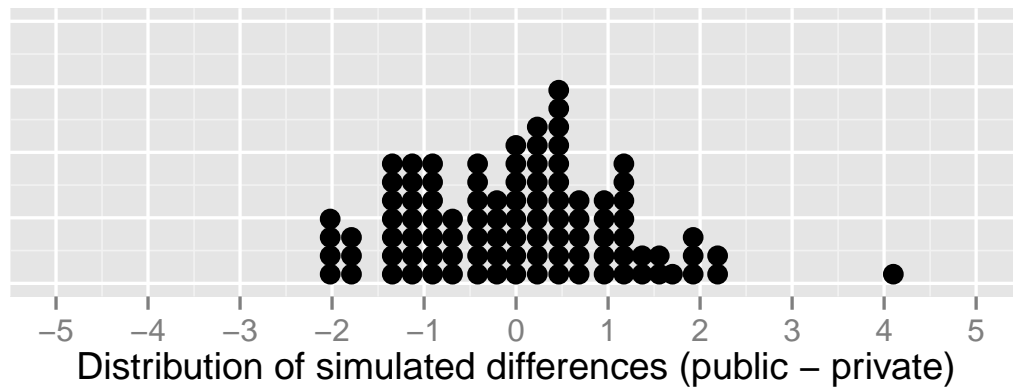
4. Based on the p-value, do these data provide convincing evidence to suggest that the student-to-faculty ratio in public four-year colleges is different than that of private four-year colleges.