Statistical Inference Project Part2

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OVERVIEW PART 2

Basic Inferential Data Analysis of "ToothGrowth data"

In the second portion of the project, we're going to analyze the ToothGrowth data in the R datasets package.

Setup work environment

```
## Warning: package 'knitr' was built under R version 3.3.3
```

```
## Warning: package 'ggplot2' was built under R version 3.3.3
```

```
## Warning: package 'dplyr' was built under R version 3.3.3
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
## Warning: package 'tidyr' was built under R version 3.3.3
```

First load data

```
data("ToothGrowth")
dtooth<-ToothGrowth
dftooth<-tbl_df(dtooth)
```

Overview/summary of "ToothGrowth"

```
summary(dftooth)
```

```
##       len        supp         dose
##  Min.   : 4.20   OJ:30   Min.   :0.500
##  1st Qu.:13.07   VC:30   1st Qu.:0.500
##  Median :19.25           Median :1.000
##  Mean   :18.81           Mean   :1.167
##  3rd Qu.:25.27           3rd Qu.:2.000
##  Max.   :33.90           Max.   :2.000
```

```
        dftooth
```

```
## # A tibble: 60 × 3
##      len   supp  dose
##    <dbl> <fctr> <dbl>
## 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
## 7   11.2     VC   0.5
## 8   11.2     VC   0.5
## 9    5.2     VC   0.5
## 10   7.0     VC   0.5
## # ... with 50 more rows
```

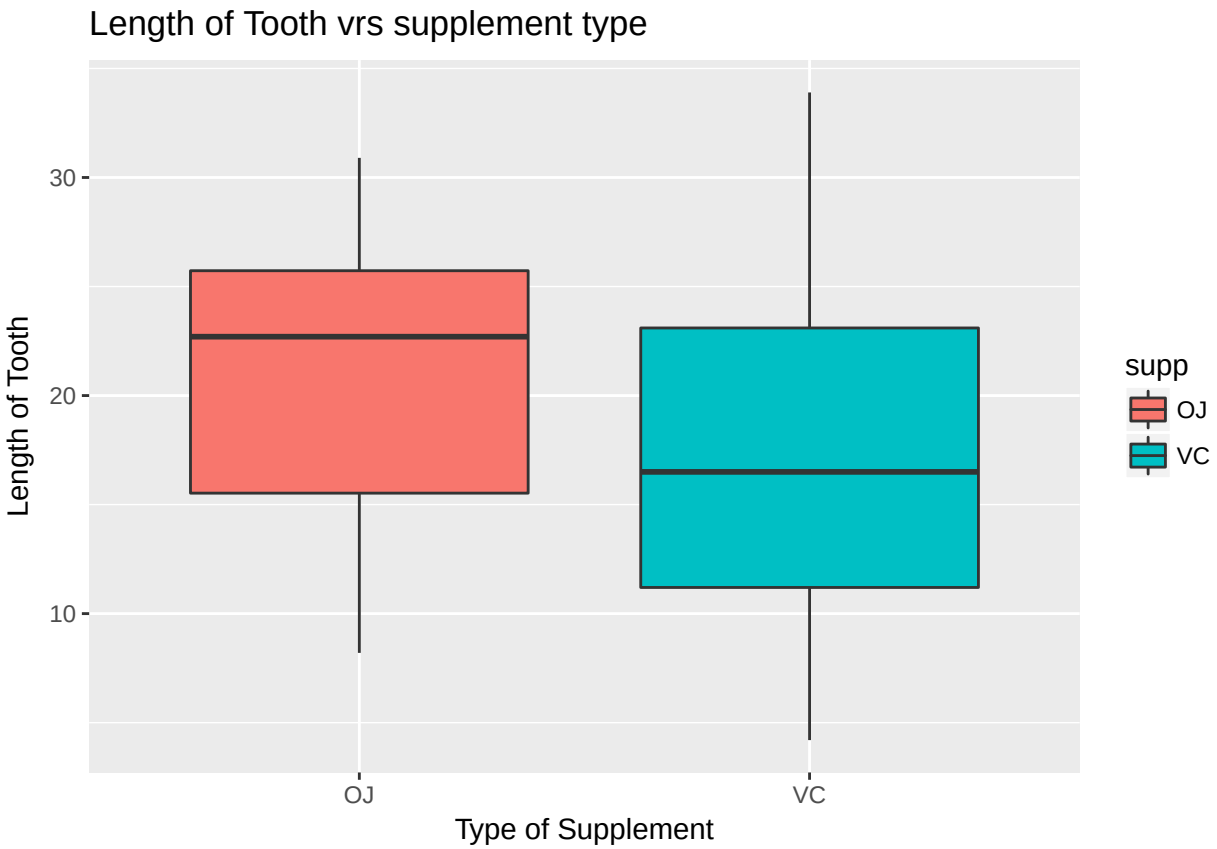
Find mean of supply mode:

```
        df2<-group_by(dtooth,supp)
        df3<-df3<-summarize(df2,length=mean(len))
        df3
```

```
## # A tibble: 2 × 2
##     supp   length
##   <fctr>    <dbl>
## 1     OJ 20.66333
## 2     VC 16.96333
```

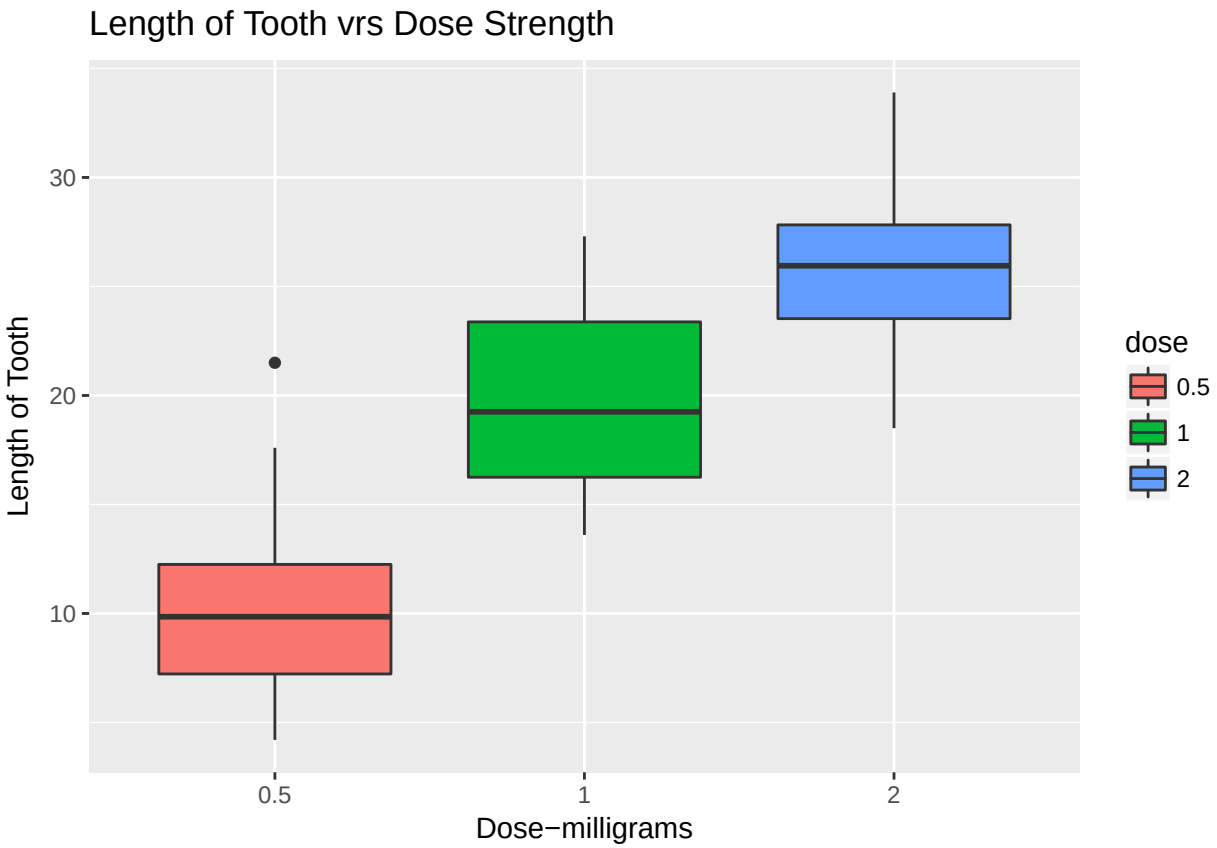
Plot 3 - Tooth size vrs kind of supplement used

```
        g3<-ggplot(dftooth, aes(x=supp,y=len))
        plot3<-g3+geom_boxplot(aes(fill=supp))+labs(x="Type of Supplement", y="Length of Tooth", title=
        plot3
```



Plot 4 - Tooth size vrs Vitamin Dose

```
dftooth$dose<-as.factor(dftooth$dose)
g4<-ggplot(dftooth, aes(x=dose,y=len))
plot4<-g4+geom_boxplot(aes(fill=dose))+labs(x="Dose-milligrams", y="Length of Tooth", title="Le
plot4
```



Use confidence intervals to compare tooth growth by supp.

```
t.test(dftooth$len[dftooth$supp=="OJ"], dftooth$len[dftooth$supp=="VC"], paired = FALSE, var.equ
```

```
## [1] -0.1710156  7.5710156
## attr(,"conf.level")
## [1] 0.95
```

The above confidence interval contains 0 therefore we can conclude that the supplement type has no impact on tooth growth

Use confidence intervals to compare tooth growth by dose.

```
t.test(dftooth$len[dftooth$dose==2], dftooth$len[dftooth$dose==1], paired = FALSE, var.equal = F
```

```
## [1] 3.733519 8.996481
## attr(,"conf.level")
## [1] 0.95
```

The above confience interval does not contain 0 therefore we can conclude that the supplement type does impact on tooth growth - the higher dose has higher growth rate.