EX.NO: 01

Date:

ODD_or_EVEN, ADDITION AND SUBTRACTION PROGRAM USING R TOOLS

PROBLEM STATEMENT:

Download the dataset from the UCI repository (or) any other appropriate website and perform (or) implement the central tendency measures. (mean, median, mode and midrange) and Data dispersion technique including summary.

DESCRIPTION:

This data comes from the 2010 census profile of general population and housing characteristics. Zip codes and limited to those that fall at least partially within LA city boundaries. The dataset will be updated after the next census in 2020.

CENTRAL TENDENCY:

i. **Odd or Even :** Odd numbers are those numbers that cannot be divided into two equal parts, whereas even numbers are those numbers that can be divided into two equal parts.

ii. **Addition :** Adding something, especially two or more numbers.

iii. **Subtraction** : Subtracting something, especially two or more numbers.

INPUTS AND OUTPUTS OF BASIC PROGRAM :

ODD or EVEN :

INPUT :

```
num=as.integer(readline(prompt = "Enter a number : "))
if((num%%2) == 0){
  print('Number is even')
} else {
  print('Number is odd')
}
```

OUTPUT :

```
> source("D:/folders/DWHDM/EXERCISE_1(BASIC_PROGRAMS)/1_odd_or_even.R")
Enter a number :     4
[1] "Number is even"
> source("D:/folders/DWHDM/EXERCISE_1(BASIC_PROGRAMS)/1_odd_or_even.R")
Enter a number : 5
[1] "Number is odd"
> source("D:/folders/DWHDM/EXERCISE_1(BASIC_PROGRAMS)/1_odd_or_even.R")
Enter a number : 1
[1] "Number is odd"
>
```

ADDITION :

INPUT :

```
num1 = as.integer(readline(prompt= "Enter a number1 : "))
num2 = as.integer(readline(prompt= "Enter a number2 : "))
num3 = num1 + num2
print(num3)
```

OUTPUT :

```
Enter a number1 : 2
Enter a number2 : 2
[1] 4
```

SUBTRACTION :

INPUT :

```
num1 = as.integer(readline(prompt= "Enter a number1 : "))
num2 = as.integer(readline(prompt= "Enter a number2 : "))
num3 = num1 - num2
print(num3)
```

OUTPUT :

```
Enter a number1 : 4
Enter a number2 : 2
[1] 2
```

RESULT:

Thus the basic programs like odd or even, addition and subtraction are executed successfully.

EX. NO: 02

Date:

CENTRAL TENDENCY AND DATA DISPERSION MEASURES USING R-TOOL

PROBLEM STATEMENT:

Download the dataset from the UCI repository (or) any other appropriate website and perform (or) implement the central tendency measures. (mean, median, mode and midrange) and Data dispersion technique including summary.

DESCRIPTION:

This data comes from the 2010 census profile of general population and housing characteristics. Zip codes and limited to those that fall at least partially within LA city boundaries. The dataset will be updated after the next census in 2020.

CENTRAL TENDENCY:

i. **Mean** : The mean is the average of the numbers: a calculated "central" value of a set of numbers.

ii. **Median :** The median is a statistical term that is one way of finding the 'average' of a set of data points.

iii. **Mode :** The mode of a set of data values is the value that appears most often.

iv. **Summary :** A summary table stores data that has been aggregated in a way that answers a mean common (or resource-intensive) business query.

INPUTS AND OUTPUTS OF CENTRAL TENDENCY AND DATA DISPERSION:

MEAN:

INPUT :

```
names<-c("Ram","Shyam","Kumar")
age<-c(23,24,35)
marks<-c(88,78,25)
df<-data.frame(names,age,marks)
mean(df $age)
write.csv(df,"datafr.csv")
```

OUTPUT :

```
> mean(df $age)
[1] 27.33333
```

MEDIAN :

INPUT :

```
names<-c("Ram","Shyam","Kumar")
age<-c(23,24,35)
marks<-c(88,78,25)
df<-data.frame(names,age,marks)
median(df $age)
write.csv(df,"datafr.csv")
```

OUTPUT :

```
> median(df $age)
[1] 24
```

MODE :

INPUT :

```
names<-c("Ram","Shyam","Kumar")
age<-c(23,24,35)
marks<-c(88,78,25)
df<-data.frame(names,age,marks)
mode(df $age)
write.csv(df,"datafr.csv")
```

OUTPUT :

```
> mode(df $age)
[1] "numeric"
```

SUMMARY :

INPUT :

```
names<-c("Ram","Shyam","Kumar")
age<-c(23,24,35)
marks<-c(88,78,25)
df<-data.frame(names,age,marks)
summary(df $age)
write.csv(df,"datafr.csv")
```

OUTPUT :

```
> summary(df $age)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
  23.00   23.50   24.00   27.33   29.50   35.00 
```

RESULT:

Thus the central tendency and measures of dispersion have been executed successfully. The outlier values are from more than upper fence there are no lower fence values.

EX.NO: 03
Date:

CENTRAL TENDENCY AND DATA DISPERSION MEASURES USING R-TOOL

PROBLEM STATEMENT:

Download the dataset from the UCI repository (or) any other appropriate website and perform (or) implement the central tendency measures.(mean, median, mode and midrange) and Data dispersion technique including summary.

DESCRIPTION:

This data comes from the 2010 census profile of general population and housing characteristics. Zip codes and limited to those that fall at least partially within LA city boundaries. The dataset will be updated after the next census in 2020.

MEASURES OF DISPERSION:

i. **Inter Quartile Range :**The interquartile range (IQR) is a measure of variability, based on dividing a data set into quartiles. Quartiles divide a rank-ordered data set into four equal parts.

ii. **Quartiles :**A quartile is a statistical term describing a division of observations into four defined intervals based upon the values of the data and how they compare to the entire set of observations.

iii. **Mid Range :**The arithmetic mean of the largest and the smallest values in a sample or other group.

INPUTS AND OUTPUTS OF CENTRAL TENDENCY AND DATA DISPERSION:

IQR :

INPUT :

```
names<-c("Ram","Shyam","Kumar")
age<-c(23,24,35)
marks<-c(88,78,25)
df<-data.frame(names,age,marks)
IQR(df $age)
write.csv(df,"datafr.csv")
```

OUTPUT :

```
> IQR(df $age)
[1] 6
```

QUANTILE :

INPUT :

```
names<-c("Ram","Shyam","Kumar")
age<-c(23,24,35)
marks<-c(88,78,25)
df<-data.frame(names,age,marks)
quantile(df $age)
write.csv(df,"datafr.csv")
```

OUTPUT :

```
> quantile(df $age)
  0%  25%  50%  75% 100%
23.0 23.5 24.0 29.5 35.0
```

RANGE :

INPUT :

```
names<-c("Ram","Shyam","Kumar")
age<-c(23,24,35)
marks<-c(88,78,25)
df<-data.frame(names,age,marks)
range(df $age)
write.csv(df,"datafr.csv")
```

OUTPUT :

```
> range(df $age)
[1] 23 35
```

RESULT:

Thus the central tendency and measures of dispersion have been executed successfully. The outlier values are from more than upper fence there are no lower fence values.

EX.NO: 04
Date :

PLOTTING GRAPHS USING R-TOOL

PROBLEM STATEMENT:

Plot the boxplot, barplot and horizontal barplot for the dataset which was taken in the previous exercise.

DESCRIPTION:

Consider a dataset diabetes.csv, where it contains the attributes are Pregnancies, Glucose, BloodPressure, SkinThickness, Insulin, BMI, DiabetesPedigreeFunction, Age, Outcomes.

IMPLEMENTATION:

i. BoxPlot
ii. BarPlot

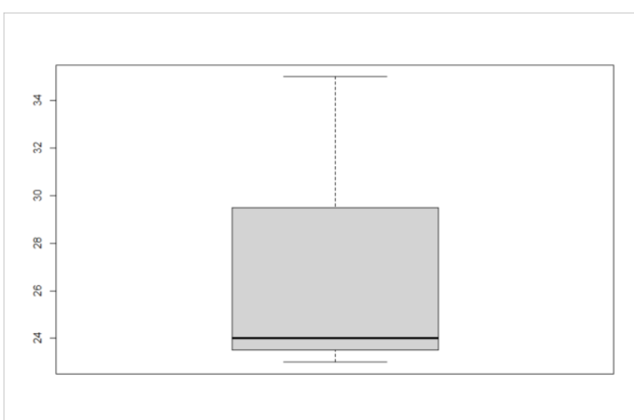
BOXPLOT :

A box plot is a graphical rendition of statistical data based on the minimum, fir0000000000000000000000000st quartile, median, third quartile, and maximum. The term "box plot" comes from the fact that the graph looks like a rectangle with lines extending from the s1top and bottom. Because of the extending lines, this type of graph is sometimes called a box-andwhisker plot.

INPUT :

```
names<-c("Ram","Shyam","Kumar")
age<-c(23,24,35)
marks<-c(88,78,25)
df<-data.frame(names,age,marks)
hist(df$age)
boxplot(df$age)
```

OUTPUT:



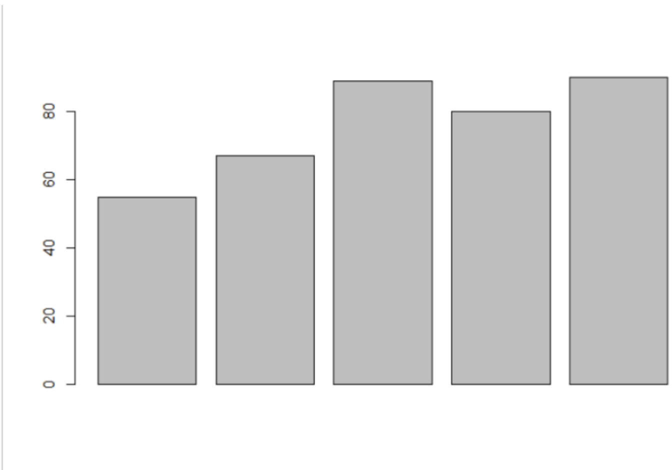
BARPLOT :

A barplot (or barchart) is one of the most common types of graphic. It shows the relationship between a numeric and a categoric variable. Each entity of the categoric variable is represented as a bar. The size of the bar represents its numeric value.

INPUT :

```
a<-c(55,67,89,80,90)
barplot(a)
```

OUTPUT :

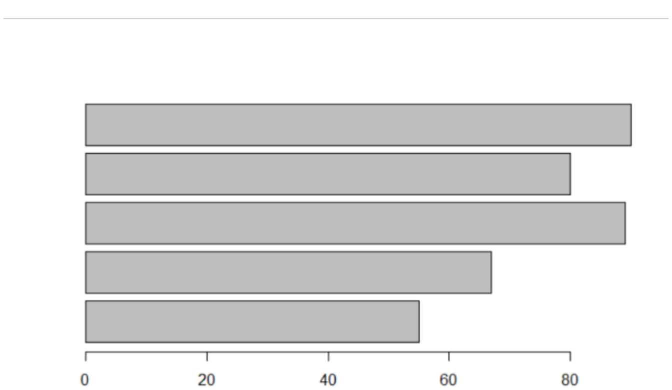


HORIZONTAL BARPLOT :

INPUT :

```
a<-c(55,67,89,80,90)
barplot(a)
barplot(a,horiz = TRUE)
```

OUTPUT :



RESULT:

Thus, the plotting of graphs like boxplot, barplot and horizontal barplot for the given dataset has been successfully completed.

EX.NO: 05
Date :

PLOTTING GRAPHS USING R-TOOL

PROBLEM STATEMENT:

Plot the histogram and scatterplot for the dataset which was taken in the previous exercise.

DESCRIPTION:

Consider a dataset diabetes.csv, where it contains the attributes are Pregnancies, Glucose, BloodPressure, SkinThickness, Insulin, BMI, DiabetesPedigreeFunction, Age, Outcomes

IMPLEMENTATION:

i. Histogram
ii. Scatterplot (Scatter Smooth)

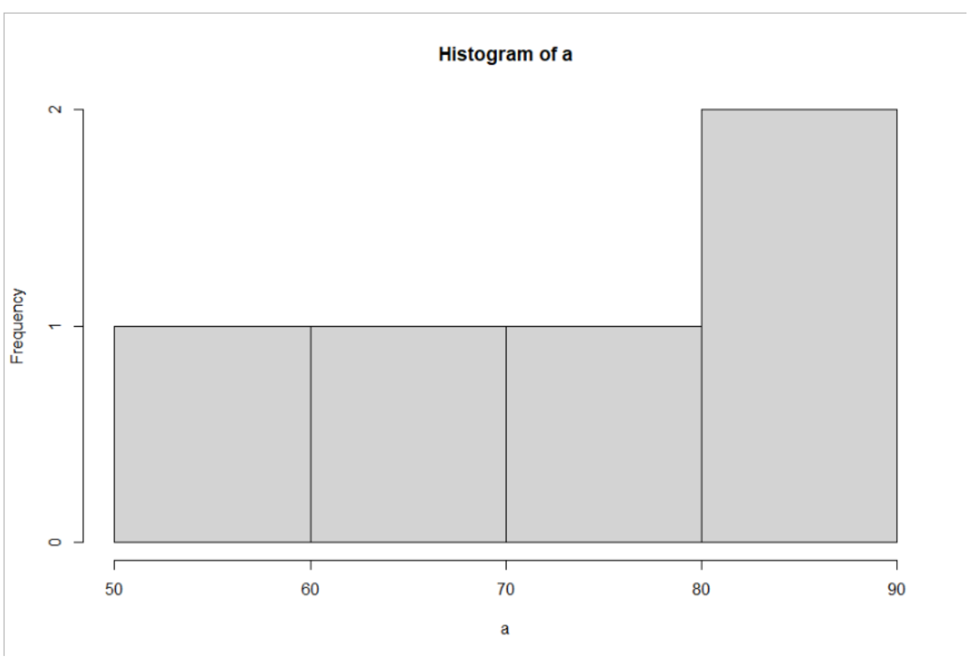
HISTOGRAM :

A diagram consisting of rectangles whose area is proportional to the frequency of a variable and whose width is equal to the class interval.

INPUT :

```
a<-c(55,67,89,80,90)
hist(a)
```

OUTPUT :



SCATTERPLOT :

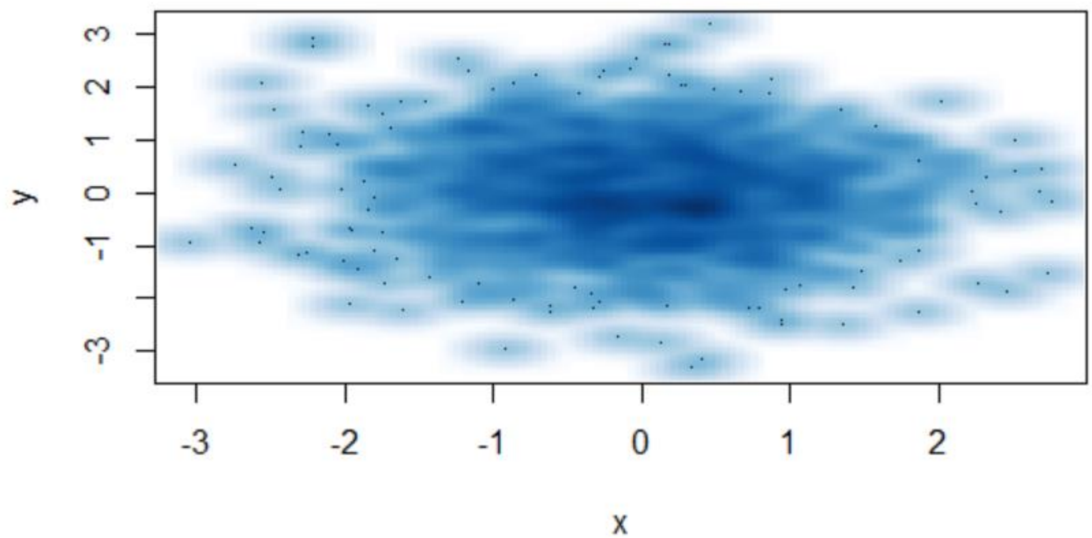
INPUT :

```
# Data
set.seed(9)
x <- rnorm(1000)
y <- rnorm(1000)

# Smooth scatter plot
smoothScatter(y ~ x)

# Equivalent to:
smoothScatter(x, y)
```

OUTPUT :



RESULT:

Thus, the plotting of graphs like histogram and scatterplot for the given dataset has been successfully completed.

EX.NO : 06
Date :

PERFORM CORRELATION ANALYSIS AND NORMALIZATION USING R-TOOL

PROBLEM STATEMENT :

Perform the correlation analysis for the numerical attribute using pearson coefficient and for categorical attribute using chi-square and also, perform the normalization technique using z score for the given data frames of particular dataset.

DESCRIPTION :

A dataset of name diabetes.csv is given for the correlation analysis, to calculate or to correlate between Age and Insulin and the same dataset for the performance of normalization technique.

- **CORRELATION ANALYSIS:**

  STEPS INVOLVED:

  i. Create a new table with required dataframes.
  ii. After that apply the formula or query for the chi-square test.

  QUERIES:

  - diabetes1<-table(diabetes$Age,diabetes$Insulin)
  - diabetes1
  - chi sq.test(diabetes1)

INPUT :

```
diabetes1<-read.csv("D:\\folders\\DWHDM\\diabetes.csv")

#step 1
diabetes1<-table(diabetes1 $Age,diabetes1 $Insulin)
diabetes1

#step 2
chisq.test(diabetes1)
```

OUTPUT :

```
> diabetes1

      0 14 15 16 18 22 23 25 29 32 36 37 38 40 41 42 43 44 45 46 48 49 50 51
  21 28  0  0  0  1  0  1  1  0  0  0  0  0  1  0  0  0  0  1  0  0  0  1  1
  22 29  0  0  1  0  0  0  0  0  1  1  1  0  0  0  0  0  1  1  0  0  0  1  0
  23 10  0  1  0  0  0  0  0  0  0  0  1  0  0  0  0  0  1  1  0  2  0  0  0
  24 15  0  0  0  0  0  0  0  0  0  1  0  0  1  0  0  1  0  0  0  0  0  1  0
  25 18  1  0  0  1  0  0  0  0  0  0  0  1  0  1  0  0  0  0  0  0  0  0  0

     52 53 54 55 56 57 58 59 60 61 63 64 65 66 67 68 70 71 72 73 74 75 76 77
  21  0  0  0  0  1  0  0  0  0  1  0  1  0  1  0  0  0  1  0  0  0  0  2  0
  22  0  1  1  0  0  0  1  0  1  0  1  1  0  1  0  0  0  0  0  0  0  1  1  0
```

```
> chisq.test(diabetes1)

        Pearson's Chi-squared test

data:  diabetes1
X-squared = 7561.7, df = 9435, p-value = 1
```

- **Z SCORE NORMALIZATION :**

  - A<- c(diabetes$Age)
  - Mean<- mean(A)
  - Std<- sd(A)
  - Zscore<- (A-Mean)/Std
  - Zscore

INPUT :

```
diabetes<-read.csv("D:\\folders\\DWHDM\\diabetes.csv")
A<-c(diabetes$Age)
Mean<-mean(A)
Std<-sd(A)
Zscore<-(A-Mean)/Std
Zscore
```

OUTPUT :

```
> sd(A)
[1] 11.76023
>
```

RESULT:

Thus, the correlation analysis and normalization for the given dataset has been successfully executed and observed.

EX.NO : 07
Date :

PERFORM CORRELATION ANALYSIS AND NORMALIZATION USING R-TOOL

PROBLEM STATEMENT :

Perform the correlation analysis for perform the normalization technique for the given data frames of particular dataset.

DESCRIPTION :

A dataset of name diabetes.csv is given for the correlation analysis, to calculate or to correlate between Age and Insulin and the same dataset for the performance of normalization technique.

- **NORMALIZATION :**

  i. **MEAN NORMALIZATION**
  - A<-c(diabetes$Age)
  - Mean<-mean(A)

  INPUT :

```
diabetes<-read.csv("D:\\folders\\DWHDM\\diabetes.csv")
A<-c(diabetes$Age)
#step 1
Mean<-mean(A)
```

  OUTPUT :

```
> mean(A)
[1] 33.24089
>
```

  ii. **MINIMUM NORMALIZATION**
  - A<-c(diabetes$Age)
  - Minimum<-min(diabetes$Age)

  INPUT :

```
diabetes<-read.csv("D:\\folders\\DWHDM\\diabetes.csv")
A<-c(diabetes$Age)

#step 2
Minimum<-min(diabetes$Age)
```

  OUTPUT :

```
> Minimum
[1] 21
>
```

iii. **MAXIMUM NORMALIZATION**

- A<-c(diabetes$Age)
- Maximum<-max(diabetes$Age)

INPUT :

```
diabetes<-read.csv("D:\\folders\\DWHDM\\diabetes.csv")
A<-c(diabetes$Age)

#step 3
Maximum<-max(diabetes$Age)
```

OUTPUT :

```
> Maximum
[1] 81
```

iv. **MINMAX NORMALIZATION**

- A<-c(diabetes$Age)
- MinMax<-(A-Minimum)/(Maximum-Minimum)
- MinMax

INPUT :

```
diabetes<-read.csv("D:\\folders\\DWHDM\\diabetes.csv")
A<-c(diabetes$Age)

MinMax<-(A-Minimum)/(Maximum-Minimum)
MinMax
```

OUPTUT :

```
>
> MinMax
  [1] 0.48333333 0.16666667 0.18333333 0.00000000 0.20000000
  [6] 0.15000000 0.08333333 0.13333333 0.53333333 0.55000000
 [11] 0.15000000 0.21666667 0.60000000 0.63333333 0.50000000
 [16] 0.18333333 0.16666667 0.16666667 0.20000000 0.18333333
 [21] 0.10000000 0.48333333 0.33333333 0.13333333 0.50000000
 [26] 0.33333333 0.36666667 0.01666667 0.60000000 0.28333333
 [31] 0.65000000 0.11666667 0.01666667 0.11666667 0.40000000
 [36] 0.20000000 0.23333333 0.41666667 0.10000000 0.58333333
 [41] 0.08333333 0.26666667 0.45000000 0.55000000 0.31666667
 [46] 0.06666667 0.13333333 0.01666667 0.16666667 0.05000000
```

v. DECIMAL SCALING NORMALIZATION

- A=c(diabetes$Age)
- decimalscaling=(A/100)
- decimalscaling

INPUT :

```
diabetes=read.csv("D:\\folders\\DWHDM\\diabetes.csv")
A=c(diabetes$Age)
decimalscaling=(A/100)
decimalscaling
```

OUTPUT :

```
> decimalscaling
  [1] 0.50 0.31 0.32 0.21 0.33 0.30 0.26 0.29 0.53 0.54 0.30 0.34 0.57 0.59
 [15] 0.51 0.32 0.31 0.31 0.33 0.32 0.27 0.50 0.41 0.29 0.51 0.41 0.43 0.22
 [29] 0.57 0.38 0.60 0.28 0.22 0.28 0.45 0.33 0.35 0.46 0.27 0.56 0.26 0.37
 [43] 0.48 0.54 0.40 0.25 0.29 0.22 0.31 0.24 0.22 0.26 0.30 0.58 0.42 0.21
 [57] 0.41 0.31 0.44 0.22 0.21 0.39 0.36 0.24 0.42 0.32 0.38 0.54 0.25 0.27
 [71] 0.28 0.26 0.42 0.23 0.22 0.22 0.41 0.27 0.26 0.24 0.22 0.22 0.36 0.22
 [85] 0.37 0.27 0.45 0.26 0.43 0.24 0.21 0.34 0.42 0.60 0.21 0.40 0.24 0.22
 [99] 0.23 0.31 0.33 0.22 0.21 0.24 0.27 0.21 0.27 0.37 0.25 0.24 0.24 0.46
[113] 0.23 0.25 0.39 0.61 0.38 0.25 0.22 0.21 0.25 0.24 0.23 0.69 0.23 0.26
[127] 0.30 0.23 0.40 0.62 0.33 0.33 0.30 0.39 0.26 0.31 0.21 0.22 0.29 0.28
[141] 0.55 0.38 0.22 0.42 0.23 0.21 0.41 0.34 0.65 0.22 0.24 0.37 0.42 0.23
```

RESULT:

Thus, the correlation analysis and normalization for the given dataset has been successfully executed and observed.

EX.No: 08
Date :

REGRESSION ANALYSIS USING R TOOL

PROBLEM STATEMENT :

Perform the linear regression and multiple regression for the given dataset.

DESCRIPTION :

Consider a dataset of diabetes.csv with the attributes pregnancies, Glucose, BloodPressure, SkinThickness, BMI, Diabetes, Age, Outcome for the analysis. There will be linear regression analysis between Age and BloodPressure. Where, for the multiple regression, the analysis is between Age, BloodPressure, Glucose from the dataset.

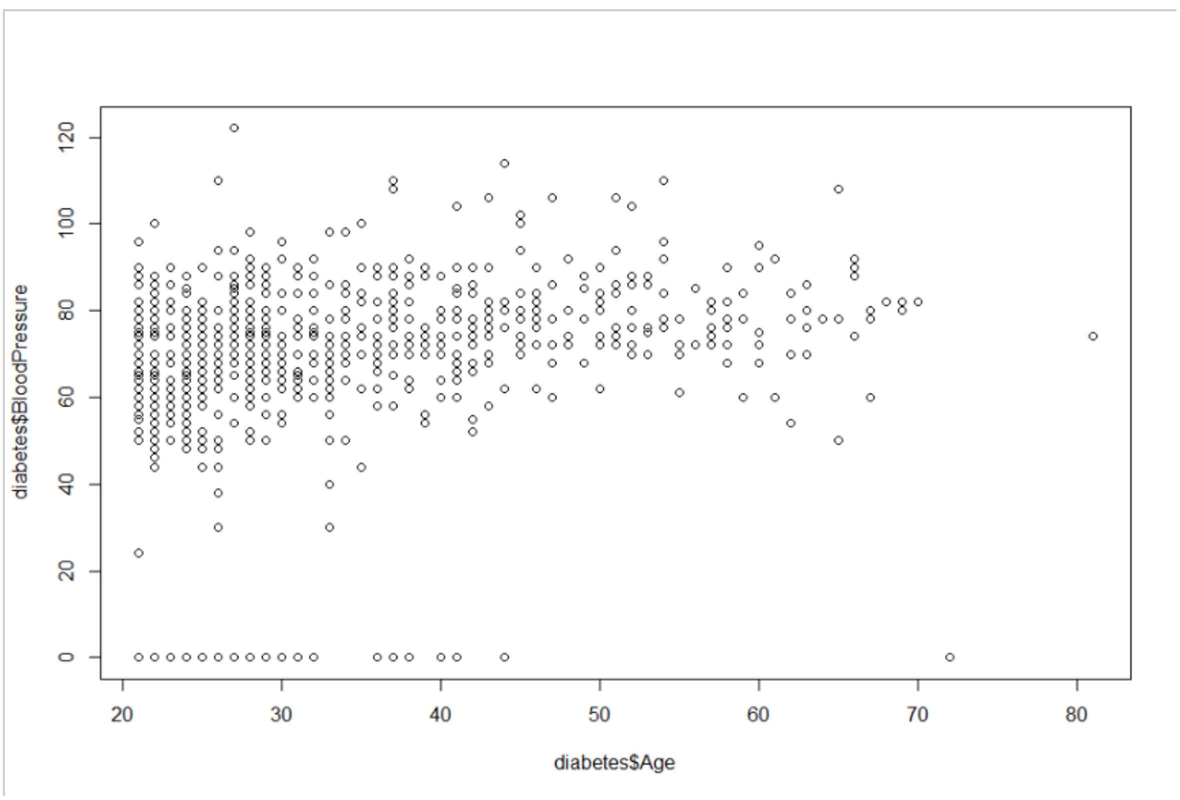
- **LINEAR REGRESSION :**

Linear regression is a kind of statistical analysis that attempts to show a relationship between two variables. Linear regression looks at various data points and plots a trend line. Linear regression can create a predictive model on apparently random data, showing trends in data, such as in cancer diagnoses or in stock prices.

INPUT :

- Relation <- lm(diabetes$BloodPressure~diabetes$Age)
- Png<- (file="linear regression.png")
- Plot(diabetes$Age, diabetes$BloodPressure, col="green", main= " Linear Regression Analysis" , abline= (lm(diabetes$BloodPressure~ diabetes$Age)), xlab = "BloodPressure", ylanb= "Age")

OUTPUT:



INPUT :

- A<- data.frame(diabetes$Age)
- Result<- predict(relation, A)
- Print(Result)

OUTPUT :

```
>
> A<- data.frame(diabetes$Age)
> Result<- predict(relation, A)
> print(Result)
       1        2        3        4        5        6        7        8        9       10       11       12       13       14       15
75.71244 68.22204 68.61627 64.27972 69.01050 67.82781 66.25088 67.43358 76.89514 77.28937 67.82781 69.40474 78.47207 79.26053 76.10668
      16       17       18       19       20       21       22       23       24       25       26       27       28       29       30
68.61627 68.22204 68.22204 69.01050 68.61627 66.64511 75.71244 72.16436 67.43358 76.10668 72.16436 72.95282 64.67395 78.47207 70.98166
      31       32       33       34       35       36       37       38       39       40       41       42       43       44       45
79.65476 67.03935 64.67395 67.03935 73.74129 69.01050 69.79897 74.13552 66.64511 78.07783 66.25088 70.58743 74.92398 77.28937 71.77013
      46       47       48       49       50       51       52       53       54       55       56       57       58       59       60
65.85665 67.43358 64.67395 68.22204 65.46242 64.67395 66.25088 67.82781 78.86630 72.55859 64.27972 72.16436 68.22204 73.34705 64.67395
      61       62       63       64       65       66       67       68       69       70       71       72       73       74       75
64.27972 71.37589 70.19320 65.46242 72.55859 68.61627 70.98166 77.28937 65.85665 66.64511 67.03935 66.25088 72.55859 65.06819 64.67395
      76       77       78       79       80       81       82       83       84       85       86       87       88       89       90
64.67395 72.16436 66.64511 66.25088 65.46242 64.67395 64.67395 70.19320 64.67395 70.58743 66.64511 73.74129 66.25088 72.95282 65.46242
      91       92       93       94       95       96       97       98       99      100      101      102      103      104      105
64.27972 69.40474 72.55859 79.65476 64.27972 71.77013 65.46242 64.67395 65.06819 68.22204 69.01050 64.67395 64.27972 65.46242 66.64511
     106      107      108      109      110      111      112      113      114      115      116      117      118      119      120
64.27972 66.64511 70.58743 65.85665 65.46242 65.46242 74.13552 65.06819 65.85665 71.37589 80.04899 70.98166 65.85665 64.67395 64.27972
     121      122      123      124      125      126      127      128      129      130      131      132      133      134      135
65.85665 65.46242 65.06819 83.20285 65.06819 66.25088 67.82781 65.06819 71.77013 80.44323 69.01050 69.01050 67.82781 71.37589 66.25088
     136      137      138      139      140      141      142      143      144      145      146      147      148      149      150
```

❖ **MULTIPLE REGRESSION :**

Multiple regression is a statistical tool used to derive the value of a criterion from several other independent, or predictor, variables. It is the simultaneous combination of multiple factors to assess how and to what extent they affect a certain outcome.

INPUT :

- Input <- diabetes[,c("Age", "BloodPressure", "Glucose")]
- Model <- lm(Age~ BloodPressure+Glucose,data=input)
- Print(model)

OUTPUT:

```
> print(diabetes)

Call:
lm(formula = Age ~ BloodPressure + Glucose, data = input)

Coefficients:
  (Intercept)  BloodPressure        Glucose
     14.33937        0.12399        0.08547

> |
```

INPUT :

- A<- coef(model)[1]
- Print(A)

OUTPUT:

```
> print(A)
(Intercept)
   14.33937
> |
```

INPUT :

- xBloodPressure<- coef(model)[2]
- yGlucose<- coef(model)[3]
- print(xBloodPressure)
- print(yGlucose)

OUTPUT:

```
> print(yGlucose)
   Glucose
0.08547277
>
```

INPUT :

- y = A+xBloodPressure + yGlucose
- print(y)

OUTPUT:

```
>
> print(y)
(Intercept)
   14.54883
>
```

RESULT :

Thus, the linear regression and the multiple regression analysis for the given dataset has been successfully completed.