Problem 5: a)

```
college=read.csv("College.csv")
```

b)

```
rownames(college)=college[,1]
fix(college)

college=college[,-1]
fix(college)
```

c)

i.

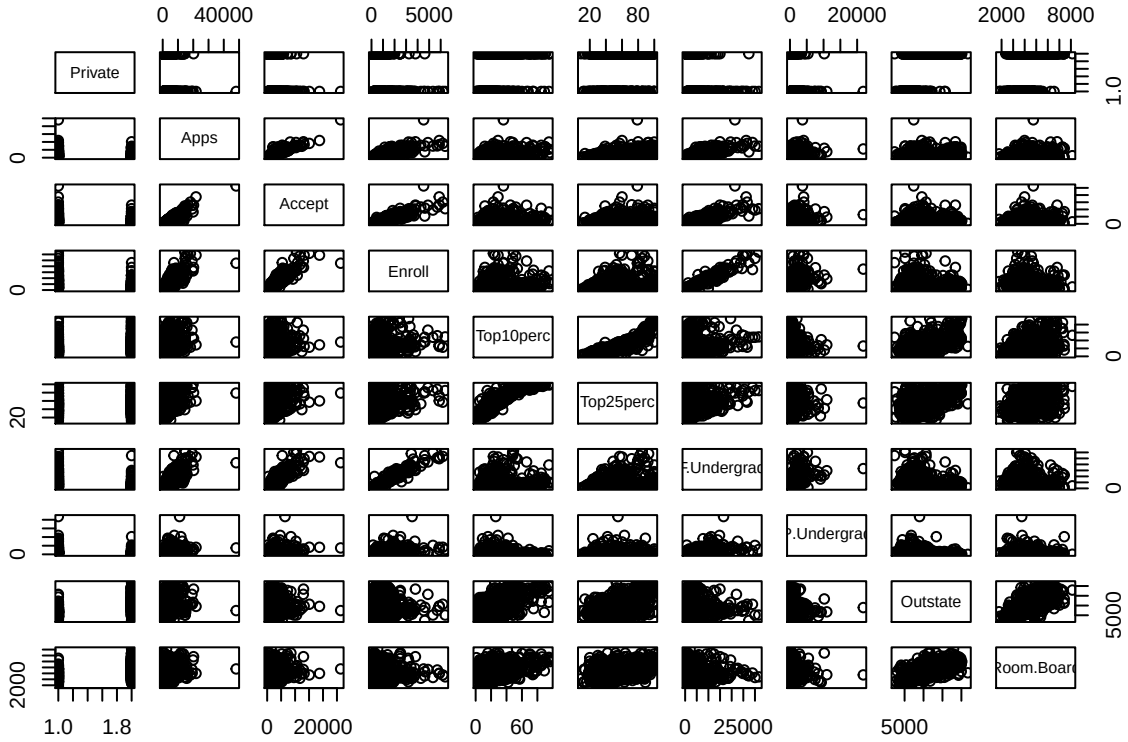
```
summary(college)
```

```
##  Private        Apps           Accept          Enroll       Top10perc
##  No :212   Min.   :   81   Min.   :   72   Min.   :  35   Min.   : 1.00
##  Yes:565   1st Qu.:  776   1st Qu.:  604   1st Qu.: 242   1st Qu.:15.00
##            Median : 1558   Median : 1110   Median : 434   Median :23.00
##            Mean   : 3002   Mean   : 2019   Mean   : 780   Mean   :27.56
##            3rd Qu.: 3624   3rd Qu.: 2424   3rd Qu.: 902   3rd Qu.:35.00
##            Max.   :48094   Max.   :26330   Max.   :6392   Max.   :96.00
##    Top25perc      F.Undergrad     P.Undergrad         Outstate
##  Min.   :  9.0   Min.   :  139   Min.   :    1.0   Min.   : 2340
##  1st Qu.: 41.0   1st Qu.:  992   1st Qu.:   95.0   1st Qu.: 7320
##  Median : 54.0   Median : 1707   Median :  353.0   Median : 9990
##  Mean   : 55.8   Mean   : 3700   Mean   :  855.3   Mean   :10441
##  3rd Qu.: 69.0   3rd Qu.: 4005   3rd Qu.:  967.0   3rd Qu.:12925
##  Max.   :100.0   Max.   :31643   Max.   :21836.0   Max.   :21700
##    Room.Board       Books           Personal          PhD
##  Min.   :1780   Min.   :  96.0   Min.   : 250   Min.   :  8.00
##  1st Qu.:3597   1st Qu.: 470.0   1st Qu.: 850   1st Qu.: 62.00
##  Median :4200   Median : 500.0   Median :1200   Median : 75.00
##  Mean   :4358   Mean   : 549.4   Mean   :1341   Mean   : 72.66
##  3rd Qu.:5050   3rd Qu.: 600.0   3rd Qu.:1700   3rd Qu.: 85.00
##  Max.   :8124   Max.   :2340.0   Max.   :6800   Max.   :103.00
##     Terminal       S.F.Ratio      perc.alumni        Expend
##  Min.   : 24.0   Min.   : 2.50   Min.   : 0.00   Min.   : 3186
##  1st Qu.: 71.0   1st Qu.:11.50   1st Qu.:13.00   1st Qu.: 6751
##  Median : 82.0   Median :13.60   Median :21.00   Median : 8377
##  Mean   : 79.7   Mean   :14.09   Mean   :22.74   Mean   : 9660
##  3rd Qu.: 92.0   3rd Qu.:16.50   3rd Qu.:31.00   3rd Qu.:10830
##  Max.   :100.0   Max.   :39.80   Max.   :64.00   Max.   :56233
##    Grad.Rate
##  Min.   : 10.00
##  1st Qu.: 53.00
##  Median : 65.00
```

```
##  Mean   : 65.46
##  3rd Qu.: 78.00
##  Max.   :118.00
```

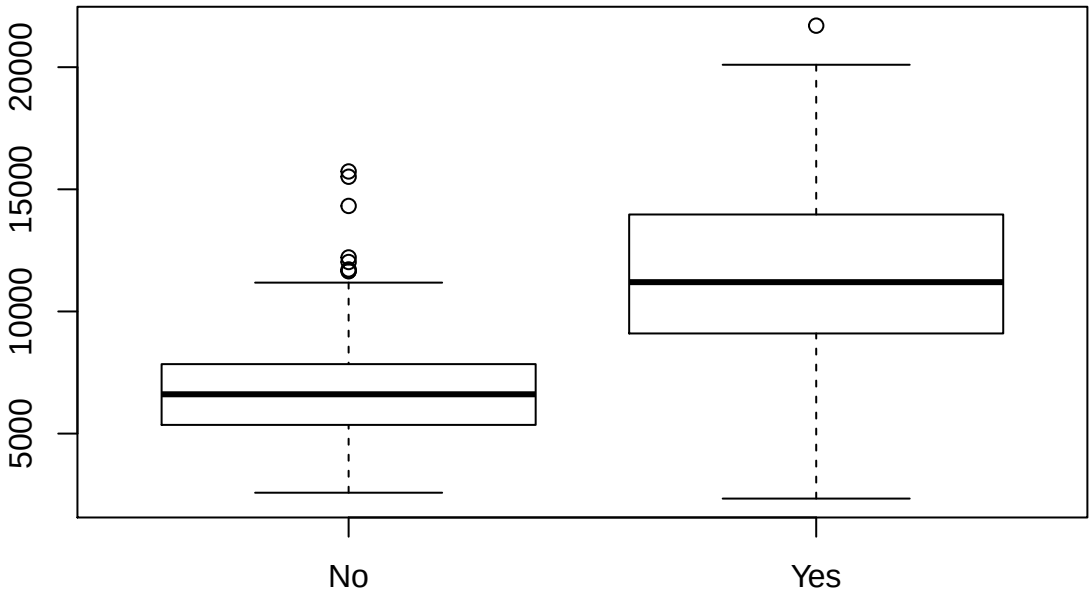
ii.

```
pairs(college[,1:10])
```



iii.

```
boxplot(Outstate~Private,data=college)
```

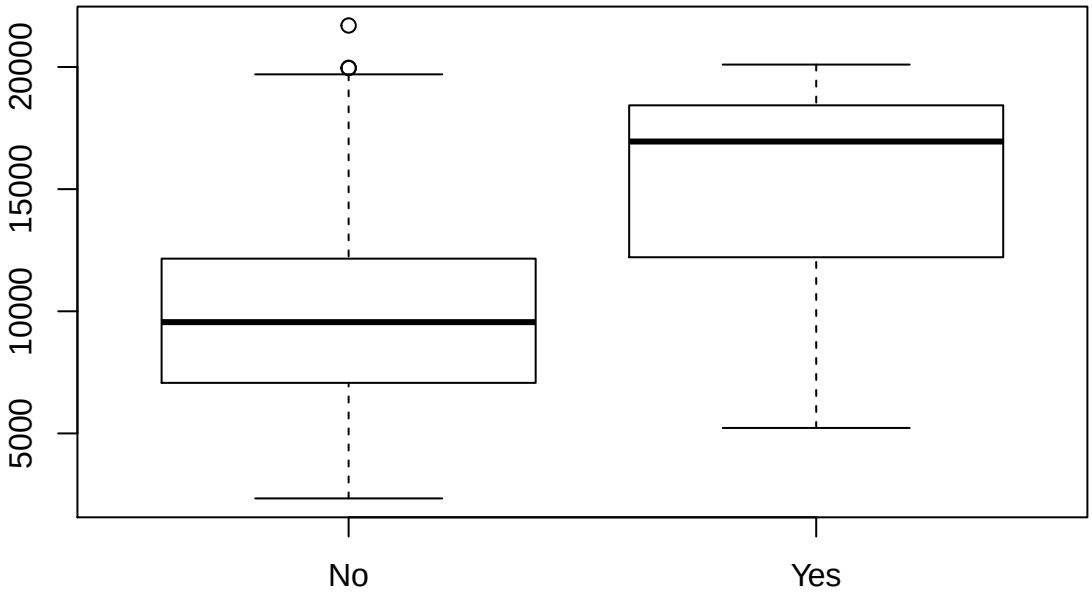


iv.

```
Elite=rep("No",nrow(college))
Elite[college$Top10perc>50]="Yes"
Elite=as.factor(Elite)
college=data.frame(college,Elite)
summary(college$Elite)
```

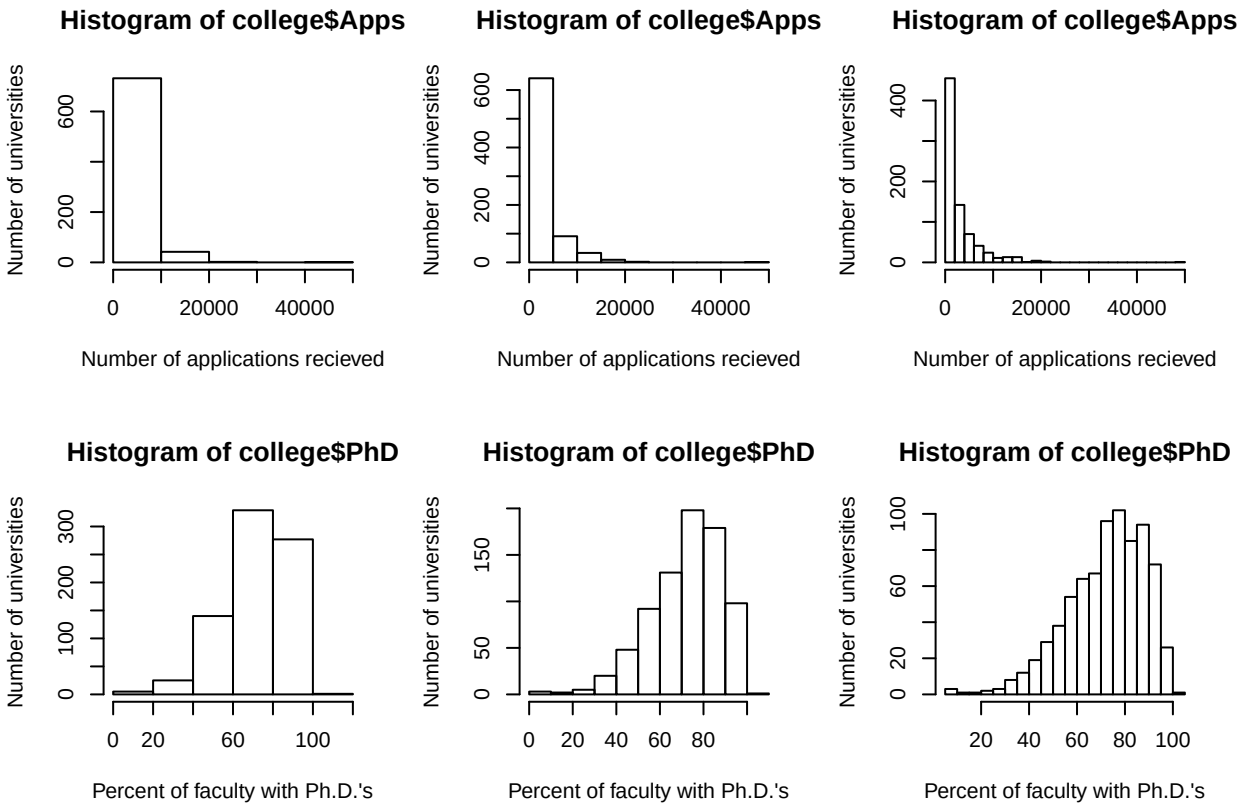
```
##  No Yes
## 699  78
```

```
boxplot(Outstate~Elite,data=college)
```



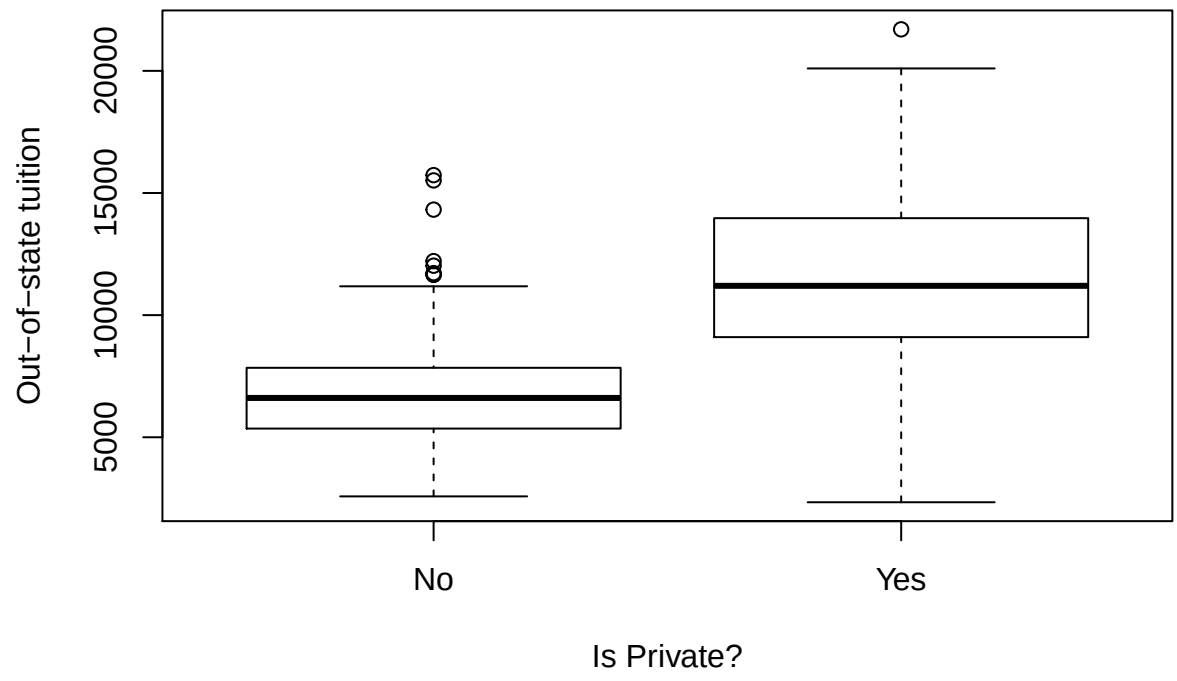
v.

```
par(mfrow=c(2,3))
hist(college$Apps,breaks=5,xlab='Number of applications recieved',ylab='Number of universities')
hist(college$Apps,breaks=10,xlab='Number of applications recieved',ylab='Number of universities')
hist(college$Apps,breaks=20,xlab='Number of applications recieved',ylab='Number of universities')
hist(college$PhD,breaks=5,xlab='Percent of faculty with Ph.D.\'s',ylab='Number of universities')
hist(college$PhD,breaks=10,xlab='Percent of faculty with Ph.D.\'s',ylab='Number of universities')
hist(college$PhD,breaks=20,xlab='Percent of faculty with Ph.D.\'s',ylab='Number of universities')
```

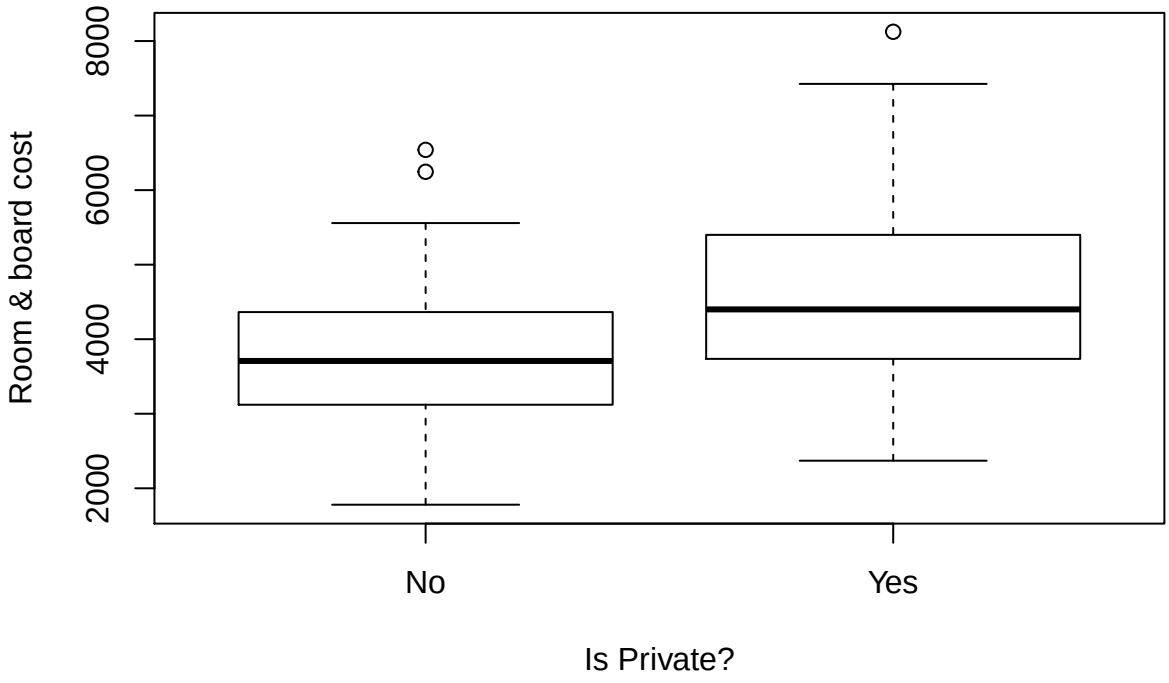


vi. The following 3 boxplots show that private university is generally more expensive to attend(high out-of-state tuition and room & board cost). And at the same time, students in private universities are spending less on there personal spending, probably because that the high expense of attending school has already shrinked their wallet.

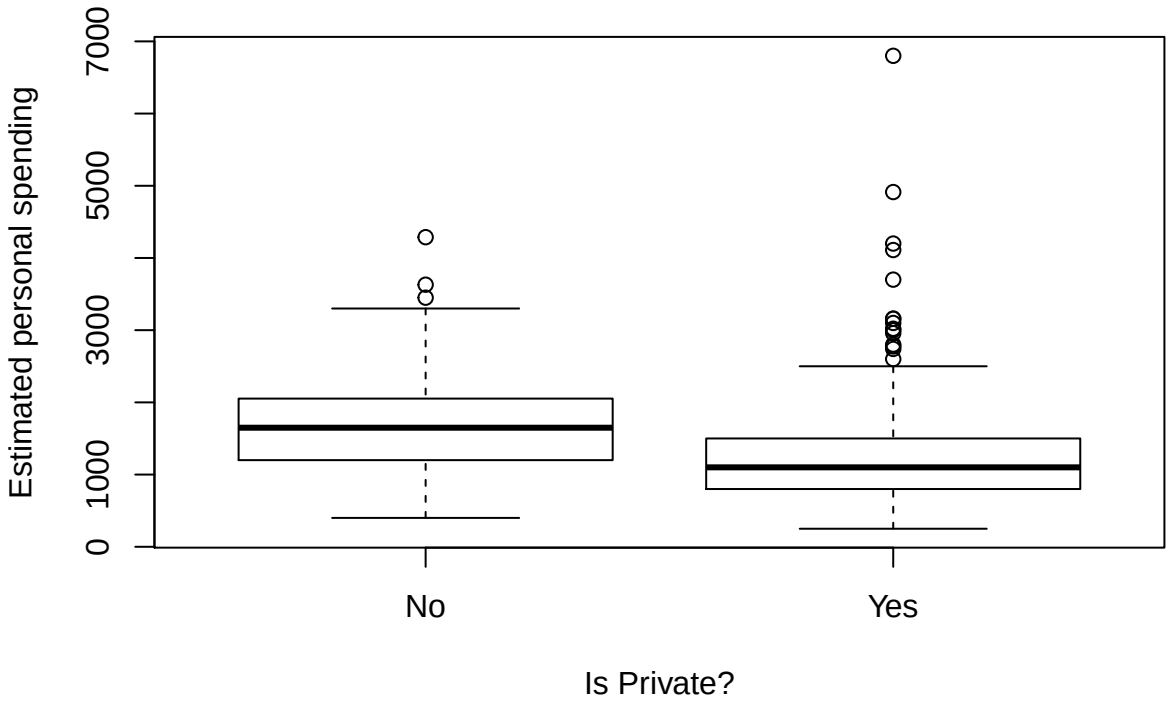
```
boxplot(Outstate~Private,data=college,xlab="Is Private?",ylab="Out-of-state tuition")
```



```r
boxplot(Room.Board~Private,data=college,xlab="Is Private?",ylab="Room & board cost")
```

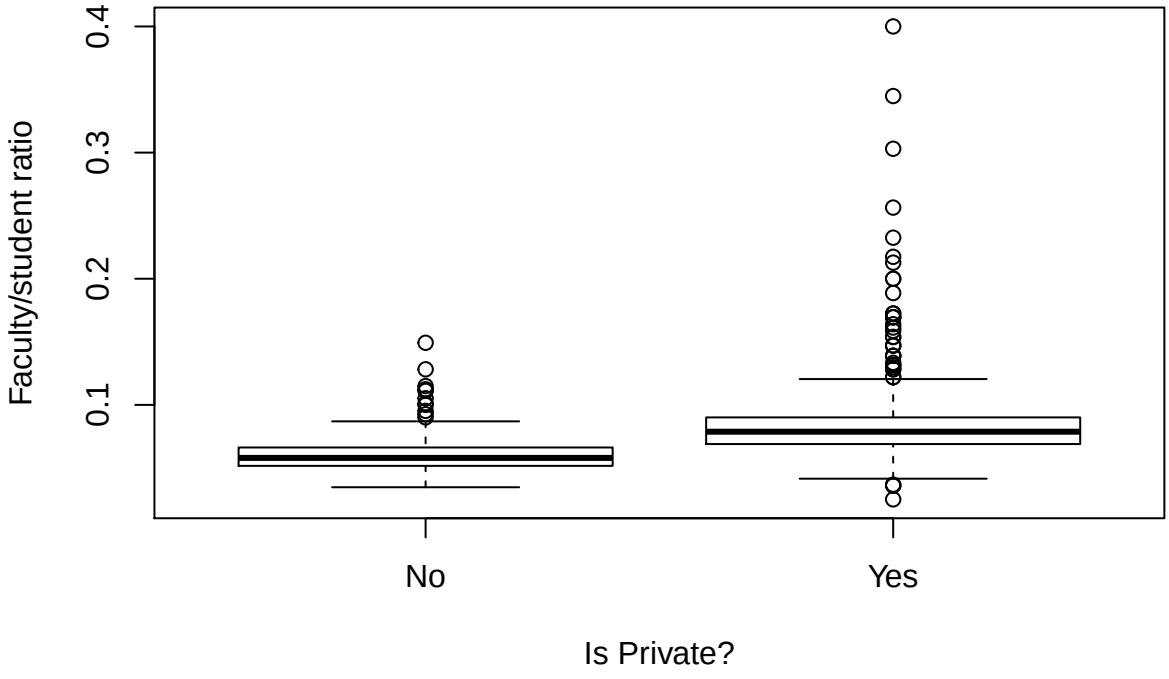



```r
boxplot(Personal~Private,data=college,xlab="Is Private?",ylab="Estimated personal spending")
```



The following 2 boxplots show that private universities are indeed put into good use of their higher tuition to provide the students with better learning environment, including a higher faculty/student ratio and a higher instructional expenditure per student. Therefore, my advice is, if you can afford a private university, then go to one. Because it's probably worth the money.

```
boxplot(1/S.F.Ratio~Private,data=college,xlab="Is Private?",ylab="Faculty/student ratio")
```




```
boxplot(Expend~Private,data=college,xlab="Is Private?",ylab="Instructional expenditure per student")
```