PSG COLLEGE OF TECHNOLOGY DEPARTMENT OF APPLIED MATHEMATICS AND COMPUTATIONAL SCIENCES



PROJECT ON: APPLIED STATISTICS AND R PROGRAMMING **FACULTY:**

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PROJECT TITLE: "CASE STUDY 5"

PROJECT MEMBERS:

• Anchala C – 20PD03

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DATA: Casestudy6.txt

Case Study-5: Stock Prices 1

A basic rule of thumb for investors in the stock market is to `diversify"; that is to spread one's money across stocks which are likely to behave differently in response to various conditions in the market. Risk to the investor is reduced because, under a given set of circumstances, some stocks in the portfolio will rise while others fall. How can one determine which stocks are similar and which are not for the purpose of diversification?

The data provided are daily stock prices from January 1988 through October 1989, for ten aerospace companies. Given this information, the first step toward answering the question posed above is to reformulate the question in terms of these data. For example, two stocks may be considered similar if they maintain approximately the same level, vary to a similar degree, or tend to move up and down in related ways over some relevant time period. An initial analysis might use some graphical techniques to examine these aspects of the data.

Describe the following using statistical software:

- 1. Make histograms of these price series
- 2. Time plots:

Another simple tool for comparing price series over time is the univariate time plot. Plot stock price on day for each of the ten companies for which price series is provided. Are the Y axis scales the same for all plots? What advantages are there in making all scales the same? What are the disadvantages? Look at the overall shapes of the plots.

It might also be useful to have one or two numbers that capture relevant characteristics of a stock's behavior. Mean and variance are two descriptive statistics often used to summarize data. Compute the means of stock prices for Companies A through J. Which company has the highest mean price? The lowest? Find the means on the histograms. Does this mean that the company with the higher mean is a better investment than the company with the lower mean? Describe the histograms of the companies with the highest and lowest means

1. Make histograms of these price series.

CODE:

```
#install.packages ("plot3D")
#library(plot3D)
data<- read.csv("C:/Users/Sukirtha/Desktop/Dataset R.csv",header=T)
print(data)
A<-data$A
B<-data$B
C<-data$C
D<-data$D
E<-data$E
F<-data$F
G<-data$G
H<-data$H
I<-data$I
J<-data$J
#hist(A)
hgA <- hist(A, plot = FALSE) # Save first histogram data
hgB <- hist(B, plot = FALSE) # Save 2nd histogram data
hgC <- hist(C, plot = FALSE)
hgD <- hist(D, plot = FALSE)
hgE <- hist(E, plot = FALSE)</pre>
hgF <- hist(F, plot = FALSE)
hgG <- hist(G, plot = FALSE)
hgH <- hist(H, plot = FALSE)
```

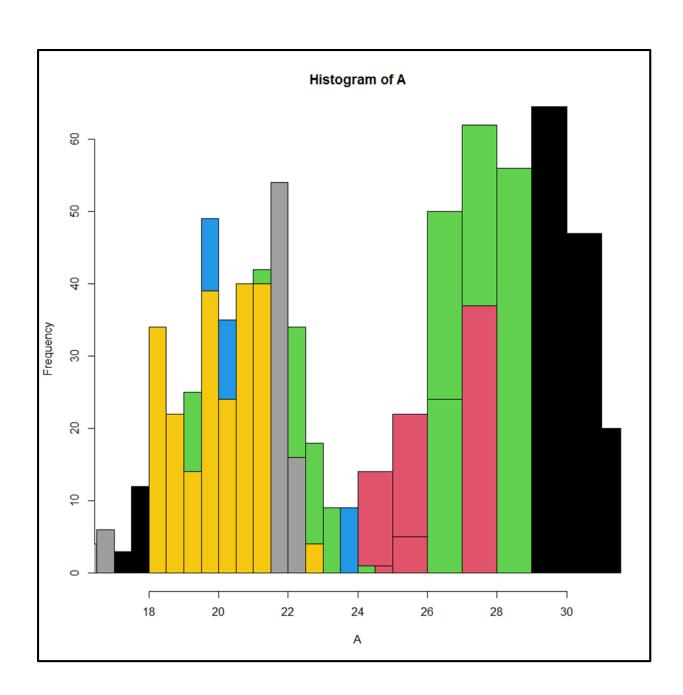
```
hgl <- hist(I, plot = FALSE)

hgJ <- hist(J, plot = FALSE)

plot(hgA, col = A) # Plot 1st histogram using a transparent color
plot(hgB, col = B,add=TRUE) # Add 2nd histogram using different color
plot(hgC, col = C,add=TRUE)
plot(hgD, col = D,add=TRUE)
plot(hgE, col = E,add=TRUE)
plot(hgF, col = B,add=TRUE)
plot(hgF, col = H,add=TRUE)
plot(hgH, col = I,add=TRUE)
plot(hgH, col = J,add=TRUE)
plot(hgJ, col = A,add=TRUE)
print(mean(A))
```

OUTPUT:

```
Date A B C D E F G H I J 4-Jan-88 17.219 50.500 18.750 43.000 60.875 26.375 67.750 19.000 48.750 34.875 5-Jan-88 17.891 51.375 19.625 44.000 62.000 26.125 68.125 19.125 48.750 35.625
                                     19.875 43.875
20.000 44.000
     6-Jan-88 18.438
                            50.875
                                                         61.875
                                                                   27.250 68.500
27.875 69.375
                                                                             68.500
                                                                                       18.250 49.000
     7-Jan-88 18.672 51.500
                                                         62.625
                                                                                       18.375 49.625
                                                                                                            36.250
     8-Jan-88 17.438
                           49.000
                                     20.000
                                               41.375
                                                                    25.875
                                                                                       16.500
   11-Jan-88 18.109 49.000 19.500 41.875 12-Jan-88 18.563 49.375 19.125 42.500
                                                         59.625
60.750
                                                                   26.625
27.250
                                                                             66.250
65.750
                                                                                        16.875 47.875
                                     19.250 43.000 61.750 28.000 66.000
19.000 43.250 61.750 29.000 65.750
                  18.672
    14-Jan-88
                 18.563 49.750
                                                                                       17.125 47.000
17.750 47.375
                                                                                                            34.875
                 19.063 50.500
                                     19.125 43.875
                                                         61.875
                                                                    29.625
                                                                             66.875
   15-Jan-88
                                                                                                            36.000
                 19.000 50.250 19.625 44.000 62.125 30.000 19.063 49.750 20.000 44.375 61.250 29.875 18.719 49.250 19.000 43.500 60.375 29.000
   18-Jan-88 19.000 50.250 19-Jan-88 19.063 49.750
                                                                             66.500
                                                                                        17.375
                                                                             66.500
                                                                                       16.875
                                                                                                 48.000
                                                                    29.000 65.875
   21-Jan-88 18.438 49.250
                                     18.375 43.375
18.375 43.500
                                                         60.375
                                                                   29.000
                                                                             65.000
                                                                                       16.500 47.500
                                                43.500
    22-Jan-88
                  19.063
                            50.250
                                                         60.375
                 20.000 50.250 18.125 44.000 60.750 30.000 19.891 50.125 18.250 44.625 60.875 30.000
   25-Jan-88
                                                                             67.000 16.750 49.000
                                                         60.875 30.000 66.250 61.250 29.750 66.500
                                                                                       17.000 48.125
16.875 48.750
   26-Jan-88
                                                                                                            37.375
                            50.125
                                               46.000
                 19.563
                                      18.625
                                                                                        16.875
                           51.000 18.750 46.500 61.875
52.250 18.875 47.000 63.500
                                                                                       17.625 49.000
17.875 49.250
   28-Jan-88
                 19.891
                                                                    31.375
                                                                             67.375
                                                                                                            37.875
   29-Jan-88
                  20.328
                                                                    32.125
                                                                             67.625
                                                                                                            38.375
                                      18.875
                                               46.500
                                                          63.375
                                                                    32.125
                            53.250 19.250 46.125
53.750 19.250 46.000
                                                                    32.125 66.375
30.750 66.500
     2-Feb-88
                 20.438
                                                         63.625
                                                                                       18.250 48.875
                                                                                                            38.500
     3-Feb-88
                                               46.000
                  20.500
                                                         63.250
                                                                             66.500
                                                                                       18.000
                                                                                                            37.500
     4-Feb-88
                  20.563
                                     19.125
                                               45.750
                                                         63.250
                                                                    30.000
                 20.328 53.500 19.000 45.500 62.375
                                                                    30.000 67.375
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     5-Feb-88
                                                                                                            37.375
                            52.875
                                     18.875
                                               45.000
                                                         61.375
                                                                    29.250
                                                                              67.375
                                                                                       17.625
                           52.500
52.750
                                     19.000
19.250
                                               45.125
45.250
                                                         61.625
62.000
                                                                             67.500
68.375
     9-Feb-88
                  20.391
                                                                    29.250
                                                                                       18.000 46.000
                                                                                                            36.375
                                                                    29.500
28 10-Feb-88
                  20.891
                                                                                        18.000 46.750
                                                                                                            37.000
   11-Feb-88
                  20.891
                                     19.000 46.000 62.000
                                                                    29.875
                                                                             68.500
                           52.500
52.750
                                                         62.250
62.000
   12-Feb-88
                  21.063
                                     19.125
                                               47.250
                                                                    29.875
                                                                             68.875
                                                                                       18.125
                                                                                                 47.250
                                                                             69.250
                                     19.125
                                               46.875
                                                                                       18.250
   16-Feb-88
                  21.281
                                                                             69.000 18.250 47.750
68.375 17.750 47.750
   17-Feb-88
                 21.219 53.375
                                     18.875 46.125 61.625
                                                                   28.875
                                                                                                            38.250
   18-Feb-88
                  20.891 52.375
                                     18.625 46.375 61.375 28.875 68.375
19.000 46.125 62.250 28.750 69.750
                                                                                                            38.000
                  21.281 52.750
   22-Feb-88 21.328 53.000 19.125 46.375 63.000 29.125 70.500 18.875 48.250 23-Feb-88 21.219 53.125 20.000 46.875 63.250 28.750 70.000 18.625 48.000
                                                                                                            40.250
   23-Feb-88 21.219 53.125 20.000 46.875 63.250 28.750 70.000 24-Feb-88 21.281 52.625 19.875 46.750 63.500 28.375 69.875
```



2. Time plots:

Another simple tool for comparing price series over time is the univariate time plot. Plot stock price on day for each of the ten companies for which price series is provided. Are the Y axis scales the same for all plots? What advantages are there in making all scales the same? What are the disadvantages? Look at the overall shapes of the plots.

CODE:

```
data<- read.csv("C:/Users/Sukirtha/Desktop/Dataset R.csv",header=T)
print(data)
d1 <- data$A
myts1 < -ts(data$A, start = c(1988,1),end = c(1989,9),frequency=12)
plot(myts1,main="Time Plot for Company - A")
d2 <- data$B
myts2 <- ts(d2, start = c(1988,1),end = c(1989,9),frequency=12)
plot(myts2,main="Time Plot for Company - B")
d3 <- data$C
myts3 < -ts(d3, start = c(1988,1),end = c(1989,9),frequency=12)
plot(myts3,main="Time Plot for Company - C")
d4 <- data$D
myts4 <- ts(d4, start = c(1988,1),end = c(1989,9),frequency=12)
plot(myts4,main="Time Plot for Company - D")
d5 <- data$E
myts5 < -ts(d5, start = c(1988,1),end = c(1989,9),frequency=12)
plot(myts5,main="Time Plot for Company - E")
d6 <- data$F
myts6 < -ts(d6, start = c(1988,1),end = c(1989,9),frequency=12)
plot(myts6,main="Time Plot for Company - F")
```

```
d7 <- data$G

myts7 <- ts(d7, start = c(1988,1),end= c(1989,9),frequency=12)

plot(myts7,main="Time Plot for Company - G")

d8 <- data$H

myts8 <- ts(d8, start = c(1988,1),end= c(1989,9),frequency=12)

plot(myts8,main="Time Plot for Company - H")

d9 <- data$I

myts9 <- ts(d9, start = c(1988,1),end= c(1989,9),frequency=12)

plot(myts9,main="Time Plot for Company - I")

d10 <- data$J

myts10 <- ts(d10, start = c(1988,1),end= c(1989,9),frequency=12)

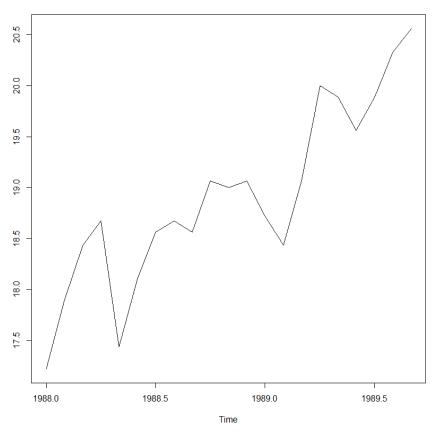
plot(myts10,main="Time Plot for Company - J")
```

OUTPUT:

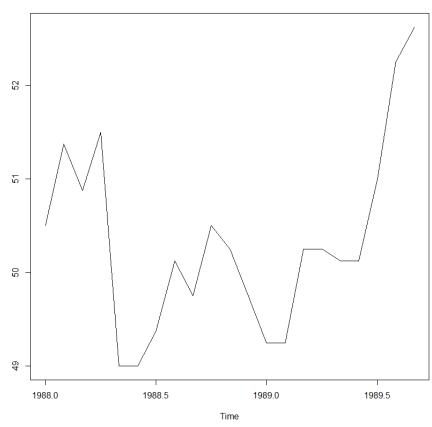
```
Date
   4-Jan-88 17.219 50.500 18.750 43.000 60.875 26.375 67.750 19.000 48.750
    5-Jan-88 17.891 51.375
                           19.625 44.000 62.000 26.125
                                                        68.125
                                                                19.125
                                                                       48.750
                                                 27.250
27.875
                           19.875
                                                                       49.000
                                  43.875 61.875
                   51.500 20.000 44.000 62.625
   8-Jan-88 17.438 49.000 20.000 41.375
                                          59.750
                                                 25.875
                                                        63.250
                                                                16.500 47.500
  11-Jan-88 18.109 49.000
                           19.500 41.875
                                          59.625
                                                 26.625
                                                        66.250
   12-Jan-88 18.563 49.375
                           19.125
                                  42.500 60.750
                                                 27.250 65.750
                                                                16.875
                                                                       47.875
                           19.250 43.000 61.750
  13-Jan-88 18.672 50.125
                                                 28.000 66.000
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                                                                       47.250
                           19.000 43.250 61.750
                                                                17.125
17.750
                                                                       47.000
   14-Jan-88 18.563 49.750
                                                 29.000
                                                         65.750
  15-Jan-88 19.063 50.500
                           19.125 43.875
                                                 29.625
                                          61.875
                                                         66.875
                                                                       47.375
                                  44.000 62.125
                                                         66.500
                                                                17.375
             19.000 50.250
                           19.625
                                                 30.000
  18-Jan-88
  19-Jan-88 19.063 49.750
                                                         66.500
                           20.000
                                  44.375
                                          61.250
                                                 29.875
                                                                16.875
                                                                       48.000
  20-Jan-88 18.719 49.250
                           19.000 43.500 60.375
                                                 29.000
                                                         65.875
                                                                16.500
  21-Jan-88 18.438 49.250
                                          60.375
                                  43.375
                                                 29.000
                                                         65.000
             19.063 50.250
                           18.375
                                  43.500
                                          60.375
                                                 29.125
  25-Jan-88 20.000 50.250 18.125
                                  44.000 60.750 30.000 67.000 16.750 49.000
  26-Jan-88
             19.891 50.125
                           18.250 44.625 60.875
                                                 30.000 66.250
                                                                17.000
                                                                       48.125
  27-Jan-88 19.563 50.125
                           18.625 46.000 61.250
                                                 29.750
                                                        66.500
67.375
                                                                16.875
                                                                       48.750
                                                                              37.750
37.875
  28-Jan-88 19.891 51.000
                           18.750 46.500 61.875
                                                 31.375
                                                                17.625 49.000
20 29-Jan-88 20.328 52.250
                           18.875 47.000 63.500
                                                 32.125
                                                         67.625
                                                                17.875
                                                                       49.250
                                                                              38.375
                                  46.500 63.375
                                                 32.125
                                                         67.000
                                                                       49.000
   1-Feb-88
             20.563
                    52.625
                           18.875
                                                                18.000
                           19.250 46.125
                                                                       48.875
    2-Feb-88
             20.438
                    53.250
                                          63.625
                                                 32.125
                                                         66.375
                                                                18.250
                    53.750
                           19.250
                                  46.000 63.250
    3-Feb-88 20.500
                                                 30.750
                                                        66.500
                                                                18.000
             20.563
                    53.750
                           19.125
                                  45.750
                                          63.250
                                                 30.000
                                                         67.375
    5-Feb-88 20.328 53.500
                           19.000 45.500 62.375
                                                 30.000
                                                                       46.000
                                                 29.250
   8-Feb-88
             19.891 52.875
                           18.875
                                  45.000
                                          61.375
                                                         67.375
   9-Feb-88
             20.391 52.500
                           19.000 45.125
                                          61.625
                                                 29.250
                                                        67.500
                                                                18.000 46.000
28 10-Feb-88
             20.891 52.750
                           19.250 45.250 62.000
                                                 29.500 68.375
                                                                18.000 46.750
  11-Feb-88 20.891 52.125
                           19.000 46.000 62.000
                                                 29.875
                                                        68.500
                                                                17.625
                                                                       47.000
                                                                18.125 47.250
  12-Feb-88 21.063 52.500
                           19.125
                                  47.250 62.250
                                                 29.875
                                                        68.875
  16-Feb-88 21.281 52.750
                           19.125
                                  46.875 62.000
                                                                18.250 47.125
                                                 29.375
                                                        69.250
             21.219 53.375
                                  46.125 61.625
  17-Feb-88
                           18.875
                                                 28.875
                                                         69.000
                                                                18.250
                                                                       47.750
                                                                              38.250
                           18.625
  18-Feb-88
             20.891 52.375
                                  46.375
                                          61.375
                                                                17.750
                                                                       47.750
                                                 28.875
                                                         68.375
                    52.750
                                          62.250
             21.281
                           19.000
                                  46.125
                                                 28.750
                                                         69.750
                                                                18.375
                    53.000
                                  46.375
                                          63.000
             21.328
                           19.125
                                                 29.125
                                                        70.500
  23-Feb-88 21.219 53.125 20.000 46.875 63.250 28.750 70.000 18.625 48.000 39.625
37 24-Feb-88 21.281 52.625 19.875 46.750 63.500 28.375 69.875 18.125 48.500 40.625
```

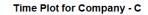
Time plots for Company A to J:

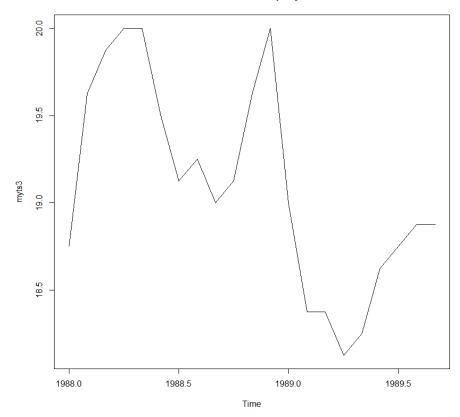
Time Plot for Company - A



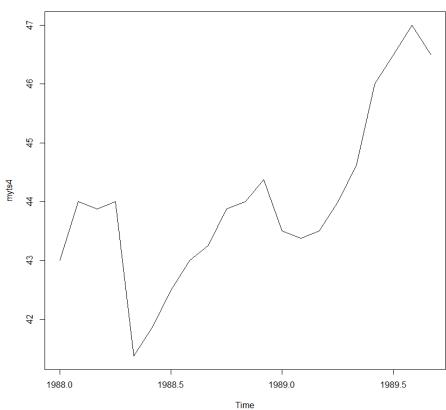
Time Plot for Company - B

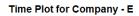


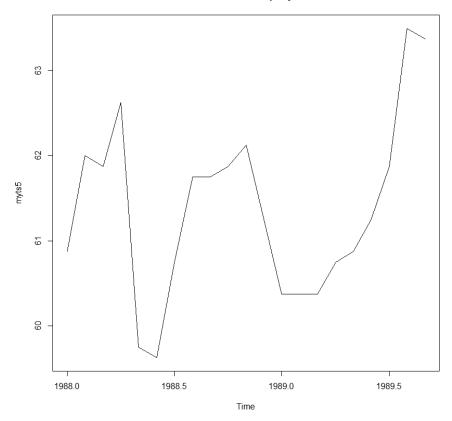




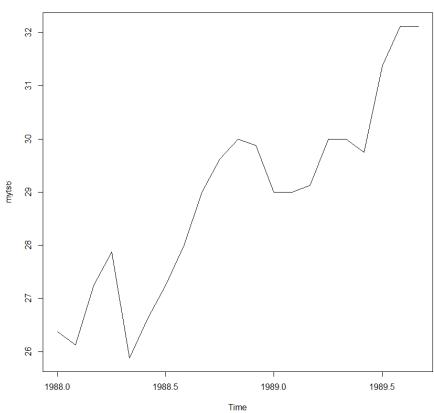
Time Plot for Company - D



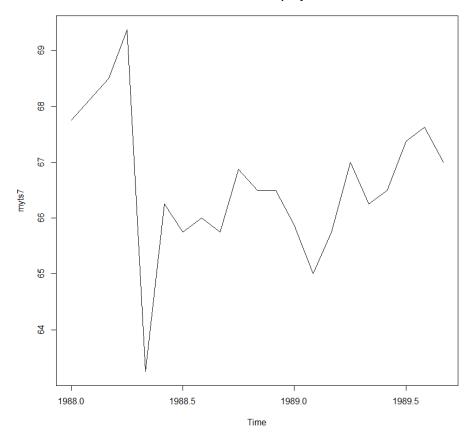




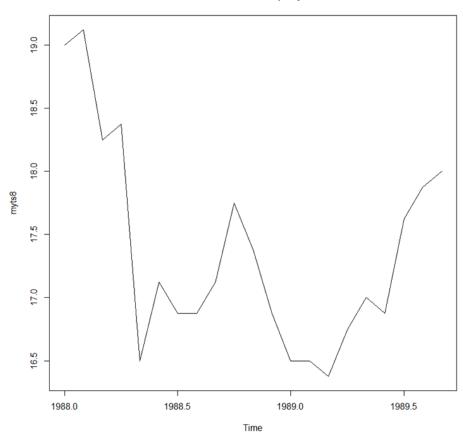
Time Plot for Company - F

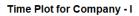


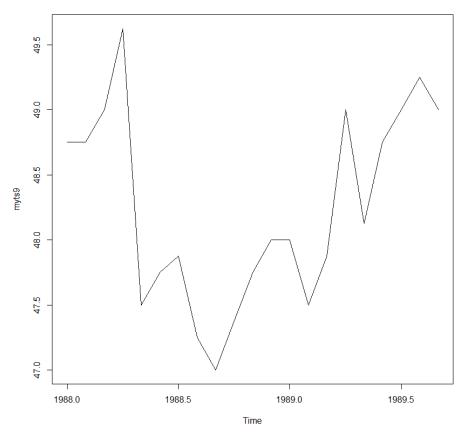
Time Plot for Company - G



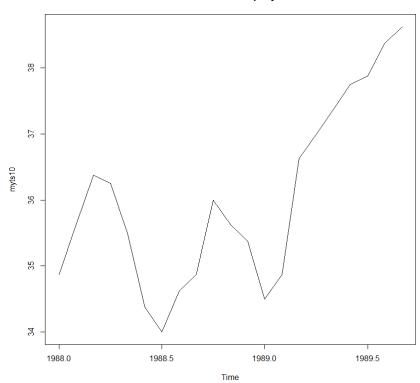
Time Plot for Company - H







Time Plot for Company - J



3. It might also be useful to have one or two numbers that capture relevant characteristics of a stock's behavior. Mean and variance are two descriptive statistics often used to summarize data. Compute the means of stock prices for Companies A through J. Which company has the highest mean price? The lowest? Find the means on the histograms. Does this mean that the company with the higher mean is a better investment than the company with the lower mean? Describe the histograms of the companies with the highest and lowest means.

CODE:

```
#install.packages("plot3D")
#library(plot3D)
data<- read.csv("C:/Users/Sukirtha/Desktop/Dataset_R.csv",header=T)
print(data)
A<-data$A
B<-data$B
C<-data$C
D<-data$D
E<-data$E
F<-data$F
G<-data$G
H<-data$H
I<-data$I
J<-data$J
MA = mean(data$A)
MB = mean(data\$B)
MC = mean(data$C)
MD = mean(data$D)
ME = mean(data$E)
```

```
MF = mean(data\$F)
MG = mean(data$G)
MH = mean(data$H)
MI = mean(data$I)
MJ = mean(data\$J)
hgA <- hist(A, plot = FALSE) # Save first histogram data
hgB <- hist(B, plot = FALSE) # Save 2nd histogram data
hgC <- hist(C, plot = FALSE)
hgD <- hist(D, plot = FALSE)
hgE <- hist(E, plot = FALSE)
hgF <- hist(F, plot = FALSE)
hgG <- hist(G, plot = FALSE)
hgH <- hist(H, plot = FALSE)
hgl <- hist(I, plot = FALSE)
hgJ <- hist(J, plot = FALSE)
plot(hgA, col = B) # Plot 1st histogram using a transparent color
plot(hgB, col = C,add=TRUE) # Add 2nd histogram using different color
plot(hgC, col = D,add=TRUE)
plot(hgD, col = E,add=TRUE)
plot(hgE, col = F,add=TRUE)
plot(hgF, col = G,add=TRUE)
plot(hgG, col = H,add=TRUE)
plot(hgH, col = I,add=TRUE)
plot(hgl, col = J,add=TRUE)
plot(hgJ, col = C,add=TRUE)
```

```
print(mean(A))
#data<- read.csv("C:/Users/Sukirtha/Desktop/Dataset_R.csv",header=T)
#print(data)
abline(v=MA,col=A)
abline(v=MB,col=A)
abline(v=MC,col=A)
abline(v=MD,col=A)
abline(v=ME,col=A)
abline(v=MF,col=A)
abline(v=MG,col=A)
abline(v=MH,col=A)
abline(v=MI,col=A)
abline(v=MJ,col=A)
print(MA)
print(MB)
print(MC)
print(MD)
print(ME)
print(MF)
print(MG)
print(MH)
print(MI)
print(MJ)
```

OUTPUT:

```
11-Jan-88 18.109 49.000 19.500 41.875 59.625 26.625 66.250 17.125 47.750
        12-Jan-88 18.563 49.375 19.125 42.500 60.750 27.250 65.750 16.875 47.875 34.000 13-Jan-88 18.672 50.125 19.250 43.000 61.750 28.000 66.000 16.875 47.250 34.625
          14-Jan-88 18.563 49.750 19.000 43.250 61.750 29.000 65.750 17.125 47.000
10 15-Jan-88 19.063 50.500 19.125 43.875 61.875 29.625 66.875 17.750 47.375 36.000 11 18-Jan-88 19.000 50.250 19.625 44.000 62.125 30.000 66.500 17.375 47.750 35.625 12 19-Jan-88 19.063 49.750 20.000 44.375 61.250 29.875 66.500 16.875 48.000 35.375
13 20-Jan-88 18.719 49.250 19.000 43.500 60.375 29.000 65.875 16.500 48.000 34.500 14 21-Jan-88 18.438 49.250 18.375 43.375 60.375 29.000 65.000 16.500 47.500 34.875
         22-Jan-88 19.063 50.250 18.375 43.500 60.375 29.125 65.750 16.375 47.875
        25-Jan-88 20.000 50.250 18.125 44.000 60.750 30.000 67.000 16.750 49.000 37.000 26-Jan-88 19.891 50.125 18.250 44.625 60.875 30.000 66.250 17.000 48.125 37.375
 16
 17
17 26-Jan-88 19.891 50.125 18.250 44.625 60.875 30.000 66.250 17.000 48.125 37.375 18 27-Jan-88 19.563 50.125 18.625 46.000 61.875 31.375 67.375 17.625 49.000 37.875 19 28-Jan-88 19.891 51.000 18.750 46.500 61.875 31.375 67.375 17.625 49.000 37.875 20 29-Jan-88 20.328 52.250 18.875 47.000 63.500 32.125 67.625 17.875 49.250 38.375 1-Feb-88 20.563 52.625 18.875 46.500 63.375 32.125 67.000 18.000 49.000 38.625 22 2-Feb-88 20.438 53.250 19.250 46.125 63.625 32.125 66.375 18.250 48.875 38.500 33.3Feb-88 20.500 53.750 19.250 46.000 63.250 30.750 66.500 18.000 47.750 37.500 4-Feb-88 20.328 53.500 19.000 45.500 62.375 30.000 67.375 18.250 47.500 37.125 5-Feb-88 20.328 53.500 19.000 45.500 62.375 30.000 67.375 18.375 46.000 37.375 26 8-Feb-88 19.891 52.875 18.875 45.000 61.625 29.250 67.500 18.000 46.000 36.375 79.9Feb-88 20.321 52.500 19.000 45.125 61.625 29.250 67.500 18.000 46.000 36.375 29.9Feb-88 20.391 52.500 19.000 45.125 61.625 29.250 67.500 18.000 46.000 36.375
27 9-Feb-88 20.391 52.500 19.000 45.125 61.625 29.250 67.500 18.000 46.000 28 10-Feb-88 20.891 52.750 19.250 45.250 62.000 29.500 68.375 18.000 46.750 29 11-Feb-88 20.891 52.125 19.000 46.000 62.000 29.875 68.500 17.625 47.000 30 12-Feb-88 21.063 52.500 19.125 47.250 62.250 29.875 68.875 18.125 47.250 31 16-Feb-88 21.281 52.750 19.125 46.875 62.000 29.375 69.250 18.250 47.125
                                                                                                                                                                                                                               36.375
                                                                                                                                                                                                                               37.000
                                                                                                                                                                                                                              37.375
                                                                                                                                                                                                                              37.625
        17-Feb-88 21.219 53.375 18.875 46.125 61.625 28.875 69.000 18.250 47.750
33 18-Feb-88 20.891 52.375 18.625 46.375 61.375 28.875 68.375 17.750 47.750 38.000 34 19-Feb-88 21.281 52.750 19.000 46.125 62.250 28.750 69.750 18.375 47.375 38.750 35 22-Feb-88 21.328 53.000 19.125 46.375 63.000 29.125 70.500 18.875 48.250 40.250 36 23-Feb-88 21.219 53.125 20.000 46.875 63.250 28.750 70.000 18.625 48.000 39.625 37 24-Feb-88 21.281 52.625 19.875 46.750 63.500 28.375 69.875 18.125 48.500 40.625
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MEAN VALUES:

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[1] 25.12057
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[1] 25.12057

[1] 52.17228

[1] 21.02083

[1] 42.92829

[1] 70.14423

[1] 29.63982

[1] 67.75761

[1] 20.23117

[1] 45.30008

[1] 39.65264

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HISTOGRAMS OF THE COMPANIES WITH THE HIGHEST AND LOWEST MEANS:

