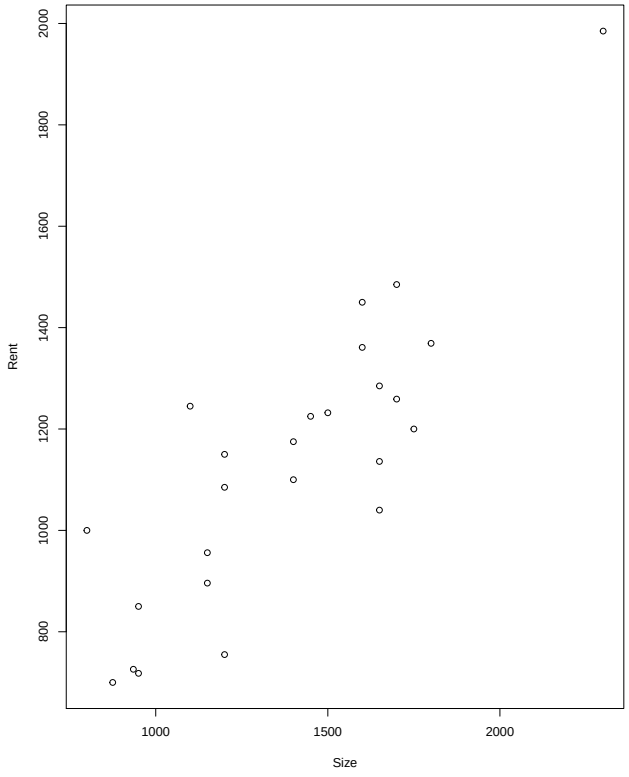
```
> file.choose()
[1] "/Users/HElbarmi/Downloads/Rent.csv"

> Rent<-read.table("/Users/HElbarmi/Downloads/Rent.csv",header=TRUE, sep=",")

> Rent
   Rent Size
1   950  850
2  1600 1450
3  1200 1085
4  1500 1232
5   950  718
6  1700 1485
7  1650 1136
8   935  726
9   875  700
10 1150  956
11 1400 1100
12 1650 1285
13 2300 1985
14 1800 1369
15 1400 1175
16 1450 1225
17 1100 1245
18 1700 1259
19 1200 1150
20 1150  896
21 1600 1361
22 1650 1040
23 1200  755
24  800 1000
25 1750 1200
```

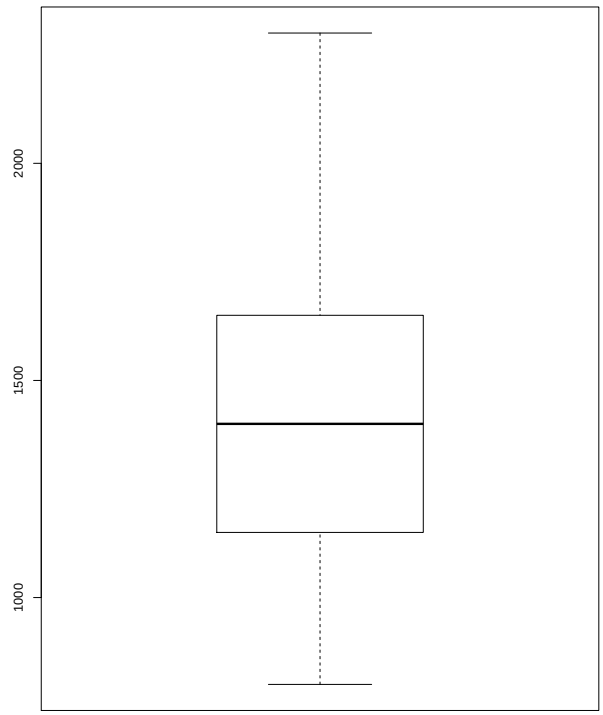
```
> Rent[,1]
 [1]  950 1600 1200 1500  950 1700 1650  935  875 1150 1400 1650 2300
[14] 1800 1400 1450 1100 1700 1200 1150 1600 1650 1200  800 1750

> Rent[,2]
 [1]  850 1450 1085 1232  718 1485 1136  726  700  956 1100 1285 1985
[14] 1369 1175 1225 1245 1259 1150  896 1361 1040  755 1000 1200


> plot(Rent[,1],Rent[,1], xlab="Size", ylab="Rent")
```

Figure 1: Rent versus Size



```
> summary(Rent[,1])
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
    800    1150    1400    1386    1650    2300

> summary(Rent[,2])
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
    700     956    1150    1135    1259    1985

> cor(Rent[,1],Rent[,2])
[1] 0.8500608
\newpage
> boxplot(Rent[,1])
```

Figure 2: Box plot of Rent




```
> lm(Rent[,1]~Rent[,2])

Call:
lm(formula = Rent[, 1] ~ Rent[, 2])

Coefficients:
(Intercept)    Rent[, 2]
    177.121        1.065
```

$$\widehat{\text{Rent}} = 177.121 + 1.065\text{Size}$$

```
    > summary(lm(Rent[,1]~Rent[,2]))

Call:
lm(formula = Rent[, 1] ~ Rent[, 2])

Residuals:
    Min      1Q  Median      3Q     Max
-442.26  -58.86  -15.42  104.17  365.13

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 177.1208   161.0043    1.10    0.283
Rent[, 2]     1.0651     0.1376    7.74 7.52e-08 ***
---
Signif. codes:  0 ?***? 0.001 ?**? 0.01 ?*? 0.05 ?.? 0.1 ? ? 1

Residual standard error: 194.6 on 23 degrees of freedom
Multiple R-squared:  0.7226,Adjusted R-squared:  0.7105
F-statistic: 59.91 on 1 and 23 DF,  p-value: 7.518e-08


> fit<-lm(Rent[,1]~Rent[,2])

> fit$coefficients
(Intercept)   Rent[, 2]
 177.120820    1.065144

> confint(fit)
                  2.5 %     97.5 %
(Intercept) -155.9419019 510.183542
Rent[, 2]      0.7804792   1.349809
```

A $100(1-\alpha)\%$ confidence interval for $E(Y_h)$, the mean at X_h is given by

$$\hat{Y} \pm t_{\alpha/2}^{n-2}\sqrt{MSE}\sqrt{\frac{1}{n}+\frac{(X_h-\bar{X})^2}{SS_{XX}}}$$

Suppose we want to estimator the average rent of apartments of size $X_h = 1000.$ square feet. In R we do the following

A $100(1-\alpha)\%$ prediction interval of Y_h, the mean at X_h is given by

$$\hat{Y} \pm t_{\alpha/2}^{n-2}\sqrt{MSE}\sqrt{1+\frac{1}{n}+\frac{(X_h-\bar{X})^2}{SS_{XX}}}$$