

# Homework 4

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5/12/2019

## Problem 1

```
boot.t.test = function(x, y, conf = 0.95, B = 9999){
  m = length(x)
  n = length(y)
  sehat = sqrt((var(x)/m) + (var(y)/n))
  diffbar = mean(x) - mean(y)

  tratio = numeric(B)
  for(b in 1:B){
    xboot = sample(x, m, replace = TRUE)
    yboot = sample(y, n, replace = TRUE)
    tratio[b] = (mean(xboot) - mean(yboot) - diffbar)/sqrt( (var(xboot)/m) + (var(yboot)/n) )
  }

  talphaboot = as.numeric(quantile(tratio, conf))

  cat("The one-sided ", conf, " confidence interval is: ", (diffbar - talphaboot*sehat), " to infinity")
}
```

now this function can be applied to the dataset

```
datmemory = read.delim("~/Documents/Math185/memory.txt", header=TRUE, fill=TRUE)
a = na.omit(datmemory)
boot.t.test(a$Ginkgo,a$Placebo , conf = 0.95, B = 9999)
```

```
## The one-sided 0.95 confidence interval is: -2.161774 to infinity
```

Problem 2 Compare gas consumption btw AUTOMATIC and MANUAL transmission Example for citympg only

```
datcar = read.csv("~/Documents/Math185/cars.csv", header=TRUE, sep=";", fill=FALSE)
```

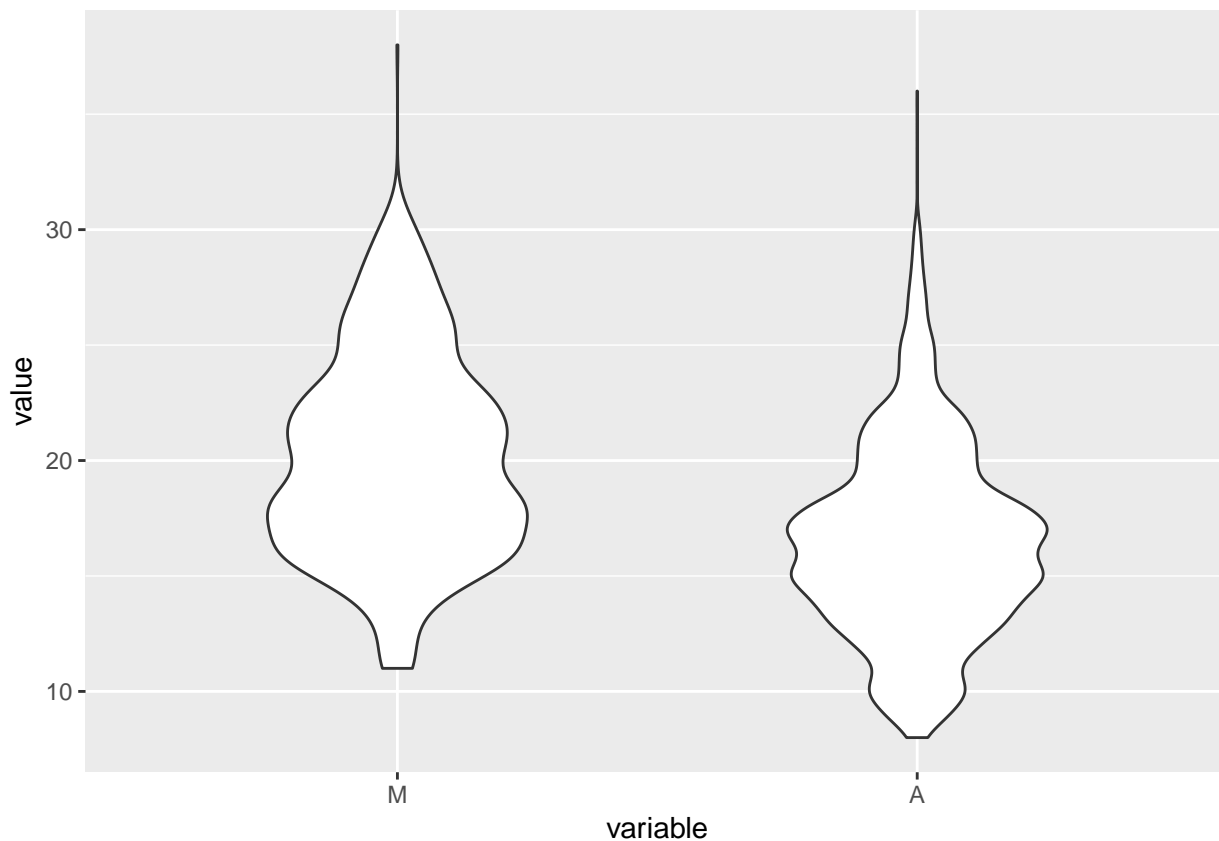
Select Automatic and Manual Transmissions

```
manualdat = datcar[which(datcar$Classification == "Manual transmission"),]
autodat = datcar[which(datcar$Classification == "Automatic transmission"),]

manualcitympg = manualdat$City
autocitympg = autodat$City
```

PART A

```
library("ggplot2")
C1=data.frame(value>manualcitympg, variable="M")
C2=data.frame(value=autocitympg, variable="A")
dat=rbind(C1,C2)
ggplot(dat, aes(x=variable, y=value)) + geom_violin(scale="width", adjust=1, width=0.5)
```



```
boot.t.test(manualcitympg,autocitympg , conf = 0.95, B = 9999)
```

```
## The one-sided 0.95 confidence interval is: 3.475282 to infinity
```

PART B

```
fourspeed = datcar[which(datcar$Transmission == "4 Speed Automatic"),]
sixspeed = datcar[which(datcar$Transmission == "6 Speed Automatic"),]
fourAutocitympg = fourspeed$City
sixAutocitympg = sixspeed$City

C3=data.frame(value=fourAutocitympg, variable="Auto 4 Speed")
C4=data.frame(value=sixAutocitympg, variable="Auto 6 Speed")
dat2=rbind(C3,C4)
ggplot(dat2, aes(x=variable, y=value)) + geom_violin(scale="width", adjust=1, width=0.5)
```



```
boot.t.test(fourAutocitympg,sixAutocitympg, conf = 0.95, B=9999 )
```

```
## The one-sided 0.95 confidence interval is: 0.9556203 to infinity
```