612303050 Deshmukh Mehmood Rehan’s Mid Semester Practical Examination

```
#Q.1) For the following frequency distribution [5M]
# x 1 2 3 4 5
# f 7 11 9 8 3
# Write a R code to find

#a) Mean
x = c(1,2,3,4,5)
f = c(7,11,9,8,3)

temporary = rep(x,f)

print(mean(temporary))

## [1] 2.710526

#b) Median
print(median(temporary))

## [1] 3

#c) Mode
y = table(temporary)
mode = names(y)[which(y == max(y))]
print(mode)

## [1] "2"

#d) Seventh decile
d7 = quantile(temporary, 0.7)
print(d7)

## 70%
##   3

#e) 29th percentile
p29 = quantile(temporary, 0.29)
print(p29)

## 29%
##   2

#Q.2) Create a dataframe of the following two vectors: [ 2M]
#Price 10 15 30 42 50 60
#Qty 4 20 15 10 16 8
#Also write a R code to add vector/variable named value=price*qty in the
created dataframe.
```

```r
price = c(10,15,30,42,50,60)
qty = c(4,20,15,10,16,8)
df = data.frame(price, qty)
df = transform(df, "value"=price*qty)
print(df)
```

```
##   price qty value
## 1    10   4    40
## 2    15  20   300
## 3    30  15   450
## 4    42  10   420
## 5    50  16   800
## 6    60   8   480
```

```r
#Q.3) Suppose the age is a vector containing ages of 10 persons as
22,27,31,41,30,25,19,20,23,35 [5M]

age = c(22,27,31,41,30,25,19,20,23,35)

#a) Remove the 5th and 7th element from the vector.
print(age[c(-5,-7)])
```

```
## [1] 22 27 31 41 25 20 23 35
```

```r
#b) Create a new vector containing the ages of persons greater than 30.
age30 = age[age>30]

print(age30)
```

```
## [1] 31 41 35
```

```r
#c) Extract the 4th to 6th element from the vector.
print(age[4:6])
```

```
## [1] 41 30 25
```

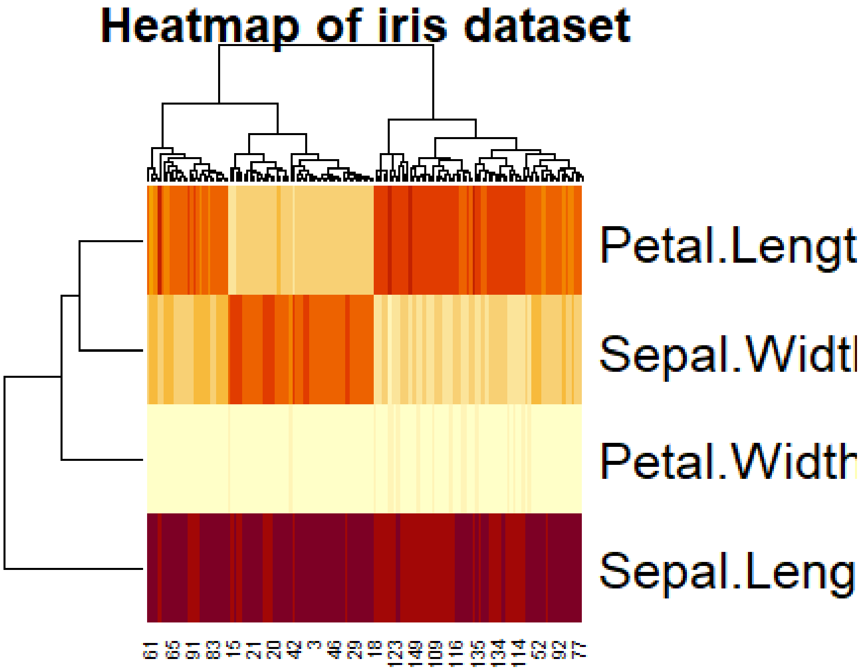
```r
#d) Create a new vector containing the ages of persons between 20 and 25.

age2 = age[age>20 & age<25]

print(age2)
```

```
## [1] 22 23
```

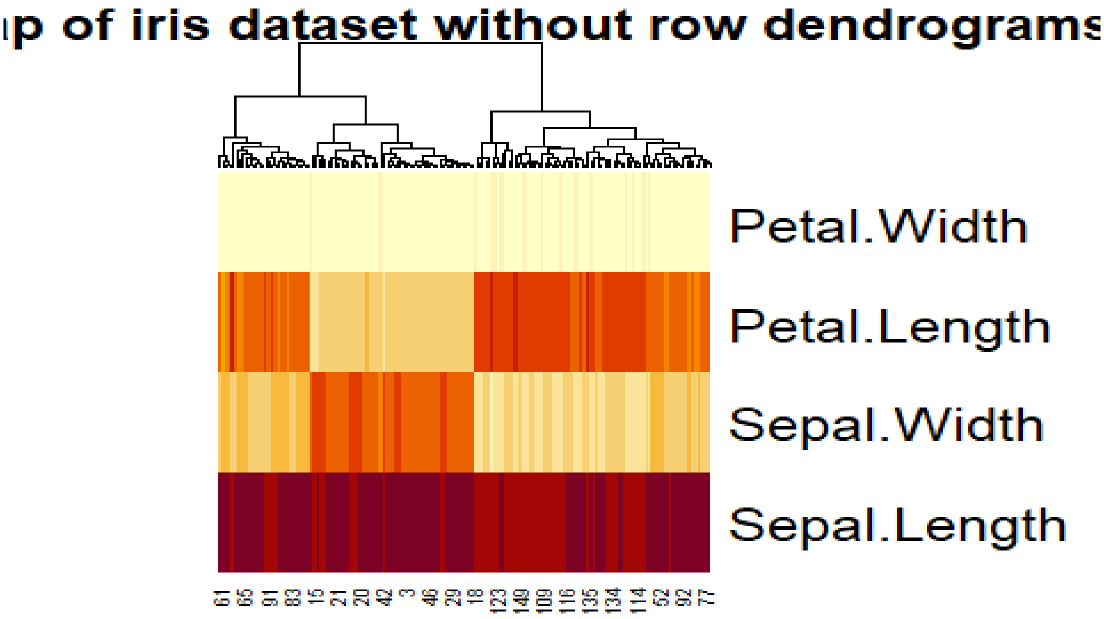
```r
#e) Extract the last 3 elements from the vector.

print(tail(age,3))
```

```
## [1] 20 23 35
```

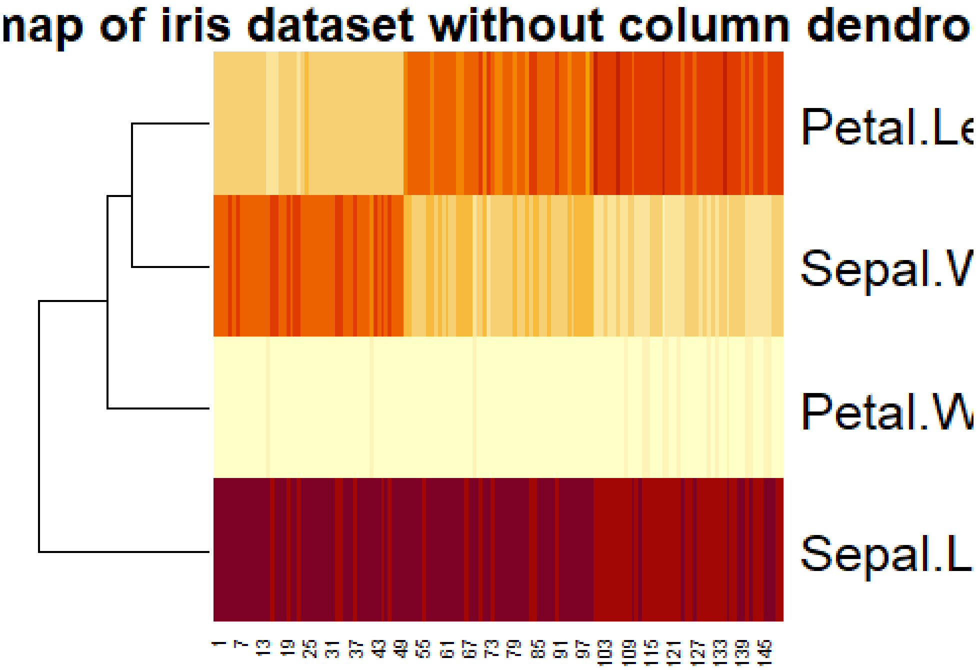
```
#Q.4) Create a heatmap using inbuilt iris datasets. [3M]
data(iris)

M = iris[,-5]

heatmap(t(M), main="Heatmap of iris dataset", scale = "column")
```



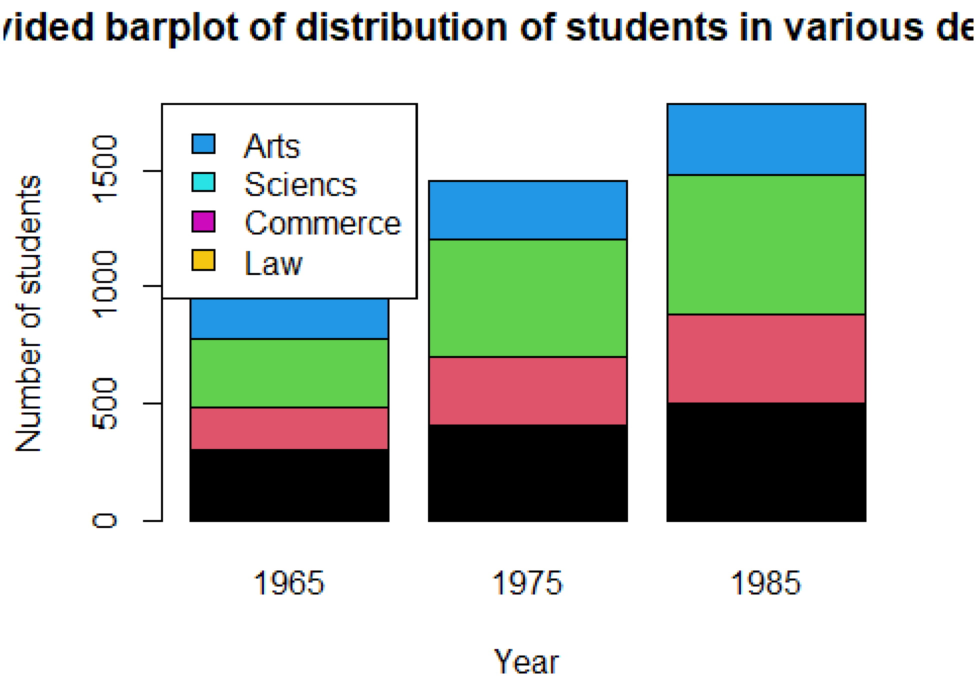
```
#Also write a R code for the following
#a) Write a code to remove row dendrogram

heatmap(t(M), main="Heatmap of iris dataset without row dendrograms", scale =
"column", Rowv = NA)
```



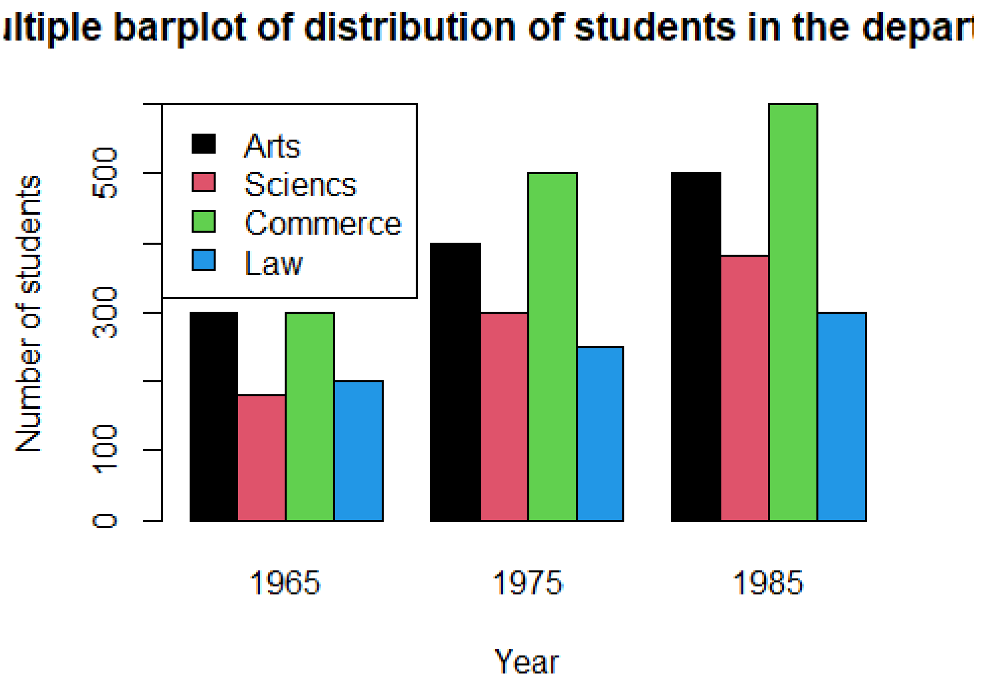
```
#b) Write a code to remove column dendrogram

heatmap(t(M), main="Heatmap of iris dataset without column dendrograms",
scale = "column", Colv = NA)
```



```r
#Q.5) Create a subdivided barplot and a multiple barplot of the following
data: [5M]
#     1965 1975 1985
#Arts 300 400 500
#Sci 180 300 380
#Com 300 500 600
#Law 200 250 300

years = c(1965,1975,1985)
arts = c(300,400,500)
science = c(180, 300, 380)
commerce = c(300,500,600)
law = c(200,250,300)
student_data = data.frame(arts,science,commerce,law)
barplot(t(student_data), main="Subdivided barplot of distribution of students
in various departments", beside=FALSE, names.arg=years, xlab="Year",
ylab="Number of students",col = 1:4)
legend("topleft",c("Arts","Sciencs","Commerce","Law"),fill=4:8)
```



```r
barplot(t(student_data), main="Multiple barplot of distribution of students
in the departments", beside=TRUE, names.arg=years, xlab="Year", ylab="Number
of students",col = 1:4)
legend("topleft",c("Arts","Sciencs","Commerce","Law"),fill=1:4)
```



```
# Q.6) Solve the following questions [5M]
# a) Write a R program to create a Dataframes which contain details of 5
employees and display
# summary of the data.
# b) Write a R program to create a two-dimensional 5×3 array of sequence of
even integers greater
# than 50.
# c) Write a R program to find the levels of factor of a given vector 1, 2,
3, 3, 4, NA, 3, 2, 4, 5,
# NA, 5.
# d) Write a R program to create a list containing strings, numbers, vectors
and a logical values.
# e) Write a R program to create a vector which contains 10 random integer
values between -50
# and +50.

#a) Dataframe

name = c("john", "doe", "jane", "smith", "james");
age = c(33, 35, 36, 29, 40);
salary = c(16000, 23000, 27000, 21000, 20000);
df = data.frame(name, age, salary)
print(df)

##    name age salary
## 1  john  33  16000
## 2   doe  35  23000
## 3  jane  36  27000
## 4 smith  29  21000
## 5 james  40  20000
```

```
summary(df)
```

```
##      name                age           salary     
##  Length:5           Min.   :29.0   Min.   :16000  
##  Class :character   1st Qu.:33.0   1st Qu.:20000  
##  Mode  :character   Median :35.0   Median :21000  
##                     Mean   :34.6   Mean   :21400  
##                     3rd Qu.:36.0   3rd Qu.:23000  
##                     Max.   :40.0   Max.   :27000
```

```
#b) 2D array

arr = array(seq(from = 52, length.out = 15, by = 2),dim = c(5,3))

print(arr)
```

```
##      [,1] [,2] [,3]
## [1,]   52   62   72
## [2,]   54   64   74
## [3,]   56   66   76
## [4,]   58   68   78
## [5,]   60   70   80
```

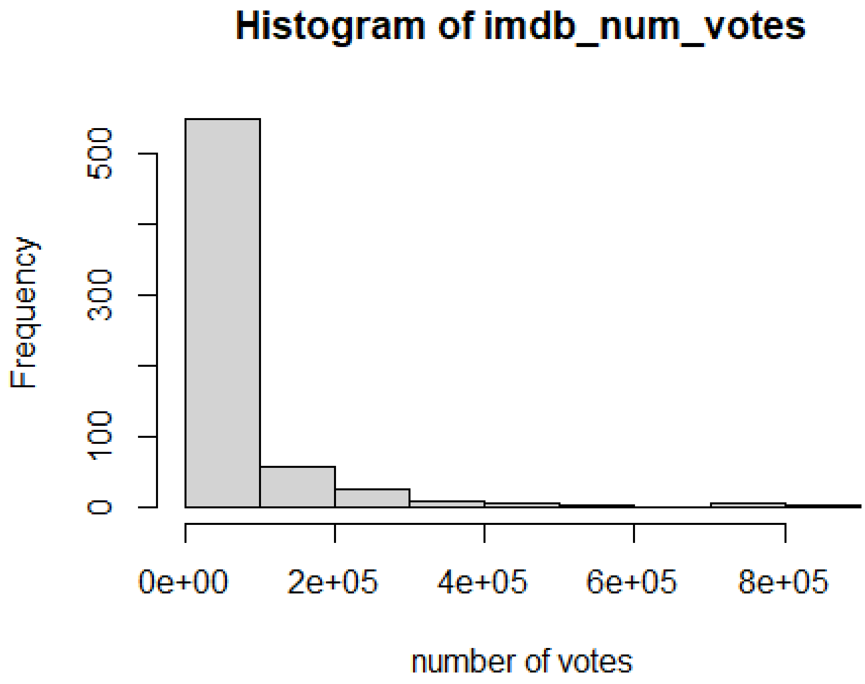
```
#c) Factor levels

vec = c( 1, 2, 3, 3, 4, NA, 3, 2, 4, 5, NA, 5)

factor(vec)
```

```
##  [1] 1    2    3    3    4    <NA> 3    2    4    5    <NA> 5   
## Levels: 1 2 3 4 5
```

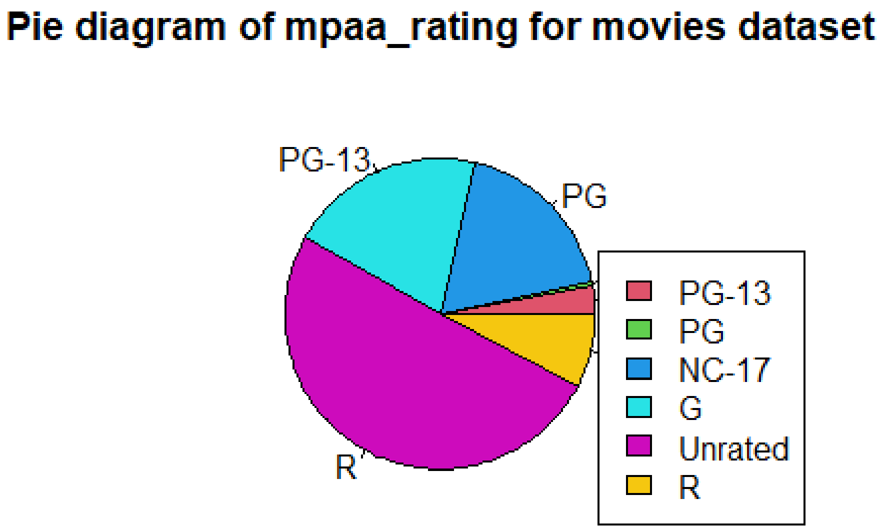
```
#d) List

vec = c(1,2,3)

list("abc", 123, vec, TRUE)
```

```
## [[1]]
## [1] "abc"
## 
## [[2]]
## [1] 123
## 
## [[3]]
## [1] 1 2 3
##
```

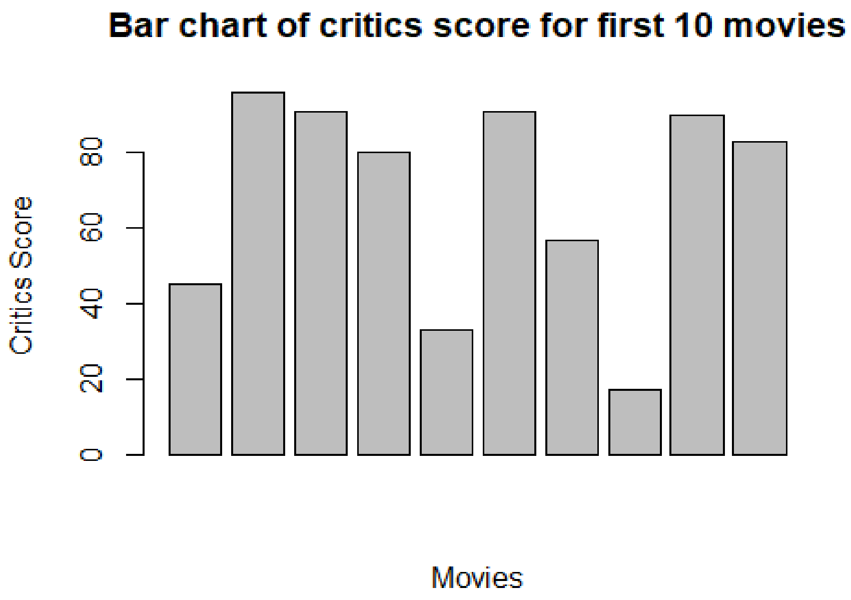
```
## [[4]]
## [1] TRUE

#e) Random vector

vec1 = sample(-50 : 50, 10)

print(vec1)

##  [1]  43  22 -14  20  28 -25  -2  44  38  26

#Q7) Read the file moviesData.csv and solve the following questions. [5M]
#) Use the moviesData. Create a histogram of the object named imdb num votes
in this file.
#b) Create a pie chart of the object mpaa rating.
#c) Create a bar chart of critics score for the first 10 movies.
#d) Create a scatter plot of imdb rating and imdb num votes to see their
relation.
#e) Create a boxplot for dvd rel day variable and also display labels.

moviesData = read.csv('./moviesData.csv')

#a) Histogram
imdb_num_votes = moviesData$imdb_num_votes
hist(imdb_num_votes, main="Histogram of imdb_num_votes", xlab="number of
votes")
```



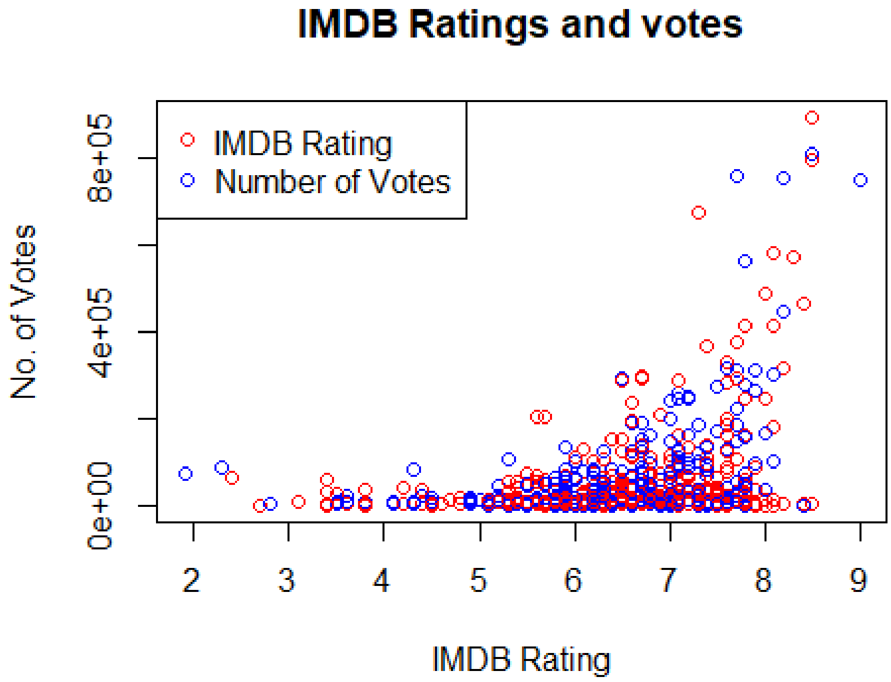
```
#b) pie diagram
rating = table(moviesData$mpaa_rating)
pie(rating, main="Pie diagram of mpaa_rating for movies dataset", col=10:16)
legend("bottomright",legend=c("PG-13","PG","NC-
17","G","Unrated","R"),fill=10:16)
```


Pie diagram of mpaa_rating for movies dataset

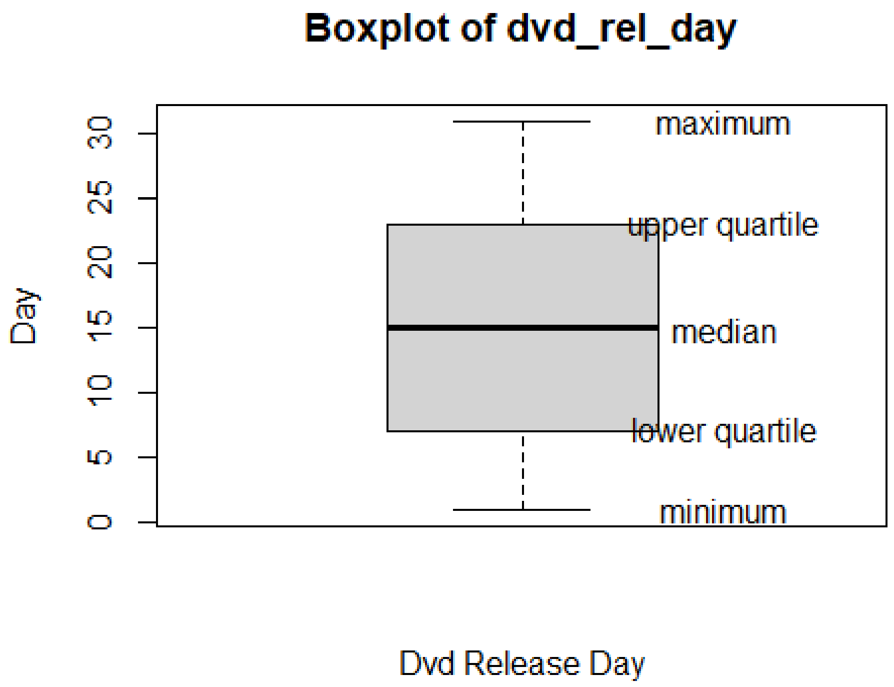
```
#c) Bar Chart

critics_score = moviesData$critics_score
barplot(critics_score[1:10], main="Bar chart of critics score for first 10
movies", xlab="Movies", ylab="Critics Score")
```



```
#d) Scatter Plot
imdb_rating = moviesData$imdb_rating
plot(imdb_rating, imdb_num_votes, col = c("red", "blue"), main = "IMDB
Ratings and votes", xlab="IMDB Rating", ylab="No. of Votes")
legend("topleft", legend = c("IMDB Rating", "Number of Votes"), col =
c("red", "blue"), pch = 1)
```



```
#e) Boxplot
dvd_rel_day = moviesData$dvd_rel_day
boxplot(dvd_rel_day, main="Boxplot of dvd_rel_day", xlab="Dvd Release Day",
ylab="Day")
f = fivenum(dvd_rel_day)
text(rep(1.3,5),f,labels=c("minimum","lower quartile","median","upper
quartile","maximum"))
```



```
#Q8) For the following in built dataset CO2 in R.Write a R program taking the
uptake variable and
#calculate the following terms [5M]
#a) Standard deviation.
#b) Quartile deviation.
#c) Range.
#d) Mode.
#e) Coefficient of range.

data("CO2")

uptake = CO2$uptake

#a) Standard deviation

print(sd(uptake))

## [1] 10.81441
```

```
#b) Quartile deviation

print((quantile(uptake, 0.75) - quantile(uptake, 0.25))/2);

##    75%
## 9.6125

#c) Range

print(max(uptake)-min(uptake))

## [1] 37.8

#d) Mode

y = table(uptake)
mode = names(y)[which(y == max(y))]
print(mode)

## [1] "17.9" "32.4"

#e) Coefficient of range

print((max(uptake)-min(uptake))/(max(uptake)+min(uptake)))

## [1] 0.7105263
```