DWDM R PROGRAMMING-PRACTICALS

1.List of Programs:

1The intervals and corresponding frequencies are as follows. age frequency

1-5. 200

5-15 450

15-20 300

20-50 1500

50-80 700

80-110 44

Compute an approximate median value for the data

CODING-

```
class_interval<-c("1-5","5-15","15-20","20-50","50-80","80-110")

data<-c(200,450,300,1500,700,44)

data.frame(class_interval,data)

median(data)
```

OUTPUT-

```
> data.frame(class_interval,data)

  class_interval data

1          1-5  200

2         5-15  450

3        15-20  300

4        20-50 1500

5        50-80  700

6       80-110   44

> median(data)

[1] 375
```

2. Suppose that the data for analysis includes the attribute age. The age values for the data tuples are (in increasing order) 13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70.

(a) What is the mean of the data? What is the median?

(b) What is the mode of the data? Comment on the data's modality (i.e., bimodal, trimodal, etc.).

(c) What is the midrange of the data?

(d) Can you find (roughly) the first quartile (Q1) and the third quartile (Q3) of the data?

Coding:

#2a

```
x<-c(13,15,16,16,19,20,20,21,22,22,25,25,25,25,30,33,33,35,35,35,35,36,40,45,46,52,70)

#mean

mean(x)

#median

median(x)
```

output:

```
mean(x)

[1] 29.96296

> #median

> median(x)

[1] 25
```

CODING FOR 2b-

#2b

```
#mode

MultipleModes <- function(x) {

  uniqx <- unique(x)

  freq_table <- tabulate(match(x, uniqx))

  modes <- uniqx[freq_table == max(freq_table)]

  modes

}
```

age_values <- c(13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70)

multiple_modes <- MultipleModes(age_values)

print(multiple_modes)

output:

25 35

CODING FOR 2c-

#midrange

c) age_values <- c(13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70)

median(age_values)

OUTPUT-

25

CODING FOR 2d-

d) #quartile

age_values <- c(13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70)

quantile(age_values)

output: 0% 25% 50% 75% 100%

13.0 20.5 25.0 35.0 70.0

3.Data Preprocessing :Reduction and Transformation

Use the two methods below to normalize the following group of data: 200, 300, 400, 600, 1000 (a) min-max normalization by setting min = 0 and max = 1 (b) z-score normalization

Coding:

#3a

data <- c(200, 300, 400, 600, 1000)

min<-min(data)

max<-max(data)

```
for (i in data)
{
  result1=i-min
  result2=max-min
  result3=result1/result2
  print(result3)
}
```

OUTPUT:

```
[1] 0
[1] 0.125
[1] 0.25
[1] 0.5
[1] 1
```

#3b

```
 data <- c(200, 300, 400, 600, 1000)
mean1<-mean(data)
deviation<-sd(data)
for (i in data)
{
  result1=i-mean1
  result2=result1/deviation
  print(result2)
}
```

OUTPUT:

```
[1] -0.9486833
[1] -0.6324555
[1] -0.3162278
[1] 0.3162278
[1] 1.581139
```

4.Data:11,13,13,15,15,16,19,20,20,20,21,21,22,23,24,30,40,45,45,45,71,

72,73,75

a) Smoothing by bin mean

b) Smoothing by bin median

c) Smoothing by bin boundaries

CODING-

```
#binning
data <- c(11, 13, 13, 15, 15, 16, 19, 20, 20, 20, 21, 21, 22, 23, 24, 30, 40, 45, 45, 45, 71, 72, 73, 75)
range=6
bin1=c()
bin2=c()
bin3=c()
bin4=c()
for(i in data[1:range]){
  bin1=append(bin1,i)
}
range1=range+1
range2=range*2
for(j in data[range1:range2])
{
  bin2=append(bin2,j)
}
range3=range2+1
range4=range*3
for(k in data[range3:range4])
{
  bin3=append(bin3,k)
}
range5=range4+1
range6=range*4
```

```
for(l in data[range5:range6]){
  bin4=append(bin4,l)
}
```

#4a

```
mean(bin1)
mean(bin2)
mean(bin3)
mean(bin4)
```

#4b

```
median(bin1)
median(bin2)
median(bin3)
median(bin4)
```

OUTPUT:

#4a

```
> mean(bin1)
[1] 13.83333
> mean(bin2)
[1] 20.16667
> mean(bin3)
[1] 30.66667
> mean(bin4)
[1] 63.5
>
```

#4b

```
> median(bin1)
[1] 14
> median(bin2)
[1] 20
> median(bin3)
[1] 27
```

> median(bin4)

[1] 71.5

5) 5. Suppose that a hospital tested the age and body fat data for 18 randomly selected adults with the following results:

age	23	23	27	27	39	41	47	49	50
%fat	9.5	26.5	7.8	17.8	31.4	25.9	27.4	27.2	31.2
age	52	54	54	56	57	58	58	60	61
%fat	34.6	42.5	28.8	33.4	30.2	34.1	32.9	41.2	35.7

CODING-

age <- c(23,23,27,27,39,41,47,49,50,52,54,54,56,57,58,58,60,61)

body_fat_percent <- c(9.5,26.5,7.8,17.8,31.4,25.9,27.4,27.2,31.2,34.6,42.5,28.8,33.4,30.2,34.1,32.9,41.2,35.7)

#5.a

mean(age)

mean(body_fat_percent)

median(age)

median(body_fat_percent)

sd(age)

sd(body_fat_percent)

#5.b

#create dataframe

df<-data.frame(age,body_fat_percent)

#box plot

boxplot(df)

#scatter plot

plot(df)

#qq plot

qqnorm(age)

qqline(age)

qqnorm(body_fat_percent)

qqline(body_fat_percent)

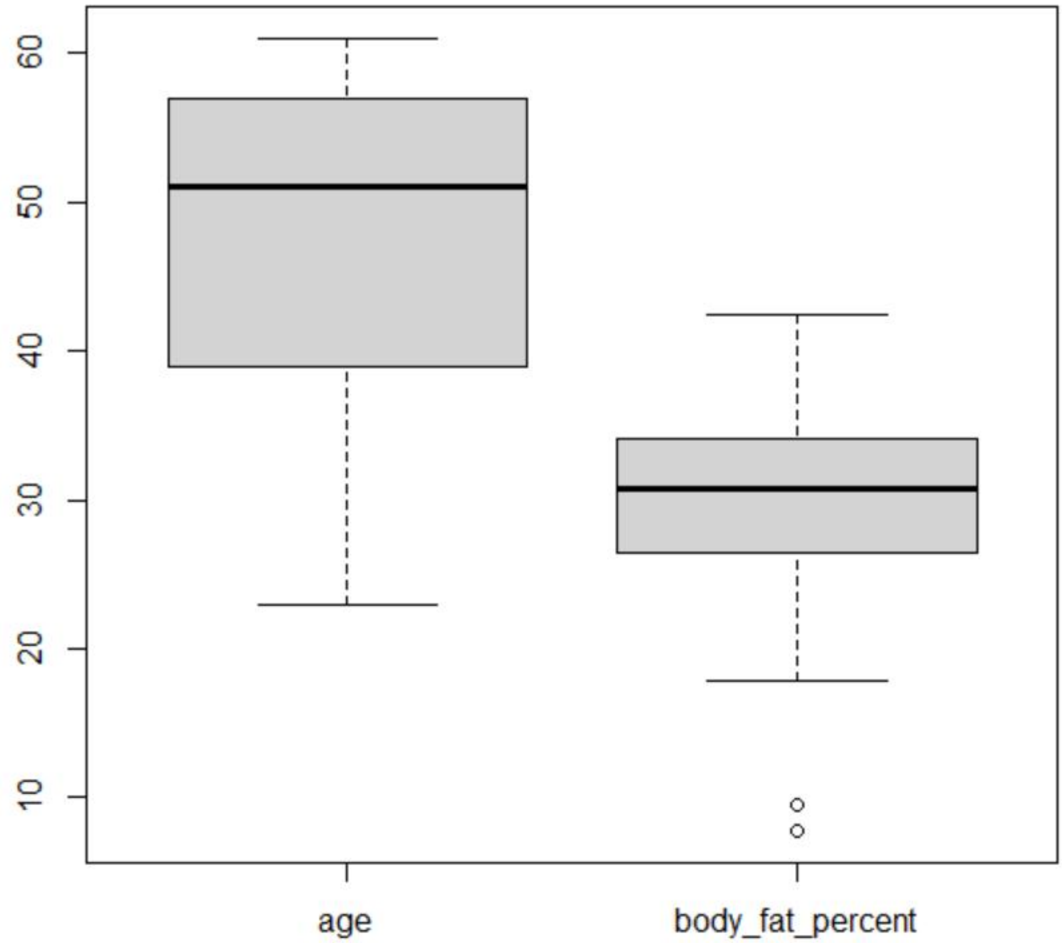
OUTPUT-

#5a

```
> mean(age)
 [1] 46.44444
> mean(body_fat_percent)
 [1] 28.78333
 > median(age)
[1] 51
 > median(body_fat_percent)
 [1] 30.7
> sd(age)
 [1] 13.21862
> sd(body_fat_percent)
 [1] 9.254395
```

#5.b

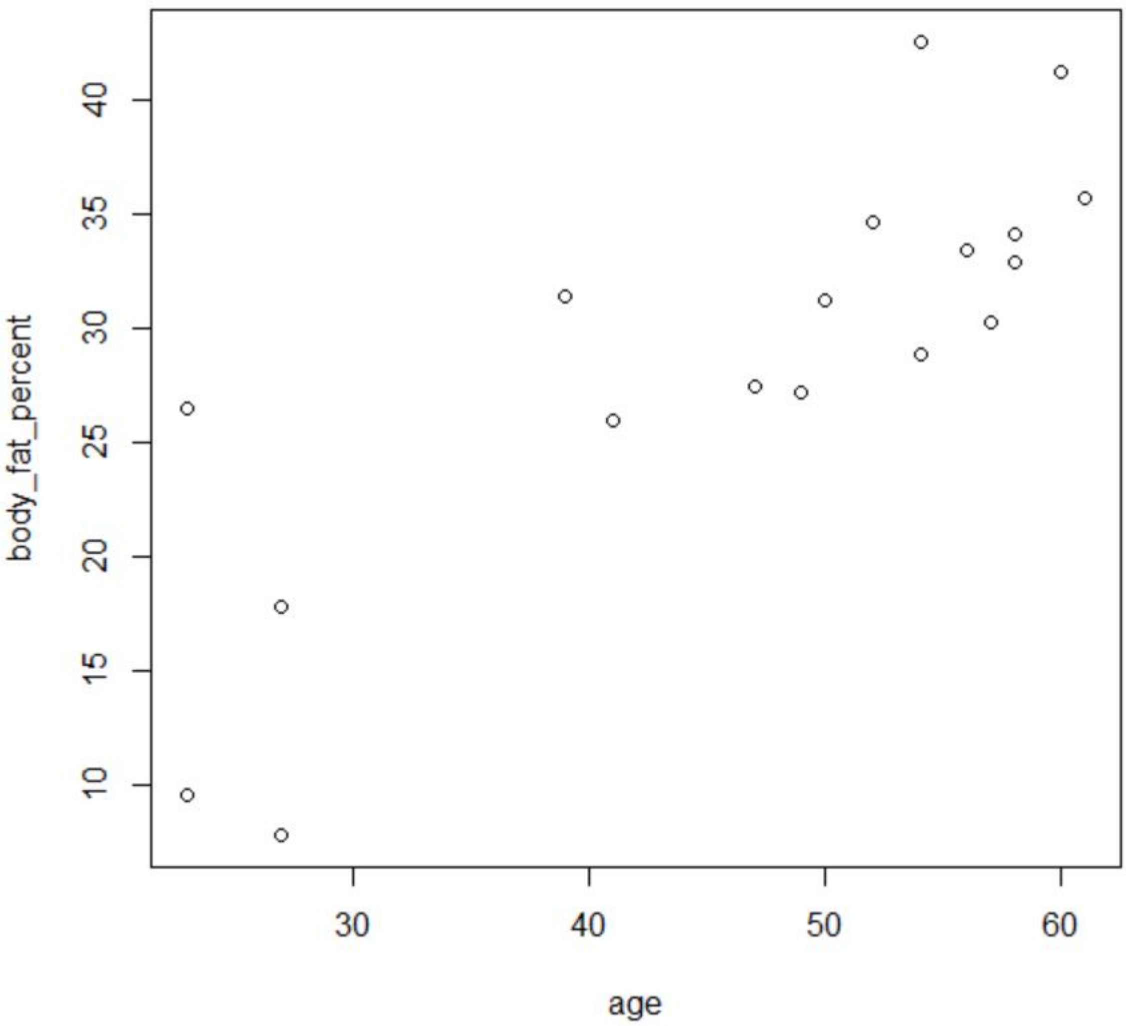
BOXPLOT-



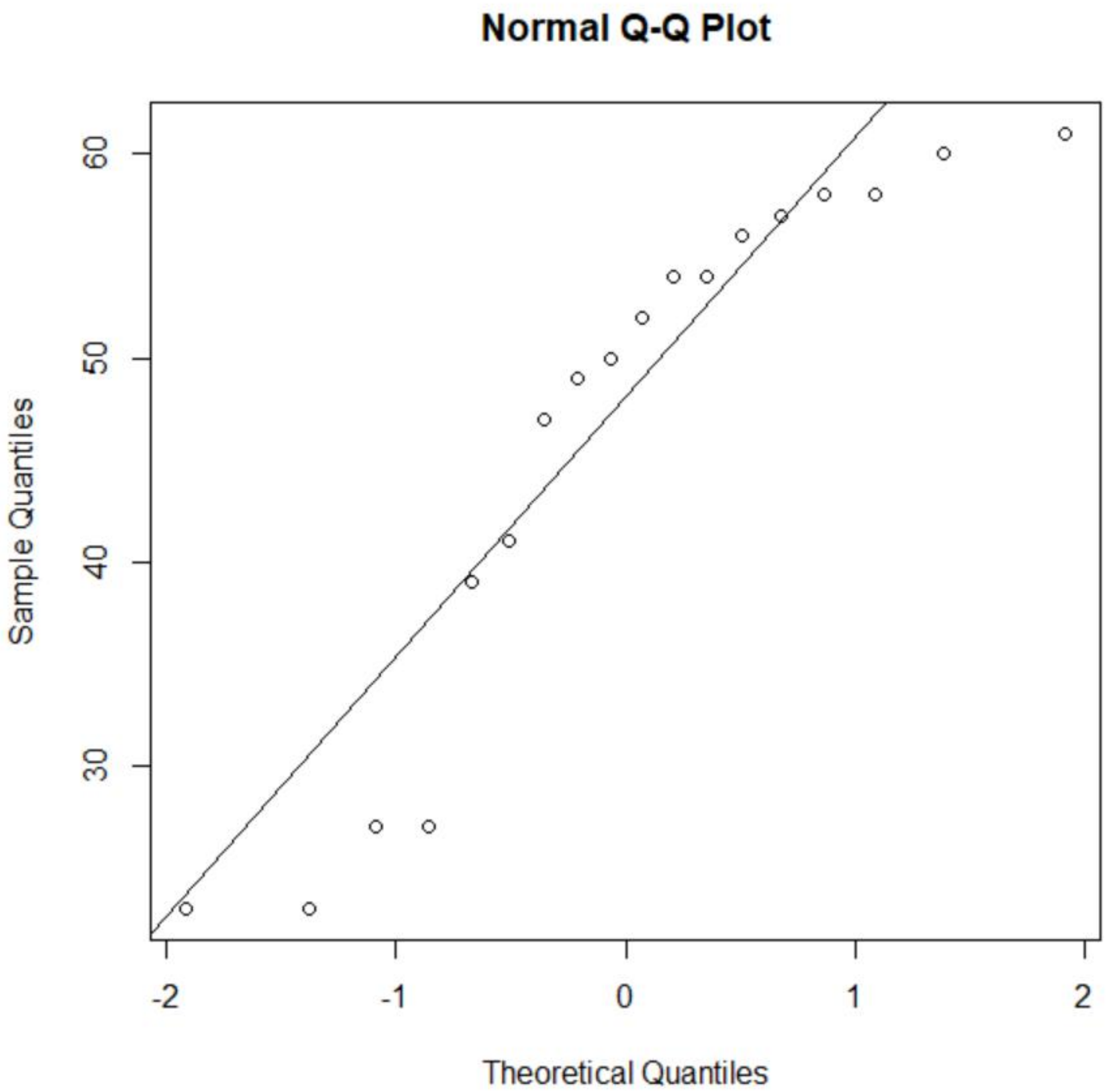
SCATTER PLOT-

#5c

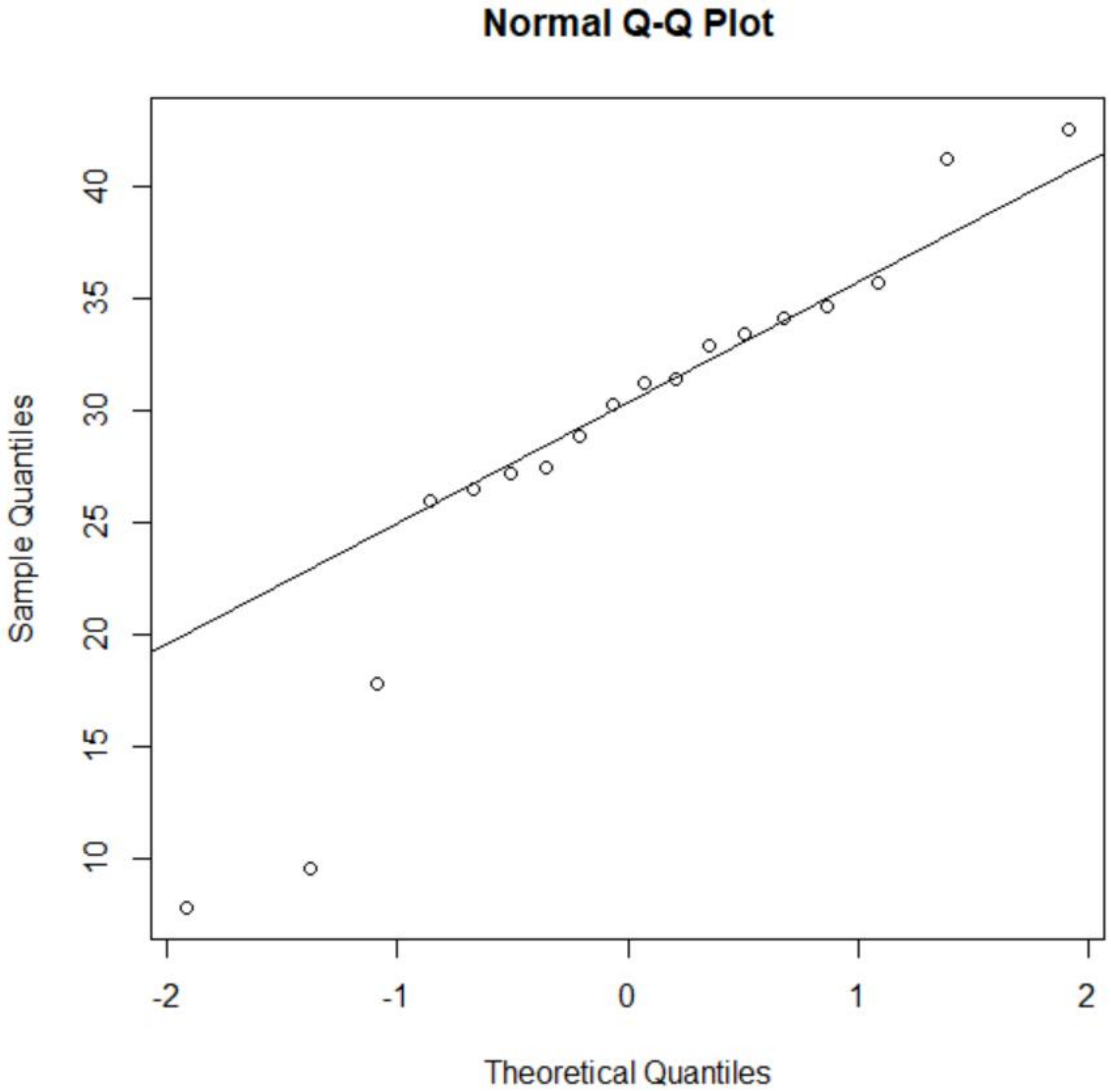
QQ



QQ PLOT FOR AGE-



QQPLOT FOR BODY FAT PERCENT-



6.Suppose that a hospital tested the age and body fat data for 18 randomly selected adults with the following results:

(i) Use min-max normalization to transform the value 35 for age onto the range [0.0, 1.0].
(ii) Use z-score normalization to transform the value 35 for age, where the standard deviation of age is 12.94 years.
(iii) Use normalization by decimal scaling to transform the value 35 for age. Perform the above functions using R – tool

CODING-

```
age <- c(23,23,27,27,39,41,47,49,50,52,54,54,56,57,58,58,60,61)

new_age<-c()

for(i in age){
```

```
  if(i<=35){
    new_age=append(new_age,i)
  }
}
print(new_age)
```

#6a

```
#min max normalization
min<-min(new_age)
max<-max(new_age)
for (i in new_age)
{
  result1=i-min
  result2=max-min
  result3=result1/result2
  print(result3)
}
```

#6b

```
#z score normalization
mean1<-mean(new_age)
for (i in new_age)
{
  result1=i-mean1
  result2=result1/12.94
  print(result2)
}
```

#6c

```
#decimal scaling
n=200
j=nchar(y)
scaling=n/10^j
print(scaling)
```

OUTPUT-

6.a MIN MAX NORMALIZATION

[1] 0

[1] 0

[1] 1

[1] 1

6.b Z SCORE NORMALIZATION

[1] -0.8660254

[1] -0.8660254

[1] 0.8660254

[1] 0.8660254

6.c DECIMAL SCALING

[1] 0.2

7.The following values are the number of pencils available in the different boxes. Create a vector and find out the mean, median and mode values of set of pencils in the given data.

Box1	Box2	Box3	Box4	Box5	Box6	Box7	Box8	Box9	Box 10
9	25	23	12	11	6	7	8	9	10

CODING-

```
box_no=c("box1","box2","box3","box4","box5","box6","box7","box8","box9","box10")

pencil=c(9,25,23,12,11,6,7,8,9,10)

df<-data.frame(box_no,pencil)

#dataframe

print(df)

#mean

mean(pencil)
```

```
#median
median(pencil)
#mode
mode=names(which.max(table(pencil)))
print(mode)
```

OUTPUT-

```
> data.frame(box_NO,pencil)
  box_NO pencil
1    box1     9
2    box2    25
3    box3    23
4    box4    12
5    box5    11
6    box6     6
7    box7     7
8    box8     8
9    box9     9
10  box10    10
> mean(pencil)
[1] 12
> median(pencil)
[1] 9.5
> print(mode)
[1] "9"
```

8. the following table would be plotted as (x,y) points, with the first column being the x values as number of mobile phones sold and the second column being the y values as money. To use the scatter plot for how many mobile phones sold.

x :4 1 5 7 10 2 50 25 90 36

y :12 5 13 19 31 7 153 72 275 110

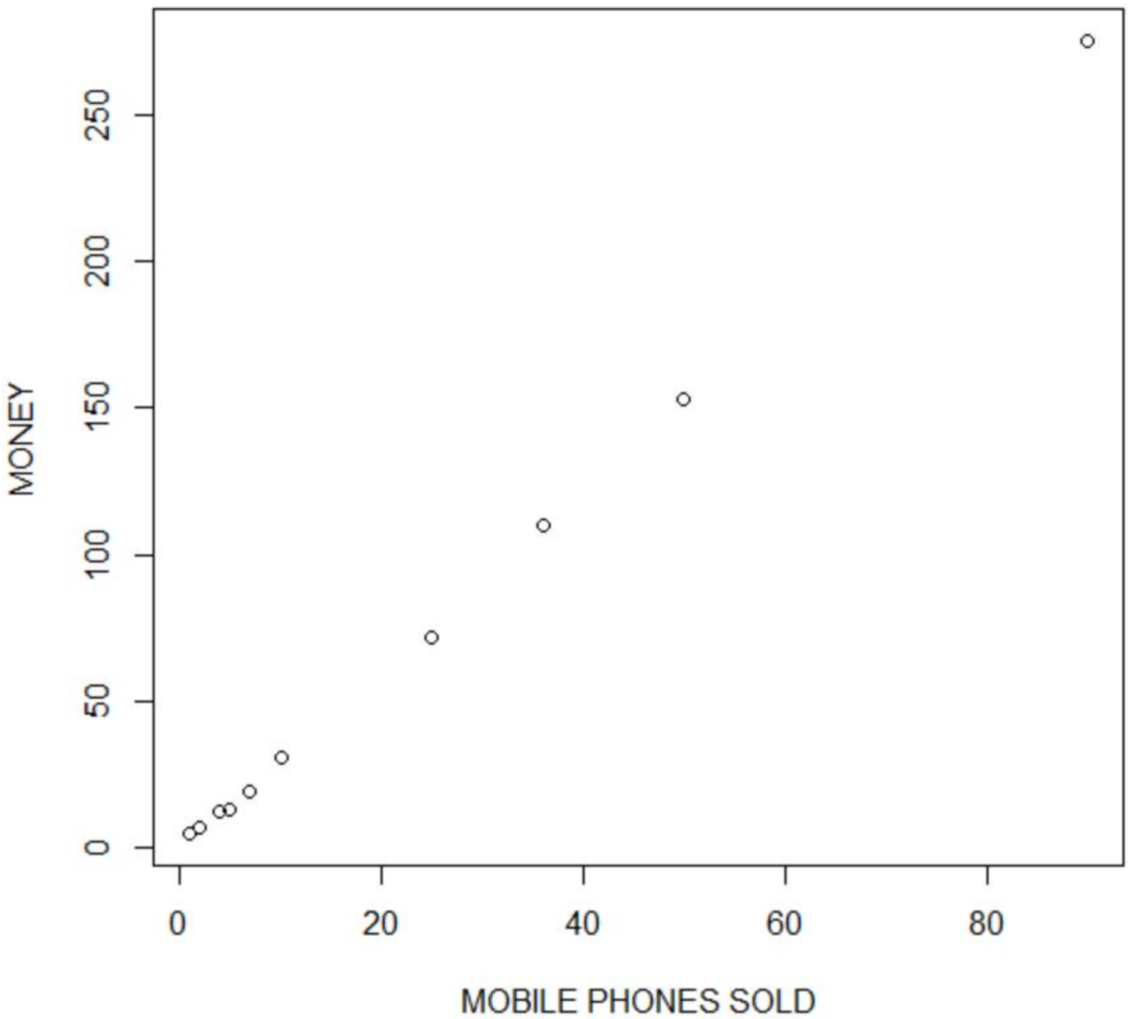
CODING-

```
x<-c(4, 1, 5, 7, 10, 2, 50, 25, 90, 36)

y<-c(12,5, 13, 19, 31, 7, 153, 72, 275, 110)

plot(x,y,xlab='MOBILE PHONES SOLD',ylab='MONEY')
```

OUTPUT-



9. Implement of the R script using marks scored by a student in his model exam has been sorted as follows: 55, 60, 71, 63, 55, 65, 50, 55,58,59,61,63,65,67,71,72,75. Partition them into three bins by each of the following methods. Plot the data points using histogram.

(a) equal-frequency (equi-depth) partitioning (b) equal-width partitioning

CODING-

```
marks<-c(55, 60, 71, 63, 55, 65, 50, 55,58,59,61,63,65,67,71,72,75)

binning1=c()

binning2=c()

binning3=c()

class=6

#binning partition

for(a in marks[1:class]){

  binning1=append(binning1,a)

}

range1=range+1

range2=range*2

for(b in marks[range1:range2])

{

  binning2=append(binning2,b)

}

range3=range2+1

range4=range*3

for(c in marks[range3:range4])

{
```

```
  binning3=append(binning3,c)
}
print(binning1)
print(binning2)
print(binning3)
```

#histogram

```
hist(binning1)
hist(binning2)
hist(binning3)
```

#9a

#equal-frequency

```
freq=length(marks)/range
print(freq)
```

#9b

#equal-width

```
min<-min(marks)
max<-max(marks)
result<-max-min
width<-result/range
cat("width is",width)
bin1=width+min
print(bin1)
bin2=2*width+min
print(bin2)
```

bin3=3*width+min

print(bin3)

OUTPUT-

> print(binning1)

[1] 55 60 71 63 55 65

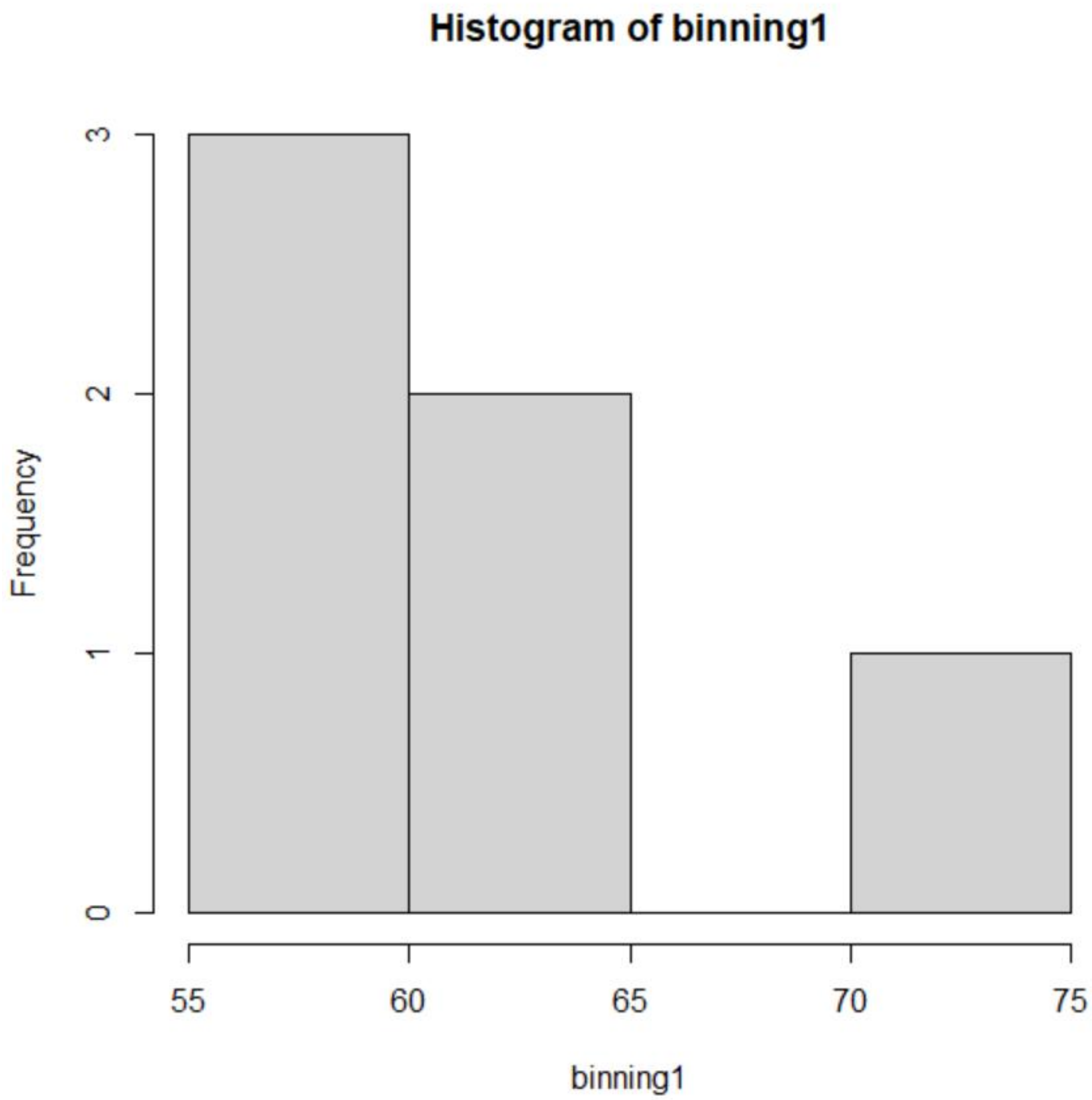
> print(binning2)

[1] 50 55 58 59 61 63

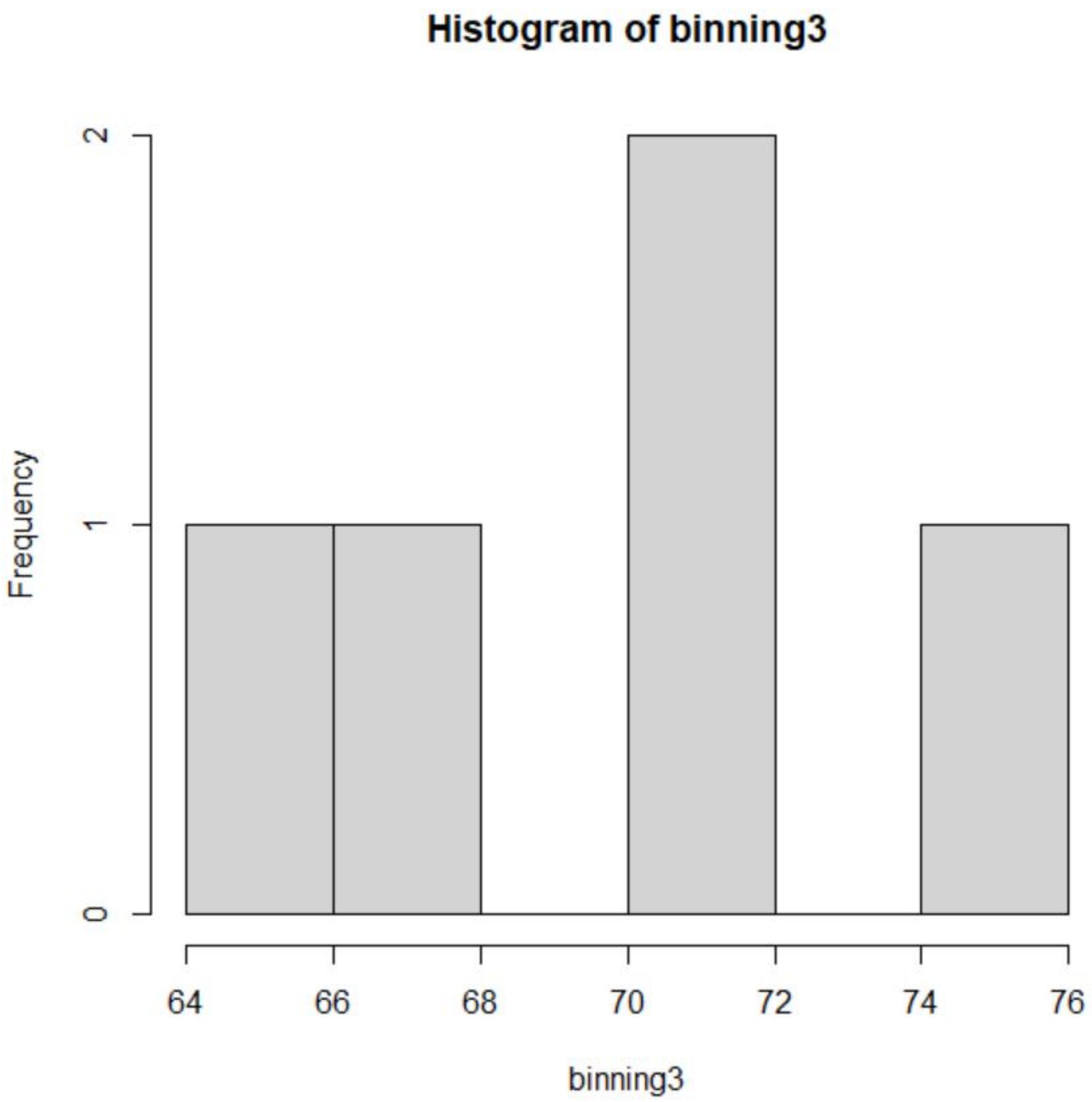
> print(binning3)

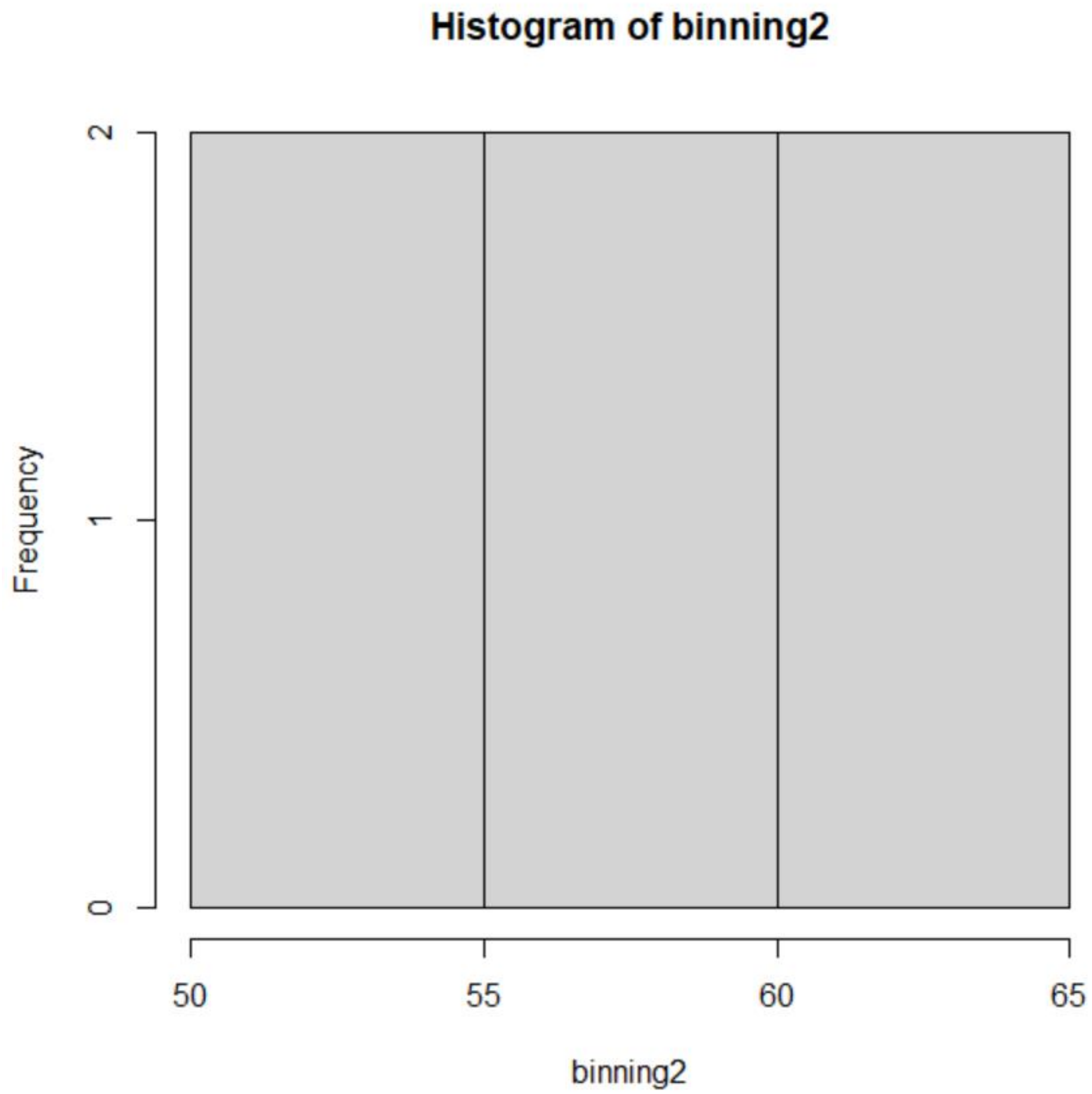
[1] 65 67 71 72 75 NA

HISTOGRAM-



Histogram of binning1
Frequency
0
1
2
3
55
60
65
70
75
binning1


Histogram of binning3
Frequency
0
1
2
64
66
68
70
72
74
76
binning3



#9a

#equal frequency

> print(freq)

[1] 2.833333

#9b

#equal width

width is 4.166667> bin1=width+min

> print(bin1)

[1] 54.16667

```
> bin2=2*width+min

> print(bin2)

[1] 58.33333

> bin3=3*width+min

> print(bin3)

[1] 62.5
```

10. Suppose that the speed car is mentioned in different driving style.

Regular 78.3 81.8 82 74.2 83.4 84.5 82.9 77.5 80.9 70.6 Speed

Calculate the Inter quantile and standard deviation of the given data.

CODING-

```
speed<-c(78.3 ,81.8 ,82 ,74.2 ,83.4 ,84.5 ,82.9 ,77.5 ,80.9 ,70.6 )

#interquartile

IQR(speed)

#standard deviation

sd(speed)
```

OUTPUT-

```
> IQR(speed)

[1] 4.975

> sd(speed)

[1] 4.445835
```

11. **Suppose that the data for analysis includes the attribute age. The age values for the data tuples are (in increasing order) 13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70.**

Can you find (roughly) the first quartile (Q1) and the third quartile

(Q3) of the data?

CODING-

marks<-c(13,15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70)

quantile(marks)

OUTPUT-

```
> quantile(marks)

  0%  25%  50%  75% 100%

13.0 20.5 25.0 35.0 70.0
```