ACADGILD

SESSION 7: Basic Statistics

Assignment 3

PROBLEM STATEMENT

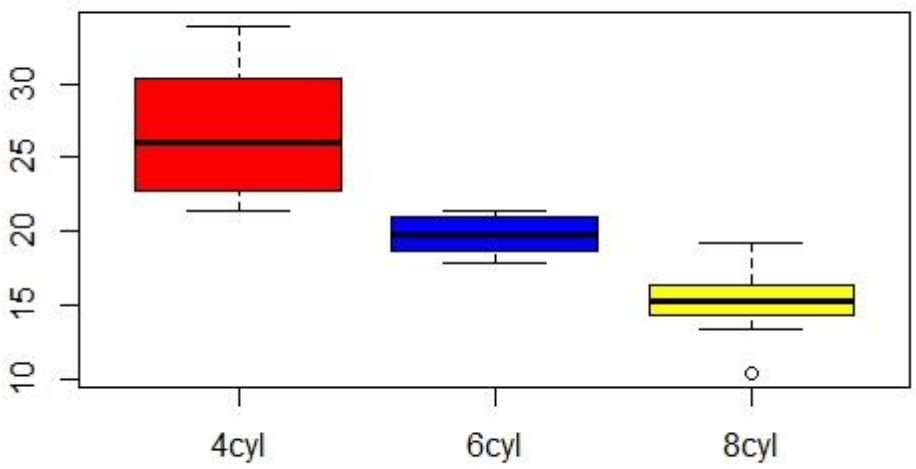
1. Create a **box and whisker plot** by class using **mtcars** dataset.

SOLUTION

```
summary(cars)
boxplot(mtcars$mpg)
boxplot(mtcars$mpg, horizontal = TRUE)
boxplot(mtcars$mpg, col = 'blue')
boxplot(mtcars$mpg, border = 'red')
boxplot(mtcars$mpg, range = 0)
boxplot(mtcars$mpg, range = 1)
boxplot(mtcars$mpg, range = 1, outline = FALSE)
boxplot(mtcars$mpg ~ mtcars$cyl)
mpg_split <- split(mtcars$mpg, mtcars$cyl)
mpg_split
mpg_4 <- mpg_split$`4`
mpg_6 <- mpg_split$`6`
mpg_8 <- mpg_split$`8`
boxplot(mpg_4, mpg_6, mpg_8)
boxplot(mtcars$mpg ~ mtcars$cyl, col = 'blue')
boxplot(mtcars$mpg ~ mtcars$cyl,col = c('red', 'blue', 'yellow'))
boxplot(mtcars$mpg ~ mtcars$cyl, range = 1, outline = TRUE,horizontal =
TRUE, col = c('red', 'blue', 'yellow'), main = 'Miles Per Gallon by Cylinders',ylab
= 'Number of Cylinders', xlab = 'Miles Per Gallon',names = c('Four', 'Six',
'Eight'))

library(ggplot2)
library(xtable)
head(mtcars)
mtcars$cyl <- factor(mtcars$cyl)
```

```
mtcars$labels <- row.names(mtcars)
summary(mtcars)
library(gridExtra)
library(ggplot2)
library(ggthemes)
library(tufte)
p <- ggplot(data = mtcars, aes(x = cyl, y = mpg, fill = cyl))

p <- p + geom_boxplot() +ggtitle("Car Milage Data") +labs(x = "Number of
Cylinders", y = "Miles Per Gallon") +scale_fill_discrete(name = "Cylinders")

p

p <- ggplot(mtcars, aes(x = wt, y = mpg)) +geom_point() +ggtitle("Cars")
p2 <- ggplot(mtcars, aes(x = wt, y = mpg, colour = factor(gear))) +geom_point()
+ggtitle("Cars")

p3 <- p2 + facet_wrap(~ am)p + geom_rangeframe() +theme_tufte() +
scale_x_continuous(breaks = extended_range_breaks()(mtcars$wt))
+scale_y_continuous(breaks = extended_range_breaks()(mtcars$mpg))

p4 <- ggplot(mtcars, aes(factor(cyl), mpg))p4 + theme_tufte(ticks=FALSE) +
geom_tufteboxplot()p4 + theme_tufte(ticks=FALSE)
+geom_tufteboxplot(median.type = "line")p4 + theme_tufte(ticks=FALSE)
+geom_tufteboxplot(median.type = "line", whisker.type = 'point', hoffset = 0)p4
+ theme_tufte(ticks=FALSE) +geom_tufteboxplot(median.type = "line",
whisker.type = 'line', hoffset = 0, width = 3)
```

```
> summary(cars)
      X1                  mpg              cyl              disp
 Length:32          Min.   :10.40   Min.   :4.000   Min.   : 71.1
 Class :character   1st Qu.:15.43   1st Qu.:4.000   1st Qu.:120.8
 Mode  :character   Median :19.20   Median :6.000   Median :196.3
                    Mean   :20.09   Mean   :6.188   Mean   :230.7
                    3rd Qu.:22.80   3rd Qu.:8.000   3rd Qu.:326.0
                    Max.   :33.90   Max.   :8.000   Max.   :472.0
       hp             drat             wt             qsec             vs
 Min.   : 52.0   Min.   :2.760   Min.   :1.513   Min.   :14.50   Min.   :0.0000
 1st Qu.: 96.5   1st Qu.:3.080   1st Qu.:2.581   1st Qu.:16.89   1st Qu.:0.0000
 Median :123.0   Median :3.695   Median :3.325   Median :17.71   Median :0.0000
 Mean   :146.7   Mean   :3.597   Mean   :3.217   Mean   :17.85   Mean   :0.4375
 3rd Qu.:180.0   3rd Qu.:3.920   3rd Qu.:3.610   3rd Qu.:18.90   3rd Qu.:1.0000
 Max.   :335.0   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
> boxplot(mtcars$mpg)
> boxplot(mtcars$mpg, horizontal = TRUE)
> boxplot(mtcars$mpg, col = 'blue')
> boxplot(mtcars$mpg, border = 'red')
> boxplot(mtcars$mpg, range = 0)
> boxplot(mtcars$mpg, range = 1)
> boxplot(mtcars$mpg, range = 1, outline = FALSE)
> boxplot(mtcars$mpg ~ mtcars$cyl)
> mpg_split <- split(mtcars$mpg, mtcars$cyl)
> mpg_split
$`4`
 [1] 22.8 24.4 22.8 32.4 30.4 33.9 21.5 27.3 26.0 30.4 21.4

$`6`
[1] 21.0 21.0 21.4 18.1 19.2 17.8 19.7

$`8`
 [1] 18.7 14.3 16.4 17.3 15.2 10.4 10.4 14.7 15.5 15.2 13.3 19.2 15.8 15.0

> mpg_4 <- mpg_split$`4`
> mpg_6 <- mpg_split$`6`
> mpg_8 <- mpg_split$`8`
> boxplot(mpg_4, mpg_6, mpg_8)
> boxplot(mtcars$mpg ~ mtcars$cyl, col = 'blue')
> boxplot(mtcars$mpg ~ mtcars$cyl,col = c('red', 'blue', 'yellow'))
```


10
15
20
25
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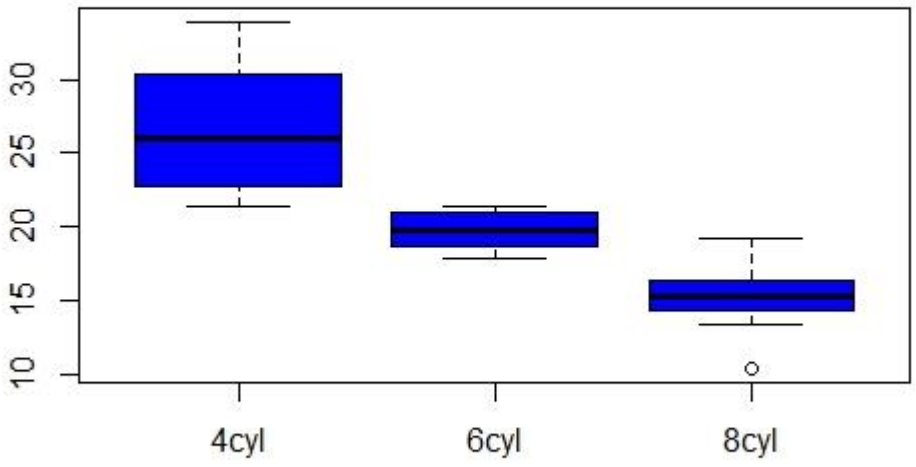
4cyl
6cyl
8cyl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4cyl
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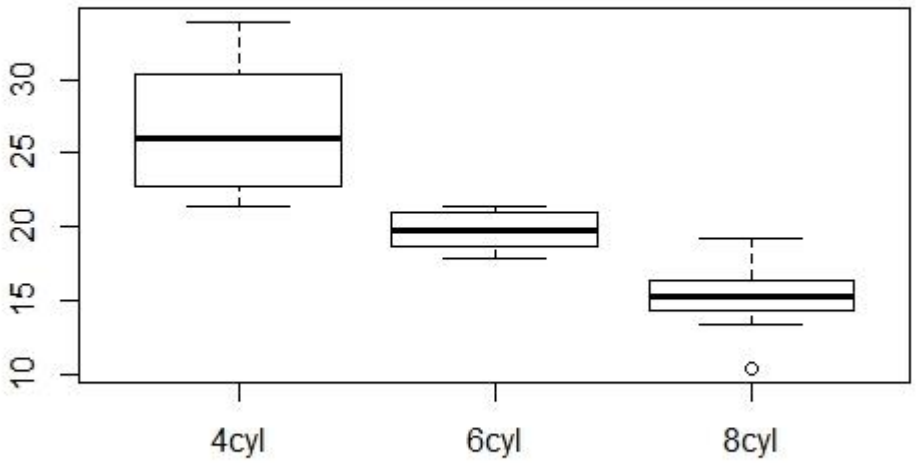
8cyl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4cyl
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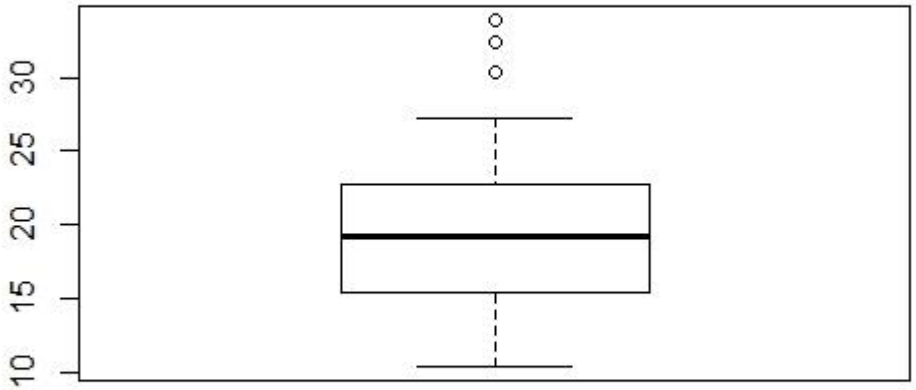
8cyl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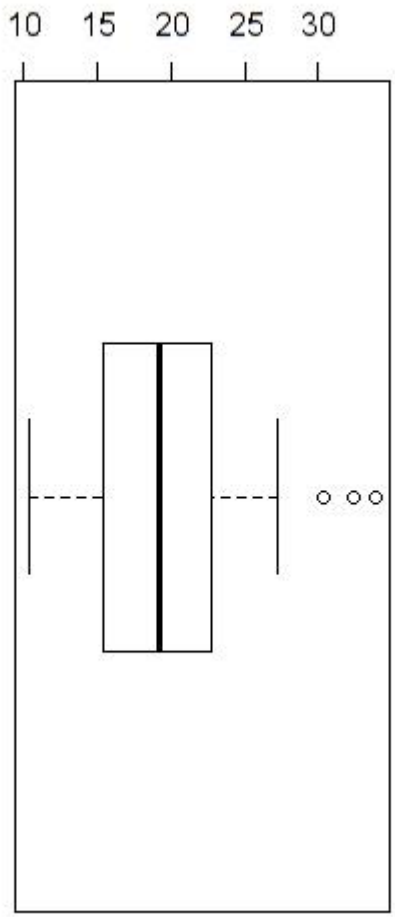
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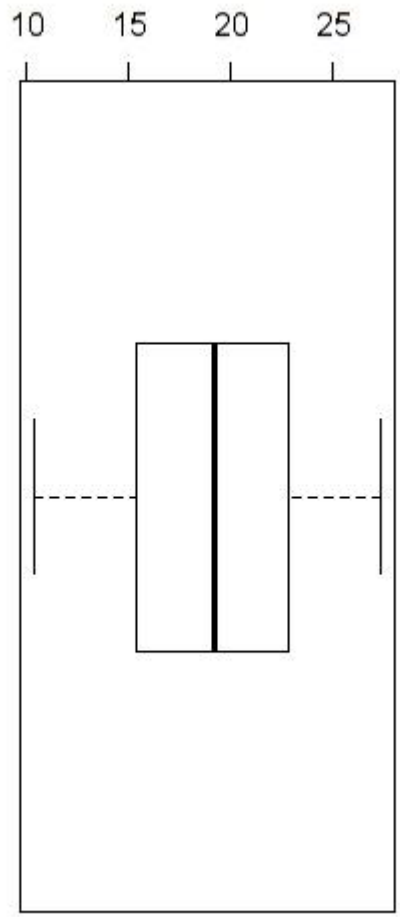
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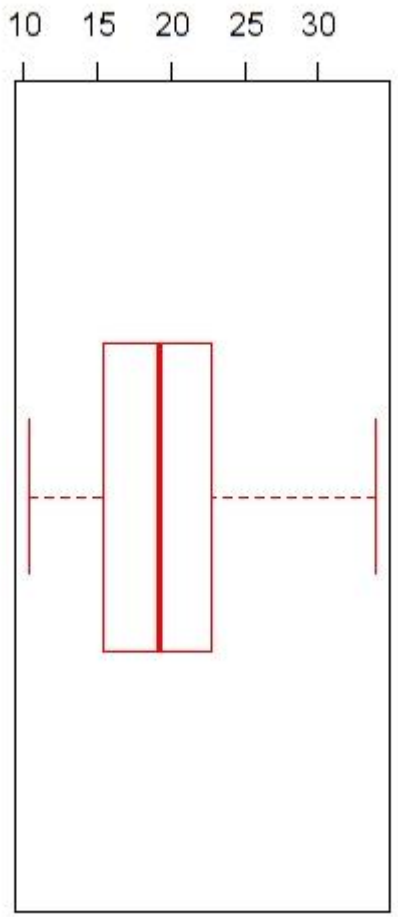
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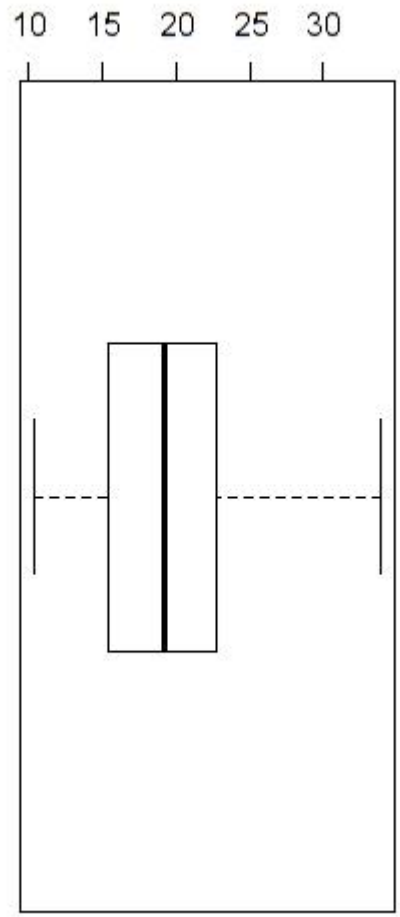
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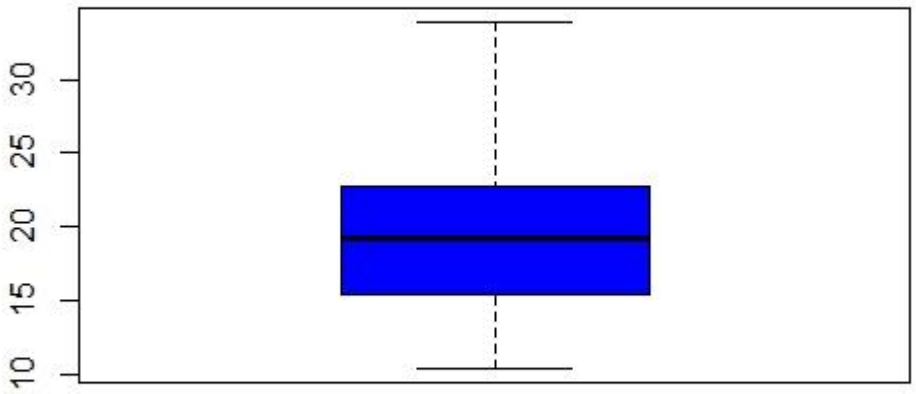
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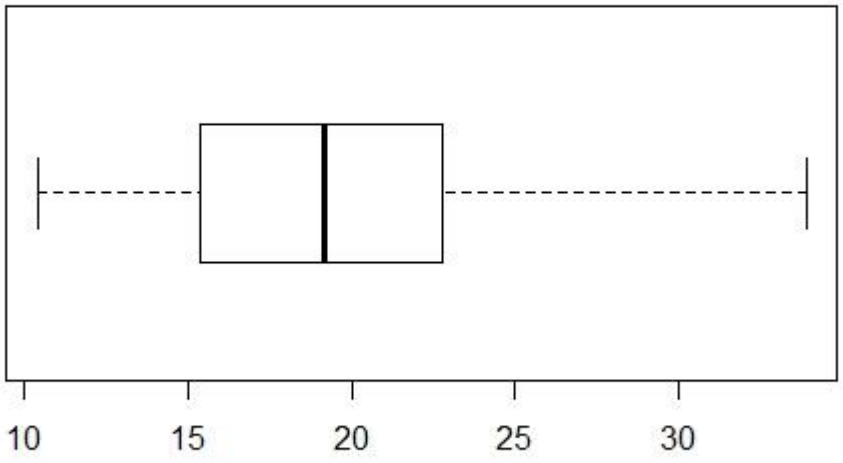
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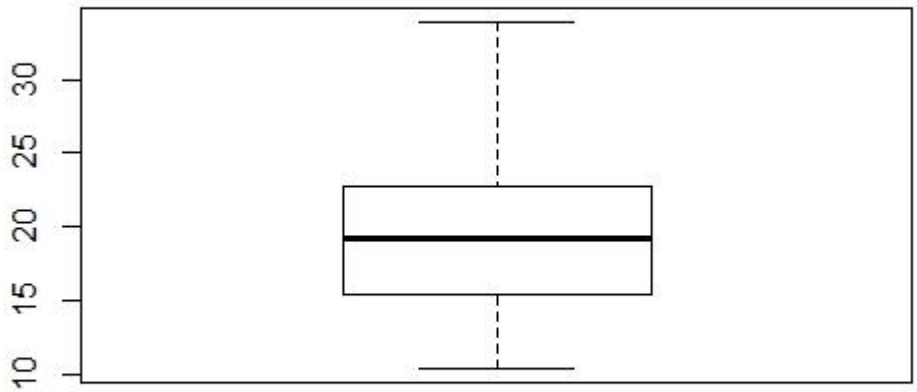
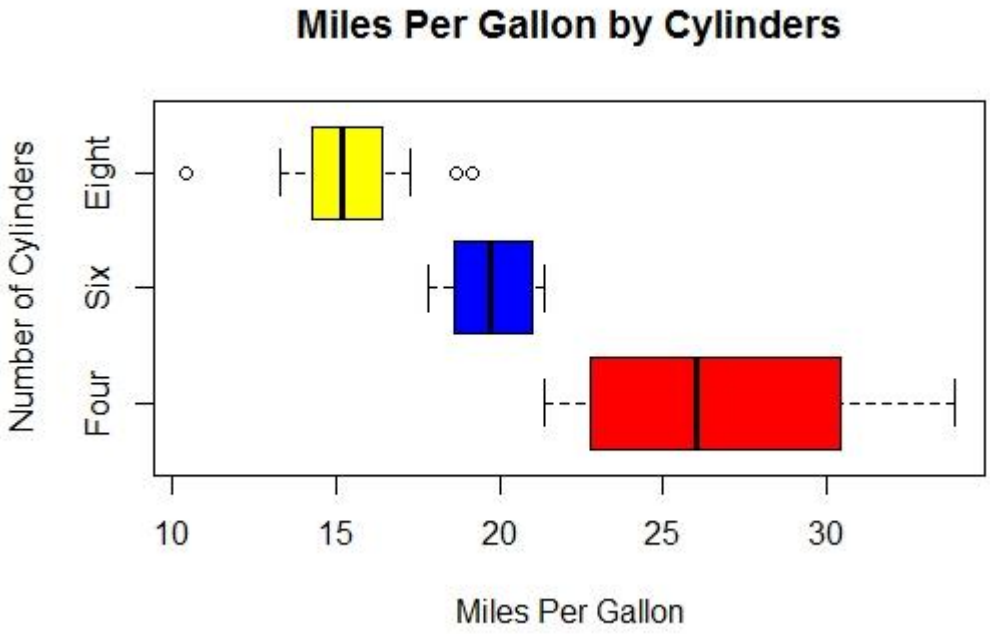
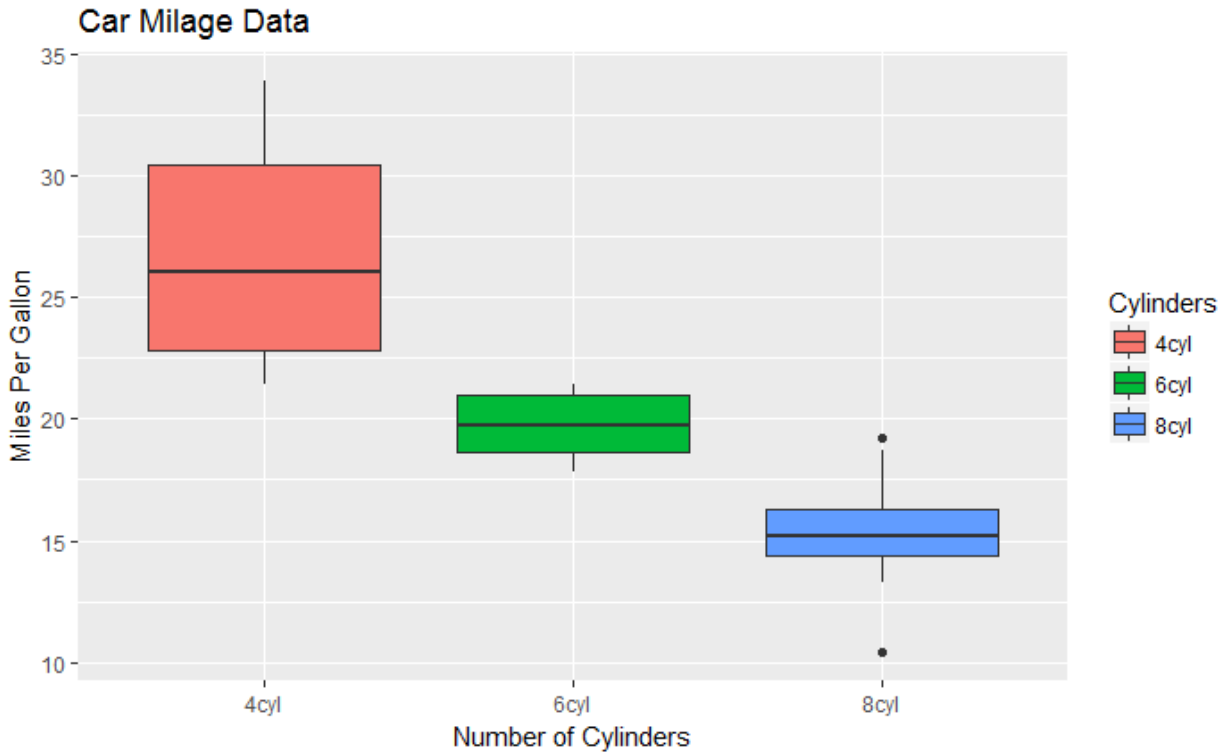
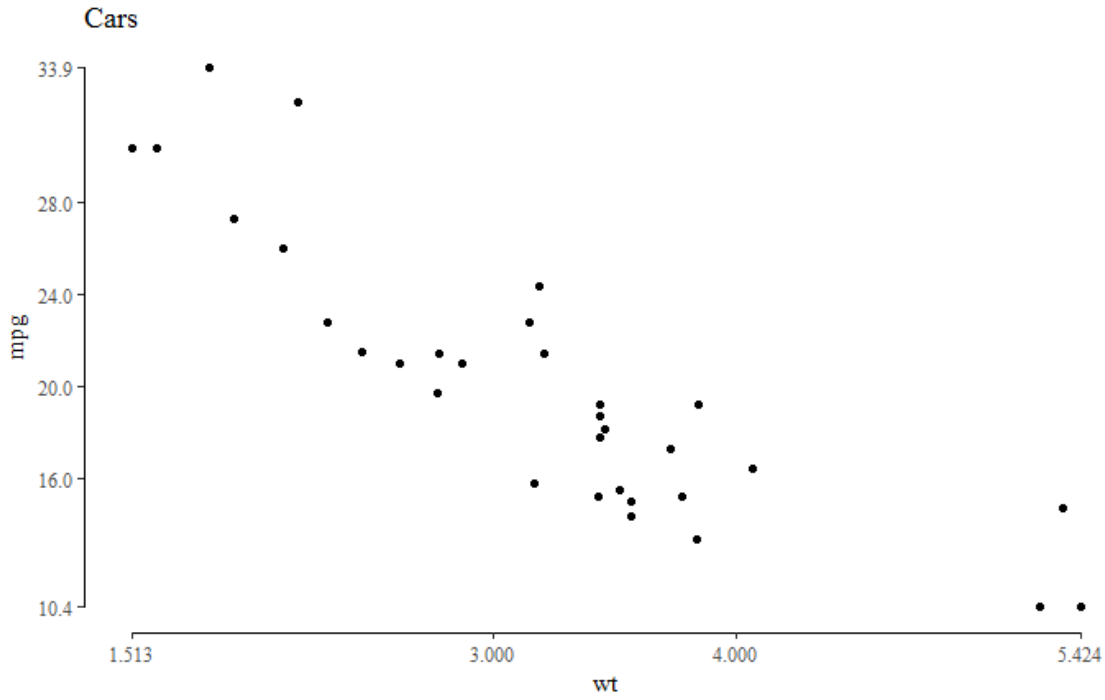




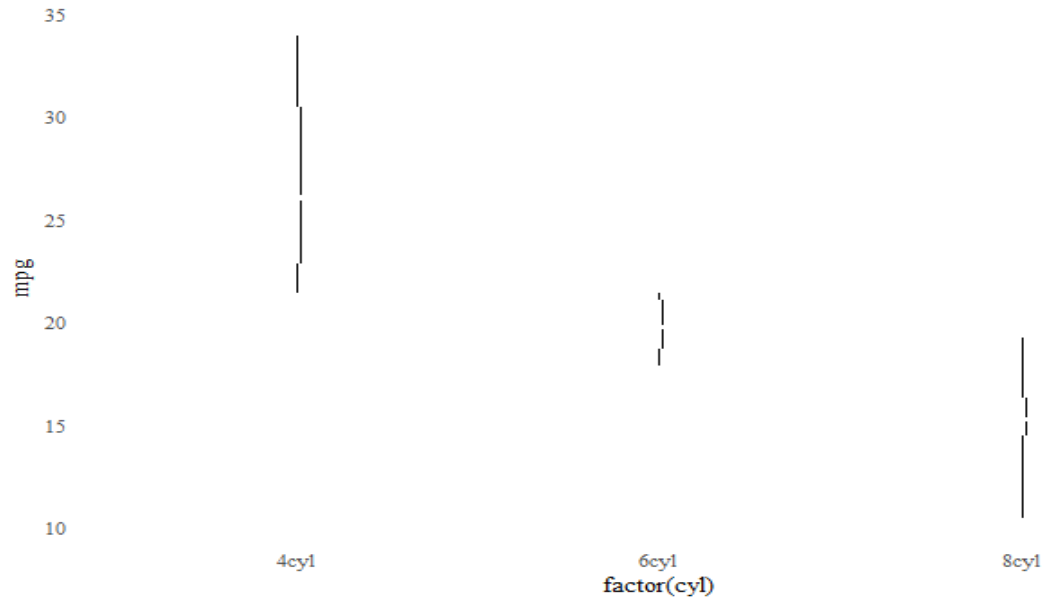

```
> library(ggplot2)
> library(xtable)
> head(mtcars)
# A tibble: 6 x 12
  X1                mpg   cyl  disp    hp  drat    wt  qsec    vs    am  gear
carb
  <chr>           <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
<dbl>
1 Mazda RX4        21       6   160   110  3.9   2.62  16.5     0     1     4
4
2 Mazda RX4 Wag    21       6   160   110  3.9   2.88  17.0     0     1     4
4
3 Datsun 710       22.8     4   108    93  3.85  2.32  18.6     1     1     4
1
```

```
4 Hornet 4 Drive   21.4     6   258   110  3.08  3.22  19.4     1     0     3
1
5 Hornet Sportab~  18.7     8   360   175  3.15  3.44  17.0     0     0     3
2
6 Valiant          18.1     6   225   105  2.76  3.46  20.2     1     0     3
1
> mtcars$cyl <- factor(mtcars$cyl)
> mtcars$labels <- row.names(mtcars)
> summary(mtcars)
      X1                 mpg        cyl         disp             hp
 Length:32          Min.   :10.40   4:11   Min.   : 71.1   Min.   : 52.0
 Class :character   1st Qu.:15.43   6: 7   1st Qu.:120.8   1st Qu.: 96.5
 Mode  :character   Median :19.20   8:14   Median :196.3   Median :123.0
                    Mean   :20.09          Mean   :230.7   Mean   :146.7
                    3rd Qu.:22.80          3rd Qu.:326.0   3rd Qu.:180.0
                    Max.   :33.90          Max.   :472.0   Max.   :335.0
      drat             wt             qsec             vs                am
 Min.   :2.760   Min.   :1.513   Min.   :14.50   Min.   :0.0000   Min.
:0.0000
 1st Qu.:3.080   1st Qu.:2.581   1st Qu.:16.89   1st Qu.:0.0000   1st
Qu.:0.0000
 Median :3.695   Median :3.325   Median :17.71   Median :0.0000   Median
:0.0000
 Mean   :3.597   Mean   :3.217   Mean   :17.85   Mean   :0.4375   Mean
:0.4062
 3rd Qu.:3.920   3rd Qu.:3.610   3rd Qu.:18.90   3rd Qu.:1.0000   3rd
Qu.:1.0000
 Max.   :4.930   Max.   :5.424   Max.   :22.90   Max.   :1.0000   Max.
:1.0000
      gear            carb          labels
 Min.   :3.000   Min.   :1.000   Length:32
 1st Qu.:3.000   1st Qu.:2.000   Class :character
 Median :4.000   Median :2.000   Mode  :character
 Mean   :3.688   Mean   :2.812
 3rd Qu.:4.000   3rd Qu.:4.000
 Max.   :5.000   Max.   :8.000
> library(gridExtra)
> library(ggplot2)
> library(ggthemes)
> library(tufte)
> p <- ggplot(data = mtcars, aes(x = cyl, y = mpg, fill = cyl))
> p <- p + geom_boxplot() +ggtitle("Car Milage Data") +labs(x = "Number of
Cylinders", y = "Miles Per Gallon") +scale_fill_discrete(name = "Cylinders")
> p
> p <- ggplot(mtcars, aes(x = wt, y = mpg)) +geom_point() +ggtitle("Cars")
> p2 <- ggplot(mtcars, aes(x = wt, y = mpg, colour = factor(gear)))
+geom_point() +ggtitle("Cars")
> p3 <- p2 + facet_wrap(~ am)p + geom_rangeframe() +theme_tufte() +
scale_x_continuous(breaks = extended_range_breaks()(mtcars$wt))
+scale_y_continuous(breaks = extended_range_breaks()(mtcars$mpg))
> p4 <- ggplot(mtcars, aes(factor(cyl), mpg))p4 + theme_tufte(ticks=FALSE) +
geom_tufteboxplot()p4 + theme_tufte(ticks=FALSE)
+geom_tufteboxplot(median.type = "line")p4 + theme_tufte(ticks=FALSE)
+geom_tufteboxplot(median.type = "line", whisker.type = 'point', hoffset =
0)p4 + theme_tufte(ticks=FALSE) +geom_tufteboxplot(median.type = "line",
whisker.type = 'line', hoffset = 0, width = 3)
```






```
p3 <- p2 + facet_wrap(~ am)p + geom_rangeframe() +theme_tufte() +
scale_x_continuous(breaks = extended_range_breaks()(mtcars$wt)) +
scale_y_continuous(breaks = extended_range_breaks()(mtcars$mpg))
```




```
p4 <- ggplot(mtcars, aes(factor(cyl), mpg))p4 + theme_tufte(ticks=FALSE) +
geom_tufteboxplot()p4 + theme_tufte(ticks=FALSE)
+geom_tufteboxplot(median.type = "line")p4 + theme_tufte(ticks=FALSE)
+geom_tufteboxplot(median.type = "line", whisker.type = 'point', hoffset =
0)p4 + theme_tufte(ticks=FALSE) +geom_tufteboxplot(median.type = "line",
whisker.type = 'line', hoffset = 0, width = 3)
```