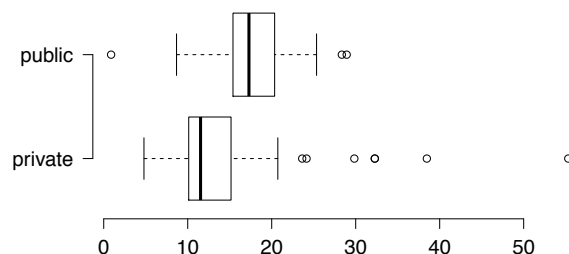


## Application exercise 1.4: Randomization testing

Write your responses on a piece of paper. WRITE LEGIBLY! Only one submission per team is required. One team will be randomly selected and their responses will be discussed and graded.

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

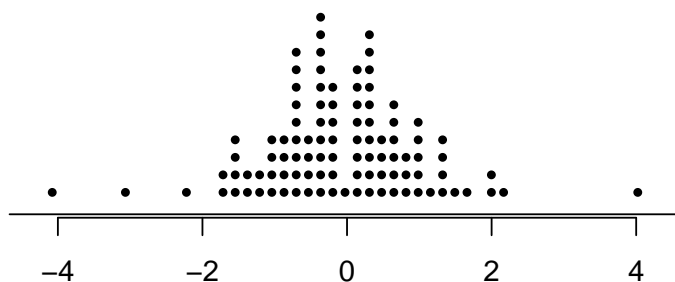
	<i>public</i>	<i>private</i>
<i>mean</i>	18	14
<i>sd</i>	4.6	7.3
<i>n</i>	57	85



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 calculate 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?



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.