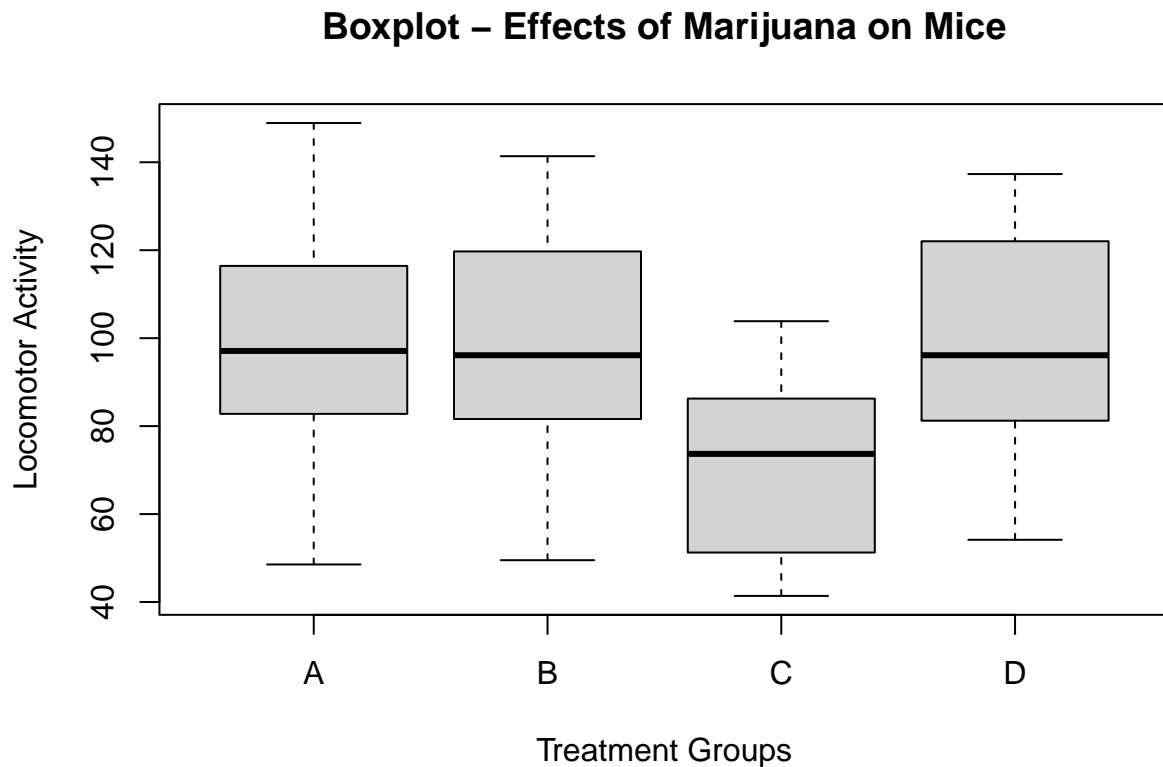# STAT6180 Statistical Analaysis

Harsh Patel (45979464)

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Question 1 (a).

```r
library(readxl)
mice_pot <- read_excel("C:/Users/harsh/Desktop/mice_pot.xlsx")
data <- data.frame(A = mice_pot$`Group 0.3`, B = mice_pot$`Group 1`, C = mice_pot$`Group 3`, D = mice_p
boxplot(data, main = "Boxplot - Effects of Marijuana on Mice", xlab = "Treatment Groups", ylab = "Locome
```

Boxplot – Effects of Marijuana on Mice

The boxes seems to be equally sized implying that the locomotor activity appear to have the same variability, although ther

Question 1 (b).

$H_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 \, H_1 \neq 0$ For Atleast One $\alpha_i, i = 1, 2, 3, 4$ Where α_i = level of activity as measured by the total distan

```
summary <-read.table('mice_pottxt.txt', header = TRUE)
summary.aov = aov(percent_of_act ~ group, data = summary)
summary(summary.aov)
```

```
##             Df Sum Sq Mean Sq F value Pr(>F)
## group        3   6329  2109.7   3.126 0.0357 *
## Residuals   42  28344   674.8
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Question 1 (c).

$H_0 : \mu_{3 \text{ doses as a whole}} = \mu_{3\text{mg/Kg}} H_1 : \mu_{3 \text{ doses as a whole}} \neq \mu_{3\text{mg/Kg}}$ Test Statistic Value $= 3.1222$ Degress of Freedom $= 44$ P-Val

```
library(readxl)
JointAnalysis <- read_excel("C:/Users/harsh/Desktop/JointAnalysis.xlsx")
t.test(JointAnalysis$`Group Joint`, JointAnalysis$`Group 3`, var.equal = TRUE)
```

```
##
##  Two Sample t-test
##
## data:  JointAnalysis$`Group Joint` and JointAnalysis$`Group 3`
## t = 3.1222, df = 44, p-value = 0.003169
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##   10.04934 46.64441
## sample estimates:
## mean of x mean of y
##   99.01474  70.66787
```
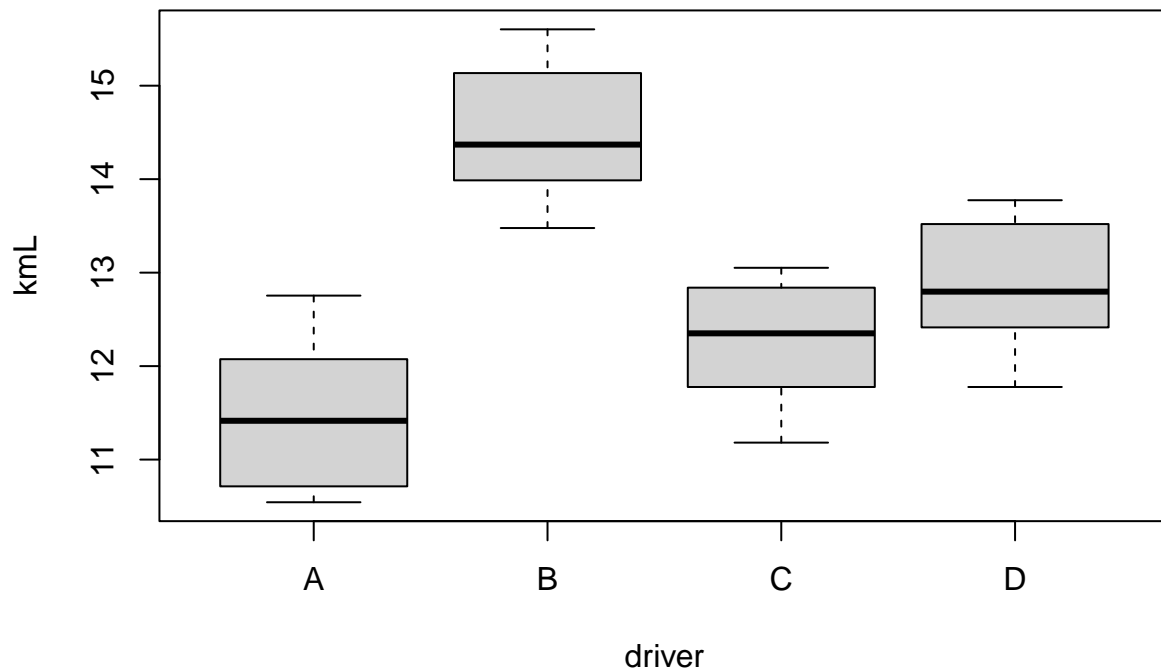
Question 2 (a).

This design is a balanced study as the number of replicates for each treatment is the same

```
kml <- read.table('kml.dat', header = TRUE)
kml.aov = aov(kmL ~ driver, data = kml)
qqnorm(kml.aov$residuals)
```

2
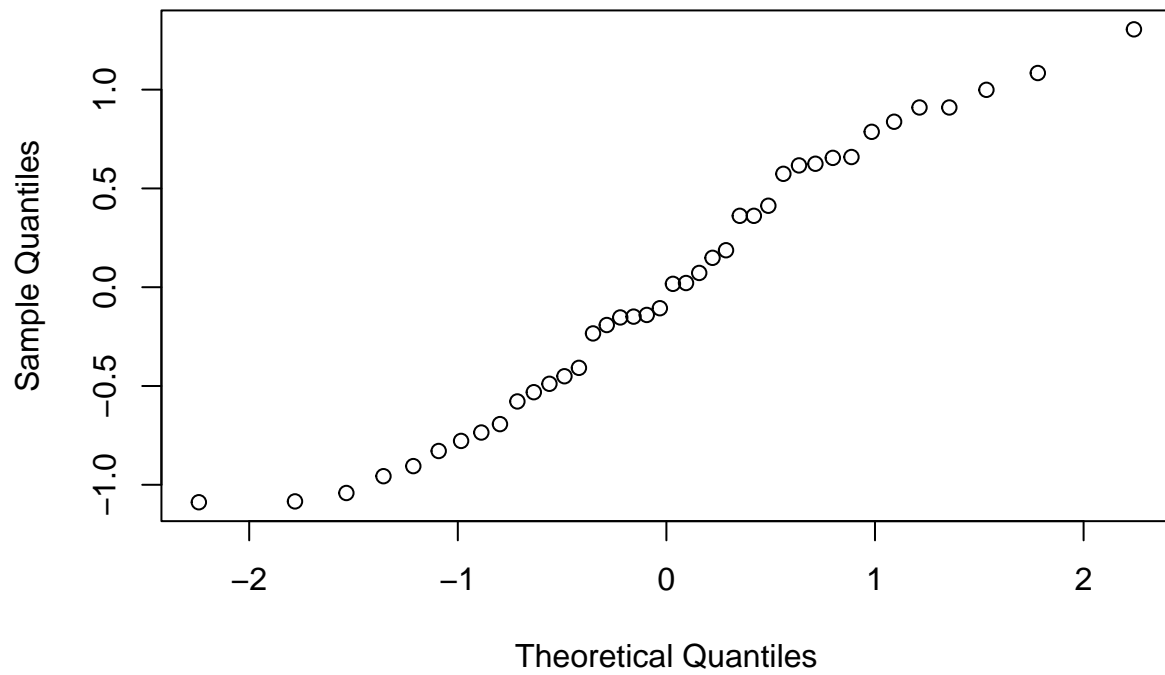
Normal Q–Q Plot


```
boxplot(kmL ~ driver, data = kml)
```

Question 2 (b). - See Above As Well

The Normal Q-Q plot of the residuals seems to show a strong linear trend meaning the residuals are closely normally distrib

Question 2 (c).

```
summary(kml.aov)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## driver        3  50.66  16.887   33.41 1.67e-10 ***
## Residuals    36  18.20   0.505
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

$H_0 : \mu_1 = \mu_2 = \mu_3 = \mu_4 H_1$: Not all means equalμ_i is effect of driver for production variationThe assumptions seem to be sa

Question 2 (d).

Conclude since P-Value < signficance level (0.05) therefore we have evidence to reject null in favour of alternativeHence evi