Statistic Tests

```
File <- read.csv("BostonHousing.csv")
View(File)
```

```
shapiro.test(File$MEDV)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  File$MEDV
## W = 0.91718, p-value = 4.941e-16
```

```
#T-Test
# 1.)
t.test(File$MEDV,mu=25,alternative="two.sided")
```

```
##
##  One Sample t-test
##
## data:  File$MEDV
## t = -6.0343, df = 505, p-value = 3.091e-09
## alternative hypothesis: true mean is not equal to 25
## 95 percent confidence interval:
##  21.72953 23.33608
## sample estimates:
## mean of x
##  22.53281
```

```
# 2.)
classA <-c(100,96,98,85,88,93,82,87,91,86,89)
classB <-c(100,100,99,99,98,97,75,61,59,48,77)
t.test(classA,classB)
```

```
##
##  Welch Two Sample t-test
##
## data:  classA and classB
## t = 1.2032, df = 11.666, p-value = 0.2528
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -6.088083 20.997174
## sample estimates:
## mean of x mean of y
##  90.45455  83.00000
```

```r
t.test(classA,classB,var.equal=T)
```

```
##
##  Two Sample t-test
##
## data:  classA and classB
## t = 1.2032, df = 20, p-value = 0.243
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -5.46975 20.37884
## sample estimates:
## mean of x mean of y
##  90.45455  83.00000
```

```r
# 3.)
#F-Test
var.test(classA,classB)
```

```
##
##  F test to compare two variances
##
## data:  classA and classB
## F = 0.083862, num df = 10, denom df = 10, p-value = 0.0005357
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.02256307 0.31169848
## sample estimates:
## ratio of variances
##         0.08386224
```

```r
var.test(classA,classB,paired=TRUE)
```

```
##
##  F test to compare two variances
##
## data:  classA and classB
## F = 0.083862, num df = 10, denom df = 10, p-value = 0.0005357
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.02256307 0.31169848
## sample estimates:
## ratio of variances
##         0.08386224
```

```
# 4.)
#chisq.Test
#install.packages("MASS")
library(MASS)
tbl <- table(File$MEDV,File$CRIM)
chisq.test((tbl))
```

```
## Warning in chisq.test((tbl)): Chi-squared approximation may be incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  (tbl)
## X-squared = 115133, df = 114684, p-value = 0.1742
```

```
# 4.)
DiceA <- c(4,6,17,16,8,9)
DiceB <- c(5,8,6,10,20,19)
tbl <- table(DiceA,DiceB)
tbl
```

```
##      DiceB
## DiceA 5 6 8 10 19 20
##    4  1 0 0  0  0  0
##    6  0 0 1  0  0  0
##    8  0 0 0  0  0  1
##    9  0 0 0  0  1  0
##    16 0 0 0  1  0  0
##    17 0 1 0  0  0  0
```

```
chisq.test(tbl)
```

```
## Warning in chisq.test(tbl): Chi-squared approximation may be incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  tbl
## X-squared = 30, df = 25, p-value = 0.2243
```

```
# 5.)
#ANOVA
#install.packages("ggplot2")
library(ggplot2)
analysis <- aov(File$MEDV ~CRIM, data=File)
summary(analysis)
```

```
##               Df Sum Sq Mean Sq F value Pr(>F)
## CRIM          1   6441    6441   89.49 <2e-16 ***
## Residuals   504  36276      72
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
analysis <- aov(File$MEDV ~CRIM+NOX+TAX, data=File)
summary(analysis)
```

```
##               Df Sum Sq Mean Sq F value   Pr(>F)
## CRIM          1   6441    6441  102.44  < 2e-16 ***
## NOX           1   3614    3614   57.48 1.66e-13 ***
## TAX           1   1097    1097   17.45 3.48e-05 ***
## Residuals   502  31564      63
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
#6.)
#prop.test
CriminalA <-c(266,75)
CriminalB <-c(592,154)
prop.test(CriminalA,CriminalB)
```

```
##
##  2-sample test for equality of proportions with continuity correction
##
## data:  CriminalA out of CriminalB
## X-squared = 0.55588, df = 1, p-value = 0.4559
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  -0.13030967  0.05493235
## sample estimates:
##    prop 1    prop 2
## 0.4493243 0.4870130
```

```
#6.)
DoctorA <-c(40,73)
DoctorB <-c(80,87)
prop.test(DoctorA,DoctorB)
```

```
##
##  2-sample test for equality of proportions with continuity correction
##
## data:  DoctorA out of DoctorB
## X-squared = 20.378, df = 1, p-value = 6.354e-06
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  -0.4851168 -0.1930441
## sample estimates:
##    prop 1    prop 2
## 0.5000000 0.8390805
```