

Assignment Number 1 - Part B

First load the required libraries

```
library(ggplot2)
library(datasets)
data(ToothGrowth)
```

Here are some basic exploratory data Analyses.

```
str(ToothGrowth)
```

```
## 'data.frame': 60 obs. of 3 variables:
## $ len : num 4.2 11.5 7.3 5.8 6.4 10 11.2 11.2 5.2 7 ...
## $ supp: Factor w/ 2 levels "OJ","VC": 2 2 2 2 2 2 2 2 2 2 ...
## $ dose: num 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 ...
```

```
head(ToothGrowth)
```

```
##      len supp dose
## 1  4.2   VC  0.5
## 2 11.5   VC  0.5
## 3  7.3   VC  0.5
## 4  5.8   VC  0.5
## 5  6.4   VC  0.5
## 6 10.0   VC  0.5
```

```
ToothGrowth$dose <- as.factor(ToothGrowth$dose)
table(ToothGrowth$supp, ToothGrowth$dose)
```

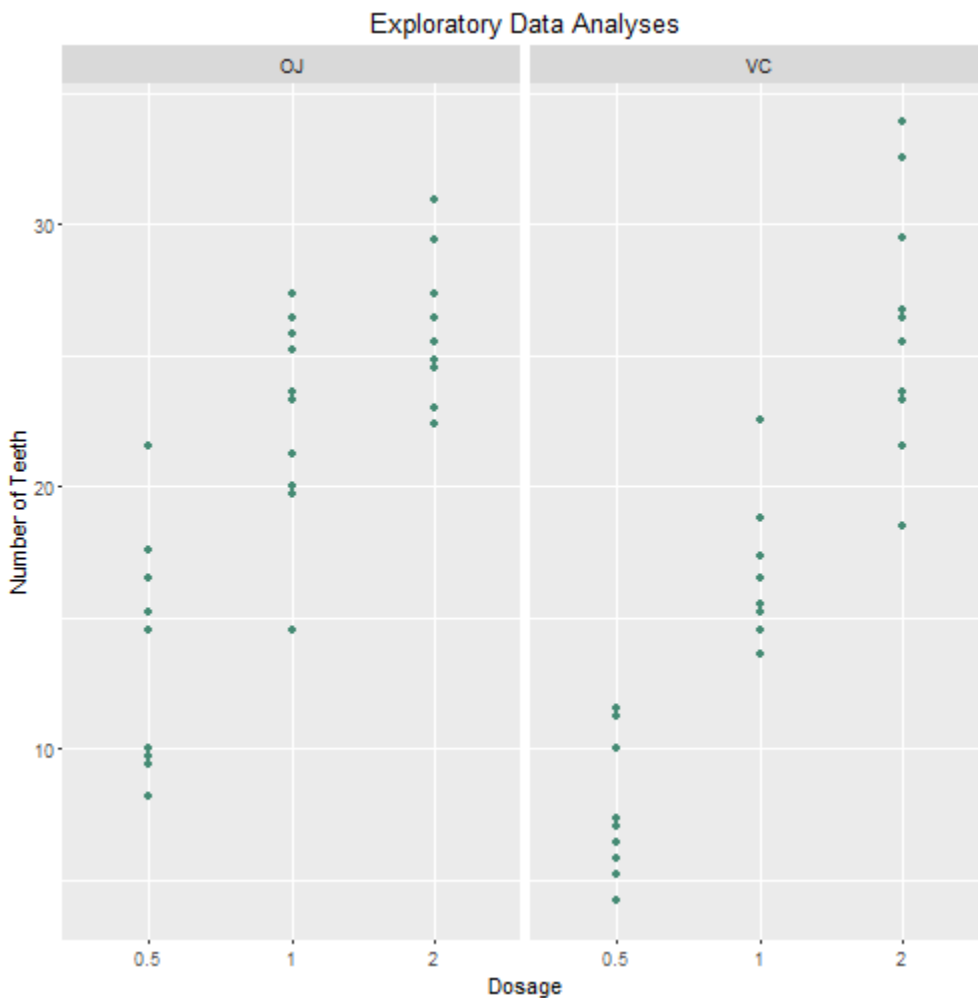
```
##
##      0.5  1  2
##   OJ  10 10 10
##   VC  10 10 10
```

```
summary(ToothGrowth)
```

```
##      len      supp      dose
## Min.   : 4.20   OJ: 30   0.5: 20
## 1st Qu.:13.07   VC: 30    1 : 20
## Median :19.25           2 : 20
## Mean   :18.81
## 3rd Qu.:25.27
## Max.   :33.90
```

A point chart to start visualizing the outcome of the data. We can get a general idea of what we may expect to see.

```
ggplot(ToothGrowth, aes(x=dose, y=len))+geom_point(color="aquamarine4")+facet_wrap(
  labs(x="Dosage", y="Number of Teeth")+
  ggtitle("Exploratory Data Analyses"))
```



We perform a variety of t-tests one for each dosage level.

95% confidence interval with dosage of .5

```
AC = ToothGrowth$len[ToothGrowth$supp == 'VC' & ToothGrowth$dose == 0.5]
OJ = ToothGrowth$len[ToothGrowth$supp == 'OJ' & ToothGrowth$dose == 0.5]
t.test(AC, OJ)
```

Confidence interval: -8.780943 to -1.719057 Does not contain 0, therefore there is a 95% confidence in the difference between AC and OJ.

95% confidence interval with dosage of 1

```
AC = ToothGrowth$len[ToothGrowth$supp == 'VC' & ToothGrowth$dose == 1]
OJ = ToothGrowth$len[ToothGrowth$supp == 'OJ' & ToothGrowth$dose == 1]
t.test(AC, OJ)
```

Confidence interval: -9.057852 to -2.802148 Does not contain 0, therefore there is a 95% confidence in the difference between AC and OJ.

95% confidence interval with dosage of 2

```
AC = ToothGrowth$I len[ToothGrowth$supp == ' VC' & ToothGrowth$dose == 2]
OJ = ToothGrowth$I len[ToothGrowth$supp == ' OJ' & ToothGrowth$dose == 2]
t.test(AC, OJ)
```

Confidence interval: -3.63807 to 3.79807 Does contain 0, therefore we can not be confident in a difference between AC and OJ.

##Conclusion

At doses of 0.5 and 1.0 we can be confident that the treatment has made a difference. However at the 2.0 dosage there is no evidence to suggest that the treatment made any difference.