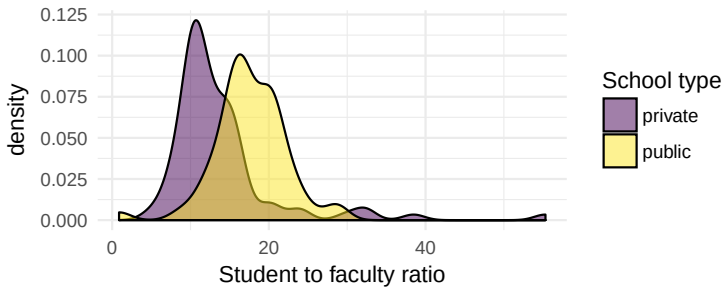
Warm-up Exercise

April 3, 2017

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

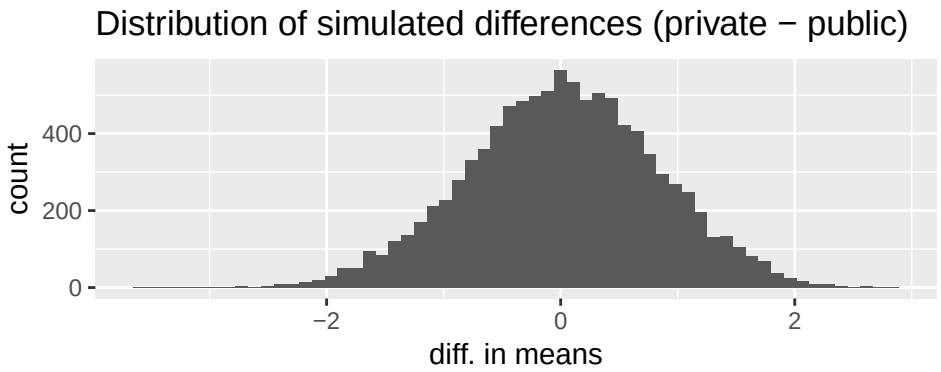
type	mean	SD	n
private	13.84	7.28	85
public	17.60	4.57	57



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. How is the reference distribution (i.e. the permutation distribution) created?

3. The histogram below is created using 9,999 resamples. What is the p-value? To help you answer this the smallest and largest 10 differences in means are displayed below.




```
##              [,1]      [,2]      [,3]      [,4]      [,5]      [,6]      [,7]      [,8]      [,9]     [,10]
## smallest -3.581598 -3.303189 -3.028894 -2.898691 -2.775187 -2.753880 -2.703525 -2.692080 -2.644764 -2.584326
## largest   2.333110  2.354737  2.378760  2.419961  2.560588  2.570464  2.600881  2.656252  2.745697  2.845808
```

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.