

Stats 101C Lec 3 HW 1

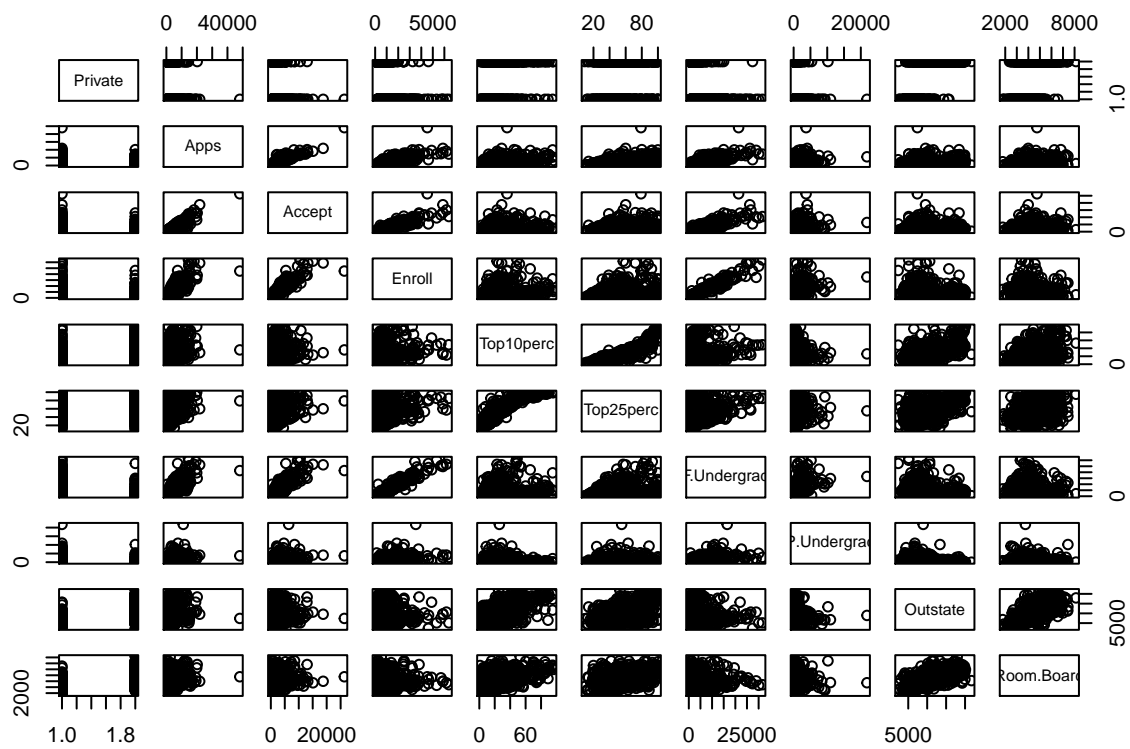
Edwin Chau

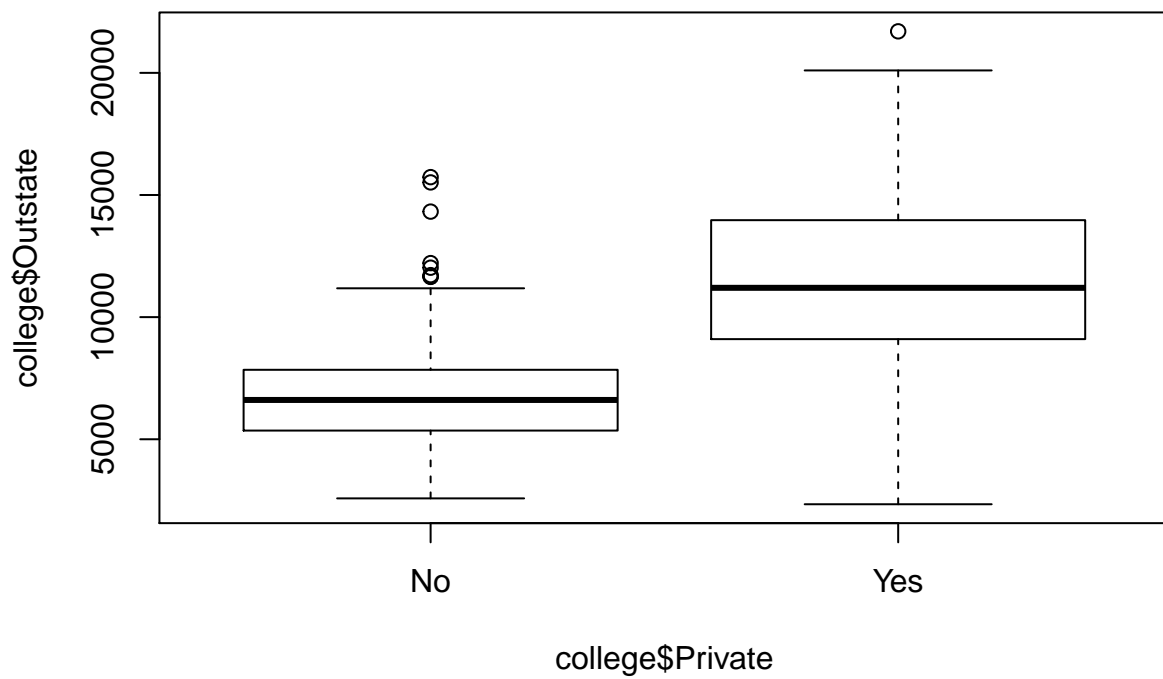
Q8 Part a

Q8 Part b

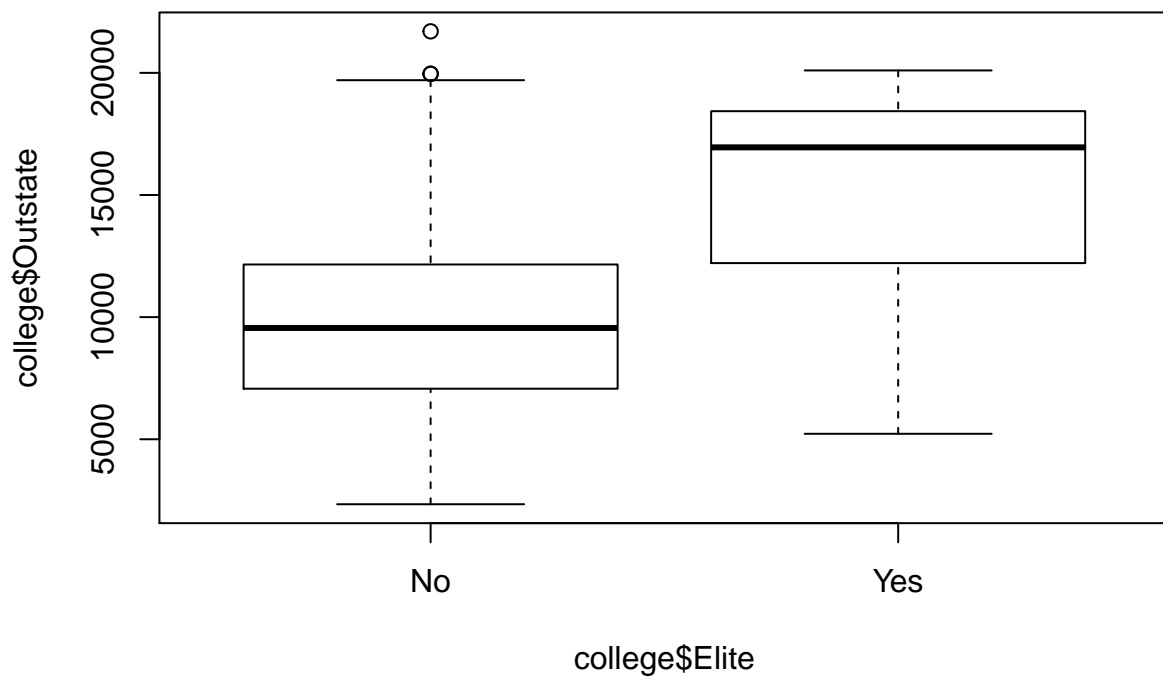
Q8 Part c

```
## 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
```

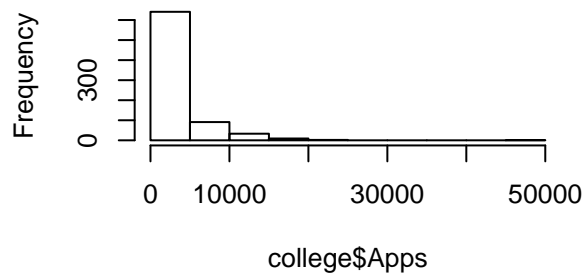




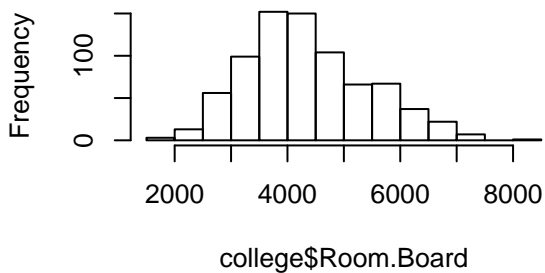
```
## No Yes
## 699 78
```



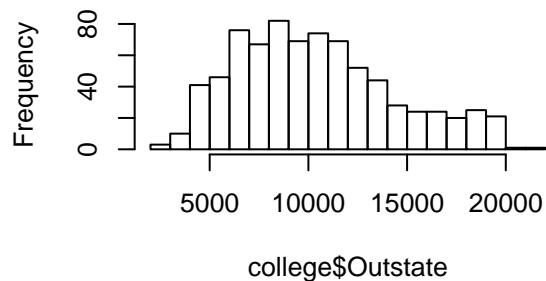
Histogram of college\$Apps



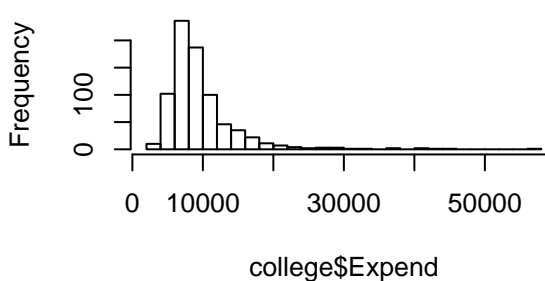
Histogram of college\$Room.Board

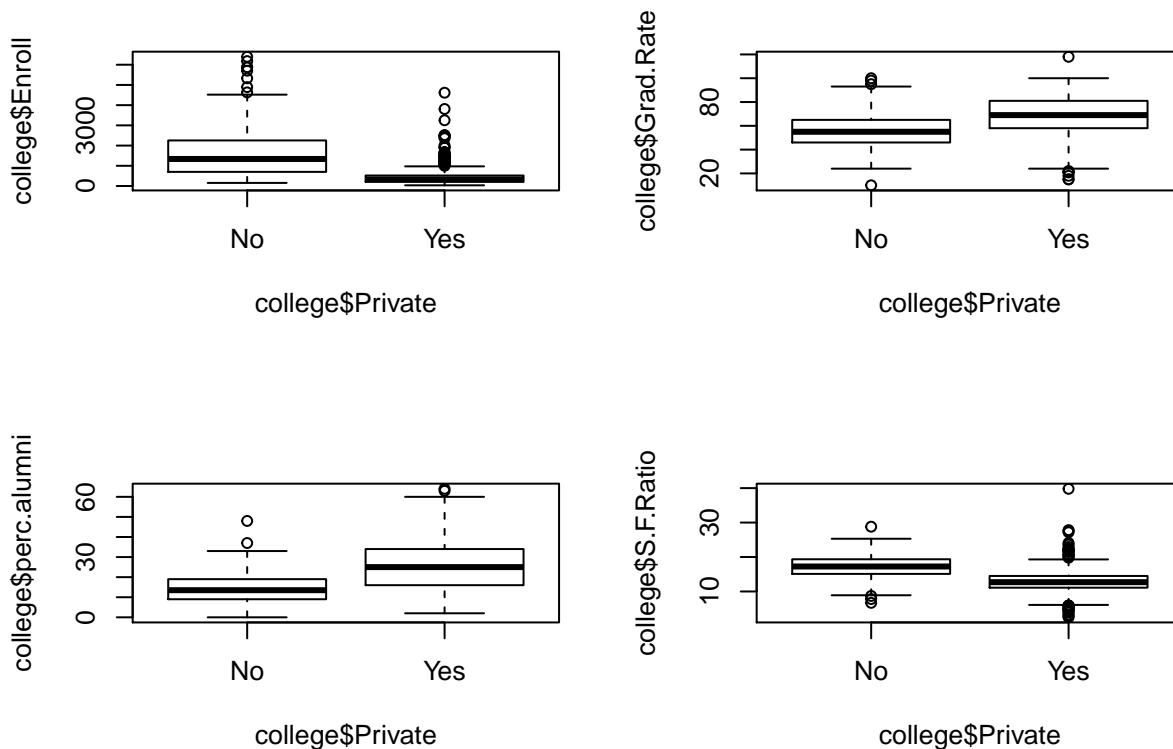


Histogram of college\$Outstate



Histogram of college\$Expend





Private colleges have a lower enrollment rate than public colleges, which is no surprise. They also have a slightly higher graduation rate, which may be the result of higher tuition or student investment in their education, reflected by their choice of private over public. Private colleges also have a higher percentage of donating alumni, which could be the result of their commonly stronger alumni networks. Finally, private colleges have a lower student to faculty ratio, which reflects their lower enrollment rates compared to public colleges.

Q9 Part a

```
## 'data.frame':   392 obs. of  9 variables:
##  $ mpg       : num  18 15 18 16 17 15 14 14 15 ...
##  $ cylinders  : num   8  8  8  8  8  8  8  8  8 ...
##  $ displacement: num  307 350 318 304 302 429 454 440 455 390 ...
##  $ horsepower  : num  130 165 150 150 140 198 220 215 225 190 ...
##  $ weight       : num 3504 3693 3436 3433 3449 ...
##  $ acceleration: num   12 11.5 11 12 10.5 10 9 8.5 10 8.5 ...
##  $ year         : num  70 70 70 70 70 70 70 70 70 70 ...
##  $ origin       : num   1  1  1  1  1  1  1  1  1 ...
##  $ name         : Factor w/ 304 levels "amc ambassador brougham",...: 49 36 231 14 161 141 54 223 241 ...
```

Qualitative predictors are name and origin, and all others are quantitative.

Q9 Part b

```
##      mpg cylinders displacement horsepower weight acceleration year
## min   9.0          3           68          46    1613          8.0    70
## max  46.6          8          455          230    5140          24.8    82
```

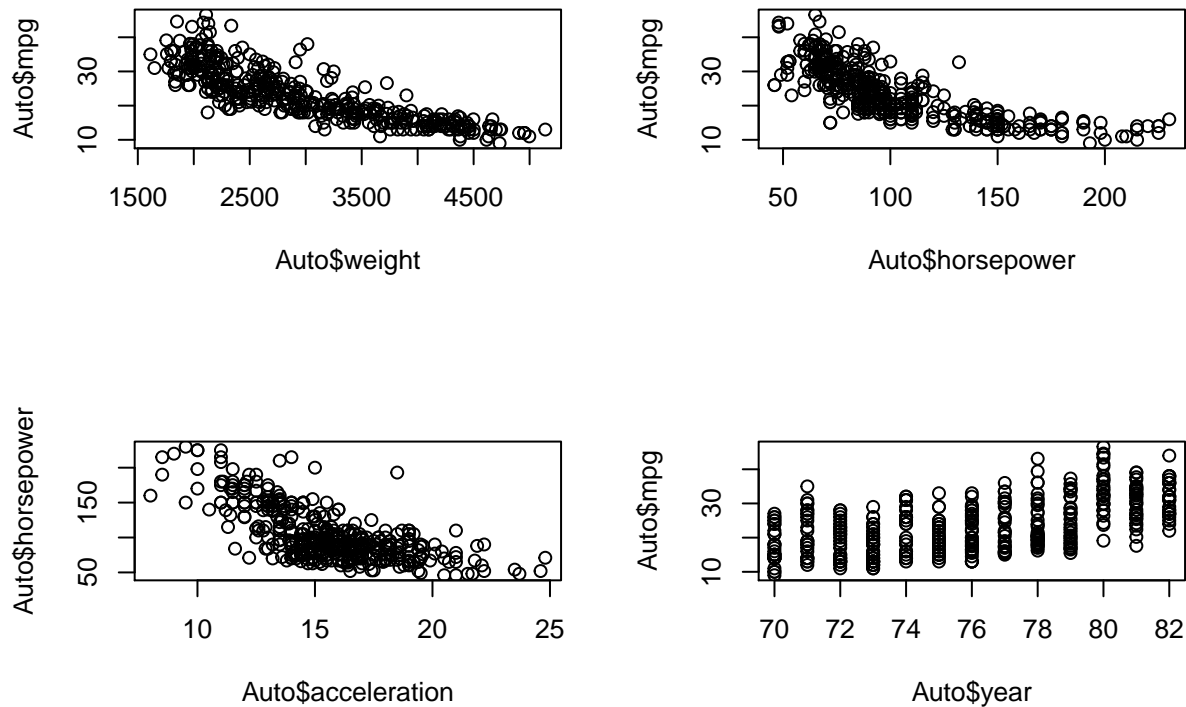
Q9 Part c

```
##      mpg cylinders displacement horsepower    weight acceleration
## means 23.445918  5.471939      194.412  104.46939 2977.5842    15.541327
## sds   7.805007  1.705783      104.644   38.49116  849.4026     2.758864
##      year
## means 75.979592
## sds   3.683737
```

Q9 Part d

```
##      mpg cylinders displacement horsepower    weight
## min   11.000000  3.000000      68.00000   46.00000 1649.0000
## max   46.600000  8.000000     455.00000  230.00000 4997.0000
## newmeans 24.404430  5.373418   187.24051  100.72152 2935.9715
## newsds   7.867283  1.654179    99.67837   35.70885  811.3002
##      acceleration    year
## min      8.500000  70.000000
## max     24.800000  82.000000
## newmeans 15.726899  77.145570
## newsds   2.693721  3.106217
```

Q9 Part e



Miles per gallon is inversely related to the weight, which is intuitive as more weight requires more fuel per gallon, lowering efficiency. Miles per gallon is also inversely related to horsepower, which indicates that more powerful engines are less efficient, which is also intuitive. Engine horsepower is inversely related to acceleration rate, which is again obvious. Finally, miles per gallon seems to slowly increase with year, which indicates that newer cars are more fuel efficient.

Q9 Part f

The plots suggest that weight and horsepower might be good indicators of miles per gallon, as they both have strong negative linear relationships with mpg. Year is a weaker predictor of miles per gallon, as there may not be a large, if significant difference in miles per gallon of older vehicles vs newer vehicles.