----------2.10----------

```
table <- read.dta13("capm4.dta")
table$date <- as.Date(as.character(table$date), "%Y%m%d")
rows <- length(colnames(table)) - 3
estimateTable <- matrix(ncol=3, nrow=rows) estimateTable1 <- matrix(ncol=2, nrow=rows)



for(i in 2:7)
{
  y      <- table[,i] - table$riskfree
  x      <- table$mkt - table$riskfree
  my     <- mean(y)
  mx     <- mean(x)
  diffy  <- y - my
  diffx  <- x - mx
  num    <- sum(diffy*diffx)
  denom  <- sum(diffx^2)
  b1     <- num/denom
  b0     <- my - b1*mx
  estimateTable[i-1,] <- c(colnames(table[i]),b0,b1)
}

colnames(estimateTable) <- c("Company","Intercept","Slope")
estimateTable <- data.frame(estimateTable)
estimateTable$Slope <- as.numeric(estimateTable$Slope)
estimateTable <- estimateTable[order(-(estimateTable$Slope)), ]
estimateTable
```

```
#For identifying the scatter relation for MSFT stock,
ymsft       <- table$msft - table$riskfree
xmsft       <- table$mkt - table$riskfree

plotscattermsft <- ggplot(table, aes(y=ymsft,x=xmsft)) +geom_point()
plotscattermsft



## Calculating the Ordinary least-squares for estimation of parameters
mymsft      <- mean(ymsft)
mxmsft      <- mean(xmsft)
diffymsft   <- ymsft - mymsft
diffxmsft   <- xmsft - mxmsft
nummsft     <- sum(diffymsft*diffxmsft)
denommsft   <- sum(diffxmsft^2)
b1msft      <- nummsft/denommsft
b0msft      <- mymsft - b1msft*mxmsft

#Using the linear model library to calculate the slope and intercept estimate
model <- lm(ymsft~xmsft, data=table)
summary(model)

plot_olsmsft <- plotscattermsft + geom_line(aes(y=predict(model)),color="red")
plot_olsmsft
```

```
#Using the linear model library to calculate the slope estimate, with zero intercept model

for(i in 2:7)
{
  y      <- table[,i] - table$riskfree
  x      <- table$mkt - table$riskfree
  model   <- lm(y~x-1, data=table)
  b1      <- model$coefficients[1]
  estimateTable1[i-1,] <- c(colnames(table[i]),b1)
}

colnames(estimateTable1) <- c("Company","Slope")
estimateTable1 <- data.frame(estimateTable1)
estimateTable1$Slope <- as.numeric(estimateTable1$Slope)
estimateTable1
```

---------- 2.14 ----------

```
table <- read.dta13("fair4.dta")
subsetTable <- subset(table, year>1915)
plotscatter <- ggplot(subsetTable, aes(y=vote,x=growth)) +geom_point()
plotscatter

## Calculating the Ordinary least-squares for estimation of parameters
y      <- subsetTable$vote
x      <- subsetTable$growth
my     <- mean(y)
```

```
mx      <- mean(x)
diffy   <- y - my
diffx   <- x - mx
num     <- sum(diffy*diffx)
denom   <- sum(diffx^2)
b2      <- num/denom
b1      <- my - b2*mx
c(b1,b2)
b1 #Intercept estimate
b2 #Slope estimate

#Using the linear model library to calculate the slope and intercept estimate
model <- lm(vote~growth, data=subsetTable)
summary(model)

plot_ols <- plotscatter + geom_line(aes(y=predict(model)),color="red")
plot_ols

#For Data till year 2004,
subsetTable2 <- subset(subsetTable, year<2005)
plotscatter2 <- ggplot(subsetTable2, aes(y=vote,x=growth)) +geom_point()
plotscatter2

## Calculating the Ordinary least-squares for estimation of parameters
y2      <- subsetTable2$vote
x2      <- subsetTable2$growth
my2     <- mean(y2)
mx2     <- mean(x2)
diffy2  <- y2 - my2
```

```
diffx2   <- x2 - mx2
num2     <- sum(diffy2*diffx2)
denom2   <- sum(diffx2^2)
b22      <- num2/denom2
b12      <- my2 - b22*mx2
c(b12,b22)
b12 #Intercept estimate
b22 #Slope estimate

#Using the linear model library to calculate the slope and intercept estimate
model2 <- lm(vote~growth, data=subsetTable2)
summary(model2)

plot_ols2 <- plotscatter2 + geom_line(aes(y=predict(model2)),color="red")
plot_ols2



#For identifying the relatinship between vote and inflation,
plotscatter3 <- ggplot(subsetTable, aes(y=vote,x=inflation)) +geom_point()
plotscatter3

## Calculating the Ordinary least-squares for estimation of parameters
y3       <- subsetTable$vote
x3       <- subsetTable$inflation
my3      <- mean(y3)
mx3      <- mean(x3)
diffy3   <- y3 - my3
diffx3   <- x3 - mx3
```

```
num3    <- sum(diffy3*diffx3)
denom3   <- sum(diffx3^2)
b23      <- num3/denom3
b13      <- my3 - b23*mx3
c(b13,b23)
b13 #Intercept estimate
b23 #Slope estimate

#Using the linear model library to calculate the slope and intercept estimate
model3 <- lm(vote~inflation, data=subsetTable)
summary(model3)

plot_ols3 <- plotscatter3 + geom_line(aes(y=predict(model3)),color="red")
plot_ols3
```