```
/* Assignment No.:02
//Part-A

> sample <- read.csv("/home/gurukul/work/sample.txt", row.names=1,
sep="")
> View(sample)
> p <- lm(y ~ sample$x1 , data=sample, x=T, y=T)
> p
Call:
lm(formula = y ~ sample$x1, data = sample, x = T, y = T)
Coefficients:
(Intercept)    sample$x1
     2.7821       0.7196
> dim(sample)
[1] 100   9
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
> plot(suqarederror)
> sumSS<-1:15
> sumSS[1]<-sum(suqarederror)
> sumSS[1]
[1] 40.99029
> plot(predictedY,xlab="y as x1 Sum SS " ,col="blue")
> points(sample$y,pch=15, col="red")
> plot(predictedY,xlab="y as x1 Sum SS " ,col="blue")
> p <- lm(y ~ sample$x2 , data=sample, x=T, y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
> plot(suqarederror)
> sumSS[2]<-sum(suqarederror)
> sumSS[2]
[1] 61.723
> plot(predictedY,xlab="y as x2" ,col="blue")
> points(sample$y,pch=15, col="red")
> p <- lm(y ~ sample$x3 , data=sample, x=T, y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
> plot(suqarederror)
> sumSS[3]<-sum(suqarederror)
> sumSS[3]
[1] 88.20018
> plot(predictedY,xlab="y as x3" ,col="blue")
> points(sample$y,pch=15, col="red")
> p <- lm(y ~ sample$x4 , data=sample, x=T, y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
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> plot(suqarederror)
> sumSS[4]<-sum(suqarederror)
> sumSS[4]
[1] 89.35453
> plot(predictedY,xlab="y as x4" ,col="blue")
> points(sample$y,pch=15, col="red")
> p <- lm(y ~ sample$x5 , data=sample, x=T, y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
> plot(suqarederror)
> sumSS[5]<-sum(suqarederror)
> sumSS[5]
[1] 89.25842
> plot(predictedY,xlab="y as x5" ,col="blue")
> points(sample$y,pch=15, col="red")
> p <- lm(y ~ sample$x6 , data=sample, x=T, y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
> plot(suqarederror)
> sumSS[6]<-sum(suqarederror)
> sumSS[6]
[1] 89.72543
> p <- lm(y ~ sample$x6 , data=sample, x=T, y=T)
> p <- lm(y ~ sample$x1+sample$x2 , data=sample, x=T, y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
> plot(suqarederror)
> sumSS[7]<-sum(suqarederror)
> sumSS[7]
[1] 10.12563
> plot(predictedY,xlab="y as x1 & x2" , col="blue")
> points(sample$y,pch=15, col="red")
> p <- lm(y ~ sample$x1+sample$x2+sample$x3 , data=sample, x=T, y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
> plot(suqarederror)
> sumSS[8]<-sum(suqarederror)
> sumSS[8]
[1] 5.113856
> plot(predictedY,xlab="y as x1 & x2 & x3" , col="blue")
> points(sample$y,pch=15, col="red")
> p <- lm(y ~ sample$x1+sample$x2+sample$x3+sample$x4 , data=sample, x=T,
y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
 > plot(error)
```

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> suqarederror<- error * error
> plot(suqarederror)
> sumSS[9]<-sum(suqarederror)
> sumSS[9]
[1] 3.337781
> plot(predictedY,xlab="y as x1 & x2 & x3 & x4" , col="blue")
> points(sample$y,pch=15, col="red")
> p <- lm(y ~ sample$x1+sample$x2+sample$x3+sample$x4+sample$x5 ,
data=sample, x=T, y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
> plot(suqarederror)
> sumSS[10]<-sum(suqarederror)
> sumSS[10]
[1] 0.8723916
> plot(predictedY,xlab="y as x1 & x2 & x3 & x4 & x5" , col="blue")
> points(sample$y,pch=15, col="red")
> p <- lm(y ~ sample$x1+sample$x2+sample$x3+sample$x4+sample$x5+sample$x6
, data=sample, x=T, y=T)
> predictedY<-predict(p,sample)
> error <- abs(sample$y - predictedY)
> plot(error)
> suqarederror<- error * error
> plot(suqarederror)
> sumSS[11]<-sum(suqarederror)
> sumSS[11]
[1] 0.6432416
> plot(predictedY,xlab="y as x1 & x2 & x3 & x4 & x5 & x6" , col="blue")
> points(sample$y,pch=15, col="red")
> plot(sumSS)

//Part-B
> TrsumSS<-0
> TssumSS<-0
> TrMSE<-0
> TsMSE<-0
> p<-0
> i<-1
> for ( i in 1:10)
+ {
+     p=10*i
+     p
+     dim(sample)
+     TrainingData <- head(sample,p)
+     TrainingData
+     dim(TrainingData)
+     lmodel_trainig_data <- lm(y ~ x1 + x2+ x3 + x4 + x5 + x6 + x7,
data=TrainingData, x=T, y=T)
+     predictedY<-predict(lmodel_trainig_data,TrainingData)
+     predictedY
+     TrainingData$y
+     TestData <- head(sample,-p )
```

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+      Trerror <- abs(TrainingData$y - predictedY)
+      Trerror
+      Trsuqarederror<- Trerror * Trerror
+      TrsumSS[i]<-sum(Trsuqarederror)
+      TrsumSS[i]
+      TrMSE[i]<-mean(Trsuqarederror)
+      predictedY<-predict(lmodel_trainig_data,TestData)
+      predictedY
+      TestData$y
+      Tserror <- abs(TestData$y - predictedY)
+      Tserror
+      Tssuqarederror<- Tserror * Tserror
+      TssumSS[i]<-sum(Tssuqarederror)
+      TssumSS[i]
+      TsMSE[i]<-mean(Tssuqarederror)
+ }
> TrsumSS
 [1] 0.001145062 0.065073632 0.126748120 0.181695975 0.271780808
0.310115347
 [7] 0.375726569 0.435561134 0.496046827 0.534387207
> TssumSS
 [1] 1.80001297 0.51670065 0.41019613 0.33922189 0.27178081 0.20249314
 [7] 0.14423624 0.07960180 0.02276229 0.00000000
> plot(TrsumSS, main="effect of size of training and test error")
>
> lines(x=TrsumSS, y = NULL, type = "l", col="blue")
>
> points(TssumSS,pch=10,col="red")
> lines(x=TssumSS, y = NULL, type = "l", col="red")
>
> TrMSE
 [1] 0.0001145062 0.0032536816 0.0042249373 0.0045423994 0.0054356162
 [6] 0.0051685891 0.0053675224 0.0054445142 0.0055116314 0.0053438721
> TsMSE
 [1] 0.020000144 0.006458758 0.005859945 0.005653698 0.005435616
0.005062328
 [7] 0.004807875 0.003980090 0.002276229         NaN
> plot(TrMSE, main="effect of size on training MSE(BLUE) and test
MSE(RED)")
> lines(x=TrMSE, y = NULL, type = "l", col="blue")
> points(TsMSE,pch=10,col="red")
> lines(x=TsMSE, y = NULL, type = "l", col="red")
```

Output