HW6Stat2094

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```
head(mtcars)
```

```
##                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
## Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
## Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
## Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
## Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
## Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
## Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

```
summary(mtcars)
```

```
##       mpg             cyl             disp             hp       
##  Min.   :10.40   Min.   :4.000   Min.   : 71.1   Min.   : 52.0  
##  1st Qu.:15.43   1st Qu.:4.000   1st Qu.:120.8   1st Qu.: 96.5  
##  Median :19.20   Median :6.000   Median :196.3   Median :123.0  
##  Mean   :20.09   Mean   :6.188   Mean   :230.7   Mean   :146.7  
##  3rd Qu.:22.80   3rd Qu.:8.000   3rd Qu.:326.0   3rd Qu.:180.0  
##  Max.   :33.90   Max.   :8.000   Max.   :472.0   Max.   :335.0  
##       drat             wt             qsec             vs        
##  Min.   :2.760   Min.   :1.513   Min.   :14.50   Min.   :0.0000  
##  1st Qu.:3.080   1st Qu.:2.581   1st Qu.:16.89   1st Qu.:0.0000  
##  Median :3.695   Median :3.325   Median :17.71   Median :0.0000  
##  Mean   :3.597   Mean   :3.217   Mean   :17.85   Mean   :0.4375  
##  3rd Qu.:3.920   3rd Qu.:3.610   3rd Qu.:18.90   3rd Qu.:1.0000  
##  Max.   :4.930   Max.   :5.424   Max.   :22.90   Max.   :1.0000  
##        am              gear            carb      
##  Min.   :0.0000   Min.   :3.000   Min.   :1.000  
##  1st Qu.:0.0000   1st Qu.:3.000   1st Qu.:2.000  
##  Median :0.0000   Median :4.000   Median :2.000  
##  Mean   :0.4062   Mean   :3.688   Mean   :2.812  
##  3rd Qu.:1.0000   3rd Qu.:4.000   3rd Qu.:4.000  
##  Max.   :1.0000   Max.   :5.000   Max.   :8.000
```

```
mtcars$cyl = factor(mtcars$cyl)
mtcars$vs = factor(mtcars$vs)
mtcars$am = factor(mtcars$am)
mtcars$gear = factor(mtcars$gear)
mtcars$carb = factor(mtcars$carb)
summary(mtcars)
```

```
##       mpg        cyl         disp             hp             drat
##  Min.   :10.40   4:11   Min.   : 71.1   Min.   : 52.0   Min.   :2.760
##  1st Qu.:15.43   6: 7   1st Qu.:120.8   1st Qu.: 96.5   1st Qu.:3.080
##  Median :19.20   8:14   Median :196.3   Median :123.0   Median :3.695
##  Mean   :20.09          Mean   :230.7   Mean   :146.7   Mean   :3.597
##  3rd Qu.:22.80          3rd Qu.:326.0   3rd Qu.:180.0   3rd Qu.:3.920
##  Max.   :33.90          Max.   :472.0   Max.   :335.0   Max.   :4.930
##        wt             qsec       vs     am     gear   carb
##  Min.   :1.513   Min.   :14.50   0:18   0:19   3:15   1: 7
##  1st Qu.:2.581   1st Qu.:16.89   1:14   1:13   4:12   2:10
##  Median :3.325   Median :17.71                 5: 5   3: 3
##  Mean   :3.217   Mean   :17.85                        4:10
##  3rd Qu.:3.610   3rd Qu.:18.90                        6: 1
##  Max.   :5.424   Max.   :22.90                        8: 1
```

The difference between the summary output between the first part and the second part is that the factor variables in the second part are organized by how many observations there were for each categorical variable, rather than showing averages.

```
sd(mtcars$mpg)
```

```
## [1] 6.026948
```

```
sd(mtcars$disp)
```

```
## [1] 123.9387
```

```
sd(mtcars$hp)
```

```
## [1] 68.56287
```

```
sd(mtcars$drat)
```

```
## [1] 0.5346787
```

```
sd(mtcars$wt)
```

```
## [1] 0.9784574
```

```
sd(mtcars$qsec)
```

```
## [1] 1.786943
```

```
table(mtcars$cyl)
```

```
##
##  4  6  8
## 11  7 14
```

```r
table(mtcars$vs)
```

```
##
##  0  1
## 18 14
```

```r
table(mtcars$am)
```

```
##
##  0  1
## 19 13
```

```r
table(mtcars$gear)
```

```
##
##  3  4  5
## 15 12  5
```

```r
table(mtcars$carb)
```

```
##
##  1  2  3  4  6  8
##  7 10  3 10  1  1
```

```r
aggregate(mtcars$mpg, by = list(mtcars$cyl), FUN = mean)
```

```
##   Group.1        x
## 1       4 26.66364
## 2       6 19.74286
## 3       8 15.10000
```

```r
table(mtcars$vs, mtcars$am)
```

```
##
##      0  1
##   0 12  6
##   1  7  7
```

```r
t = table(mtcars$vs, mtcars$am)
prop.table(t)
```

```
##
##           0       1
##   0 0.37500 0.18750
##   1 0.21875 0.21875
```