STAT 217: In Class 8/28

```r
set.seed(21)
mt <- rnorm(20, 105, 20)
id <- rnorm(20, 100, 20)

iq <- data.frame(c(mt, id), c(rep("mt", 20), rep("id", 20)))
names(iq) <- c("iq", "state")

iq
```

```
##       iq state
## 1  120.9    mt
## 2  115.4    mt
## 3  139.9    mt
## 4   79.6    mt
## 5  148.9    mt
## 6  113.7    mt
## 7   73.6    mt
## 8   86.3    mt
## 9  106.3    mt
## 10 105.0    mt
## 11  59.5    mt
## 12 120.1    mt
## 13  94.0    mt
## 14 108.5    mt
## 15 116.3    mt
## 16 135.2    mt
## 17 118.2    mt
## 18 127.4    mt
## 19  89.3    mt
## 20  96.5    mt
## 21 107.9    id
## 22 100.7    id
## 23  79.4    id
## 24  74.7    id
## 25  95.5    id
## 26 114.9    id
## 27 106.7    id
## 28  77.5    id
## 29  85.9    id
## 30  85.4    id
## 31  63.3    id
## 32  91.8    id
## 33 100.5    id
## 34 118.2    id
## 35 132.7    id
## 36 101.2    id
## 37 137.0    id
## 38 101.6    id
## 39 128.4    id
## 40 129.2    id
```

```r
require(mosaic)

mean(mt)

## [1] 108

mean(id)

## [1] 102

Tobs <- diffmean(iq ~ state, data = iq) ## this is the observed diff in means
Tobs

## diffmean
##      6.1

B <- 1000 ## this is how many permutations you want
Tstar <- matrix(NA, nrow = B) ## setting up empty slots to put our permutation statistics in
for (b in 1:B) {
  Tstar[b] <- diffmean(iq ~ shuffle(state), data = iq) ## the bth permutation stat
  ## the text uses compareMean, but that is an outdated function
}
Tstar[1:10,]

##  [1]  -5.45  11.42  -6.49  13.98  -5.46 -13.86 -12.92  -2.22   2.12
## [10]  14.41

par(mfrow = c(1, 2)) ## telling R to put the two plots side by side
hist(Tstar)
abline(v = Tobs, lwd = 2) ## adding a line for the observed statistic
abline(v = -Tobs, lwd = 2)
plot(density(Tstar), main = "Density Plot of Tstar", xlab = "")
abline(v = Tobs, lwd = 2)
abline(v = -Tobs, lwd = 2)
```