B.Maheshwar(192411195)

R Programming – Statistical Exercises (Day 2)

1. Covariance and Correlation

Aim:

To study the relationship between variables using covariance and correlation.

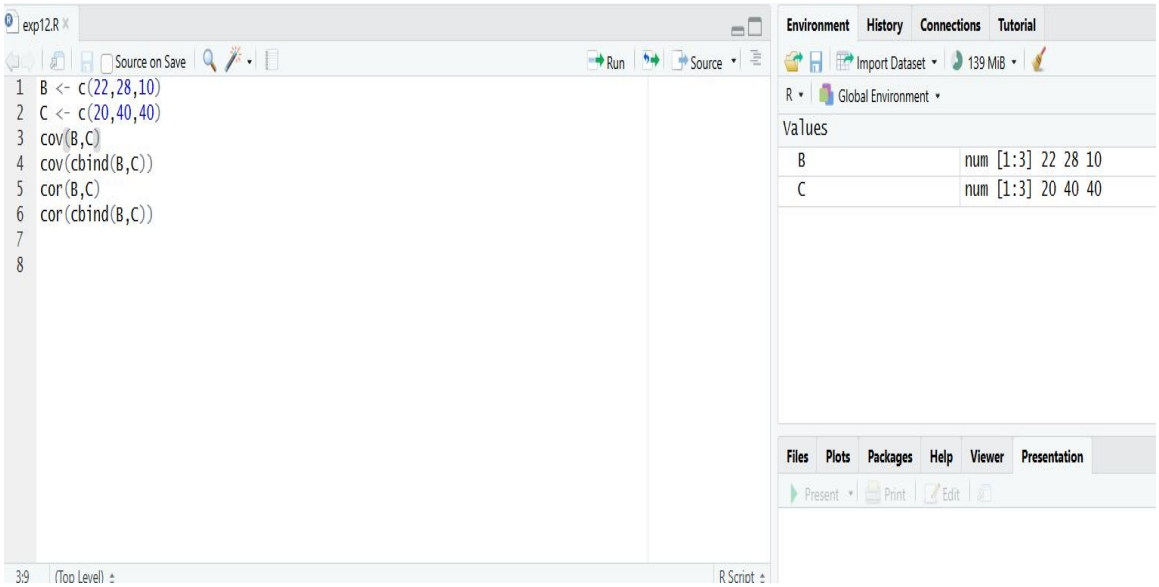
Algorithm:

Step 1: Input preference data.
Step 2: Use cov() and cor() functions.
Step 3: Display covariance and correlation matrices.

R Program:

```
B <- c(22,28,10)
C <- c(20,40,40)
cov(B,C)
cov(cbind(B,C))
cor(B,C)
cor(cbind(B,C))
```

Output:



2. Data Partitioning and Smoothing

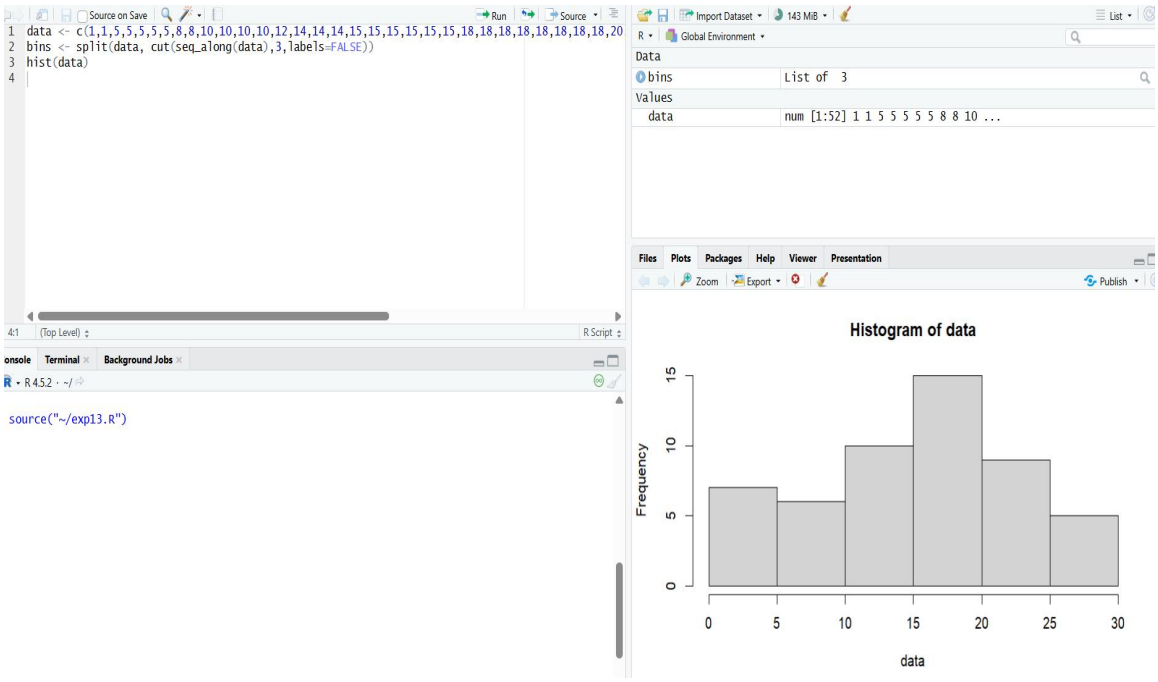
Aim:
To perform equal-frequency partitioning and apply data smoothing techniques.

Algorithm:
Step 1: Sort dataset.
Step 2: Divide into equal-frequency bins.
Step 3: Apply bin means and boundaries.
Step 4: Plot histogram.

R Program:

```
data <-
c(1,1,5,5,5,5,5,8,8,10,10,10,10,12,14,14,14,15,15,15,15,15,15,18,18,18,18,18,18,18,18,20,20,
20,20,20,20,20,21,21,21,21,25,25,25,25,25,28,28,30,30,30)
bins <- split(data, cut(seq_along(data),3,labels=FALSE))
hist(data)
```

Output:



3. Comparison of Two Classes Performance

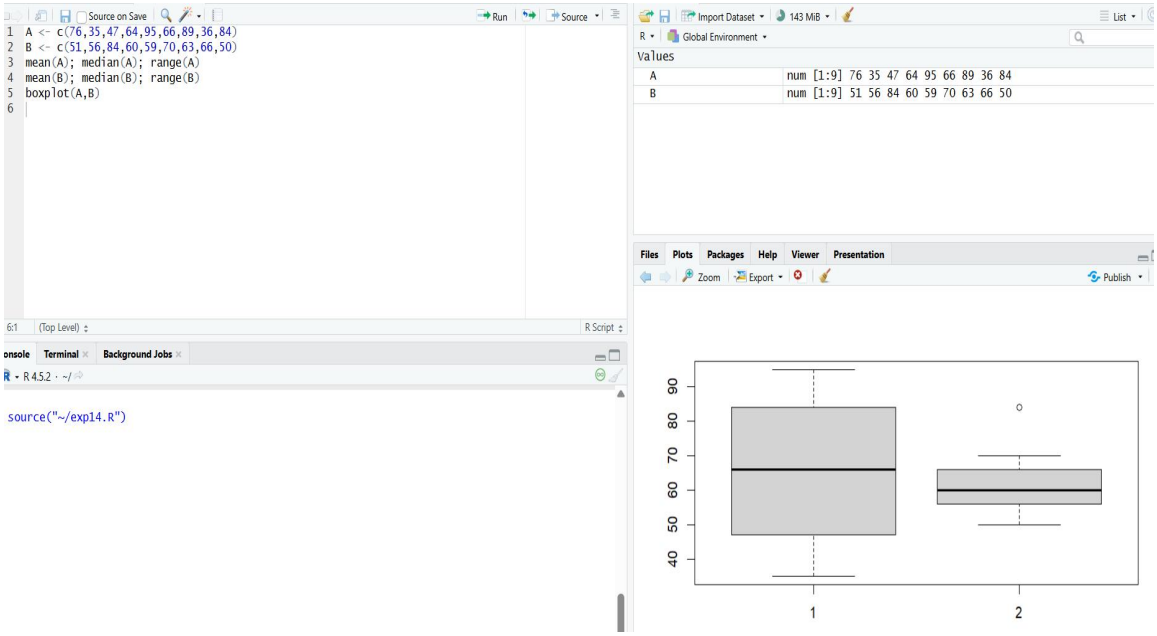
Aim:
To compare statistical measures of two classes using descriptive statistics.

Algorithm:
Step 1: Input marks.
Step 2: Compute mean, median, range.
Step 3: Plot boxplot and infer.

R Program:

```
A <- c(76,35,47,64,95,66,89,36,84)
B <- c(51,56,84,60,59,70,63,66,50)
mean(A); median(A); range(A)
mean(B); median(B); range(B)
boxplot(A,B)
```

Output:



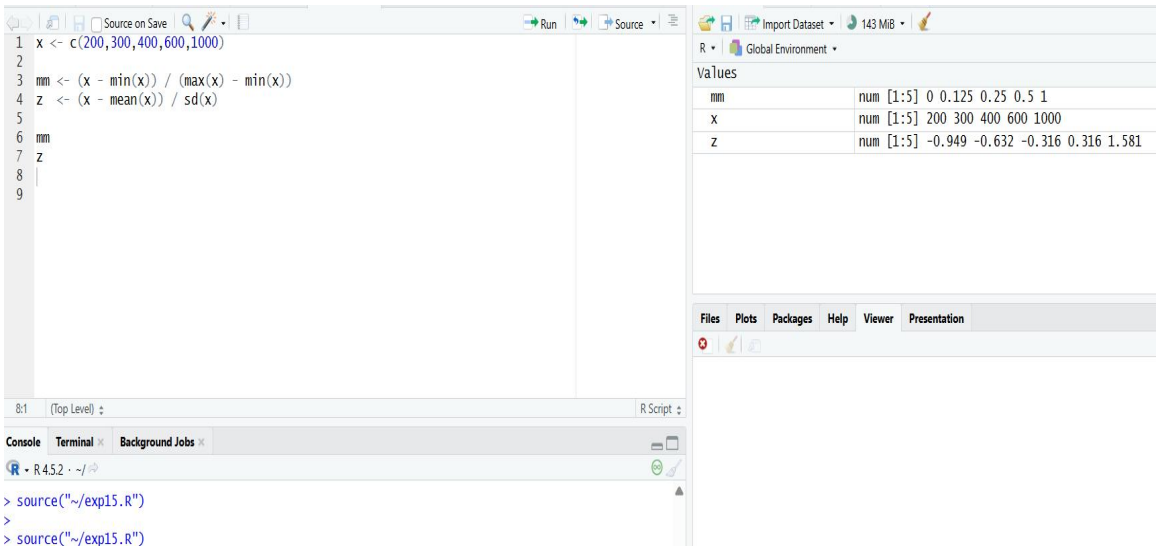
4. Data Normalization Techniques

Aim:
To normalize data using min-max and z-score normalization techniques.

Algorithm:
Step 1: Identify min and max.
Step 2: Apply min-max formula.
Step 3: Apply z-score formula.

R Program:
```
data <- c(200,300,400,600,1000)
(data-min(data))/(max(data)-min(data))
scale(data)
```

Output:



5. Histogram for AirPassengers Dataset

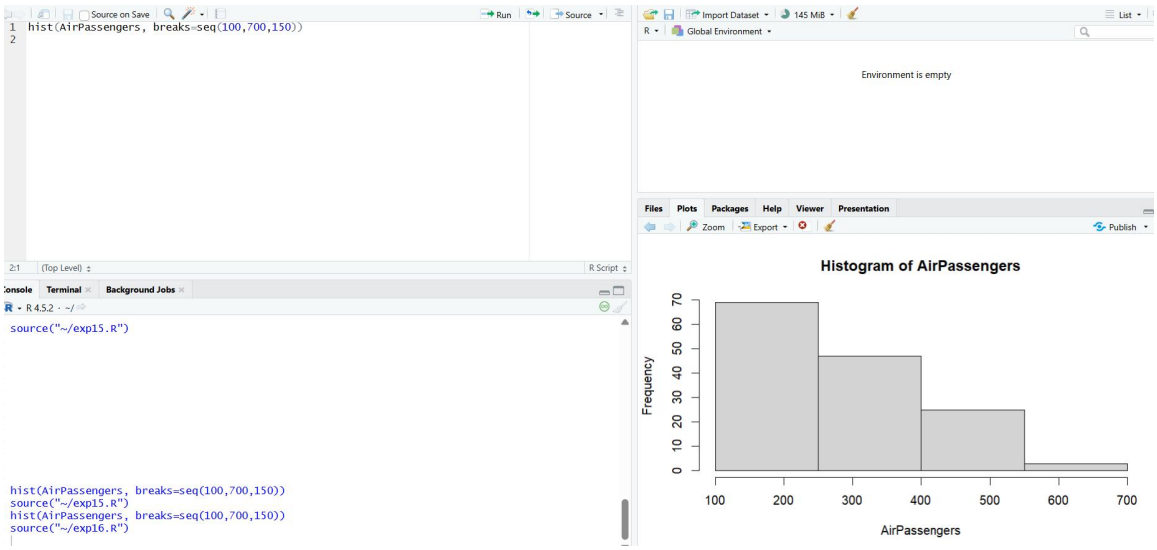
Aim:
To visualize the distribution of AirPassengers data using histogram.

Algorithm:
Step 1: Load dataset.
Step 2: Define breaks.
Step 3: Plot histogram.

R Program:

```
hist(AirPassengers, breaks=seq(100,700,150))
```

Output:



6. Multiple Line Plot using mtcars Dataset

Aim:
To plot multiple attributes using a single plot function in R.

Algorithm:
Step 1: Load mtcars dataset.
Step 2: Plot mpg and qsec using plot().

R Program:

```
plot(mtcars$mpg, type='l')
lines(mtcars$qsec, col=2)
```

Output:

7. Linear Regression on Water Dataset

Aim:
To identify linear relationship and predict values using regression.

Algorithm:
Step 1: Load water dataset.
Step 2: Plot hardness vs mortality.
Step 3: Fit linear model.
Step 4: Predict value.

R Program:

```
data(water)
plot(water$hardness, water$mortality)
model <- lm(mortality~hardness, data=water)
predict(model, data.frame(hardness=88))
```

Output:

8. Boxplot for mpg vs cyl (mtcars)

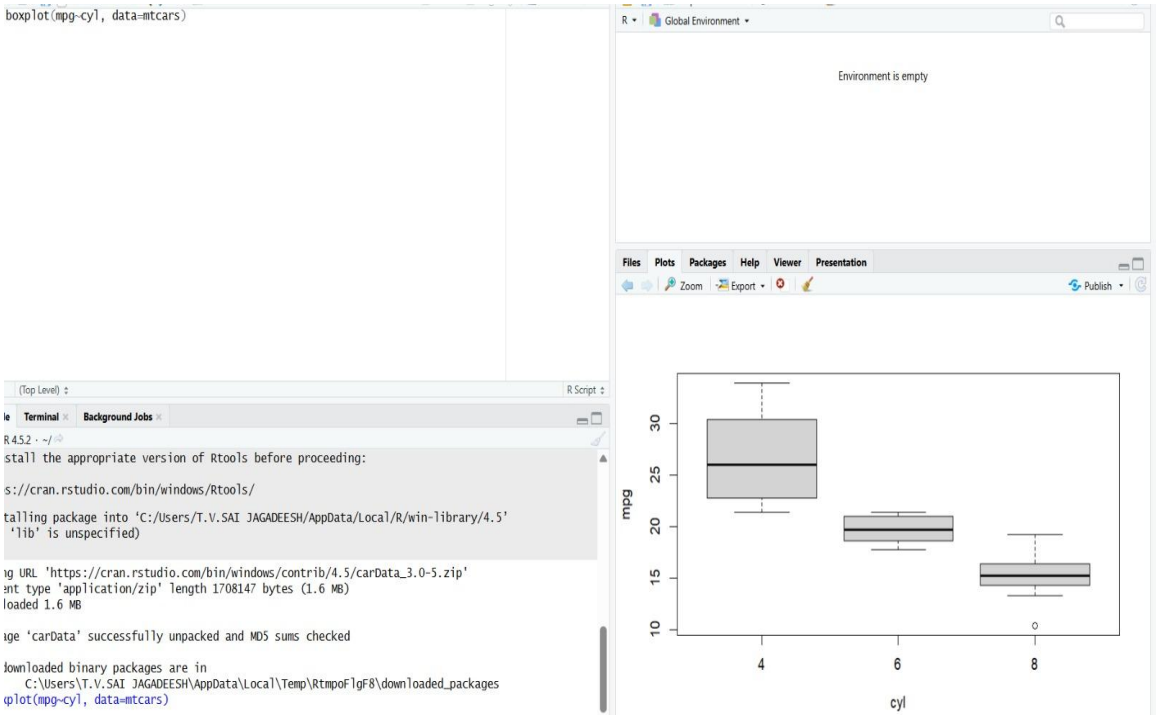
Aim:
To analyze relationship between mileage and cylinder count using boxplot.

Algorithm:
Step 1: Load mtcars.
Step 2: Plot mpg vs cyl using boxplot.

R Program:

```
boxplot(mpg~cyl, data=mtcars)
```

Output:



9. Outlier Detection using Boxplot

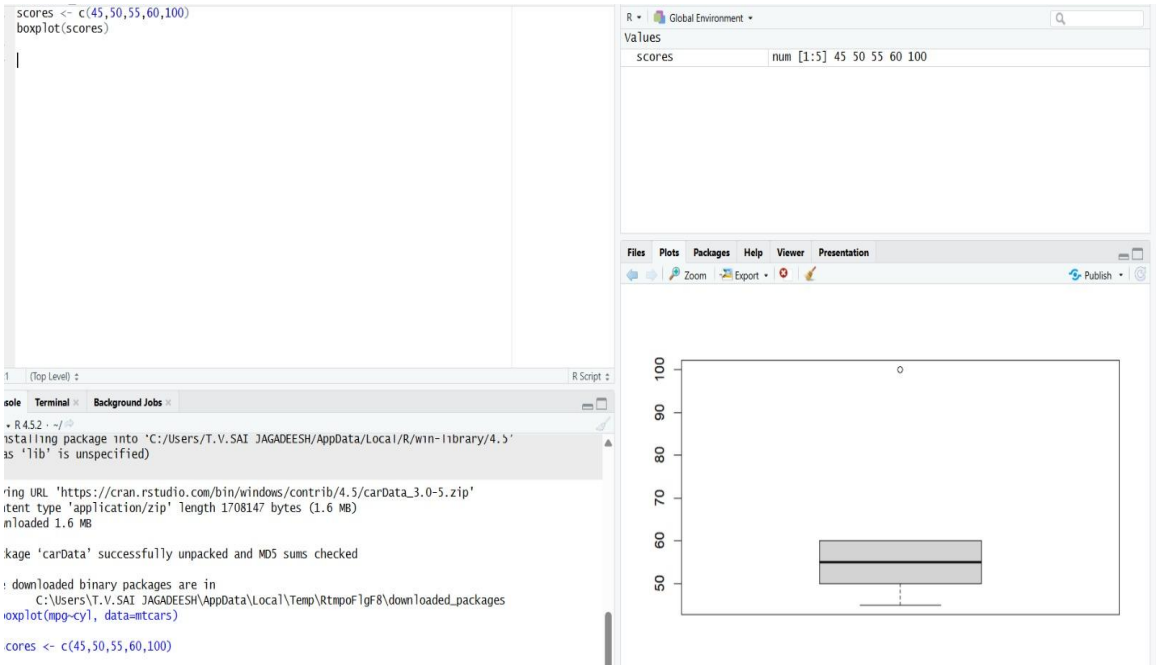
Aim:
To detect outliers using boxplot visualization.

Algorithm:
Step 1: Collect player scores.
Step 2: Plot boxplot.
Step 3: Identify outliers.

R Program:

```
scores <- c(45,50,55,60,100)
boxplot(scores)
```

Output:



10. Blood Pressure vs Age Analysis (Diabetes Dataset)

Aim:

To analyze age group affected by blood pressure using diabetes data.

Algorithm:

Step 1: Load diabetes dataset.
Step 2: Plot scatterplot and bar chart.

R Program:

```
data <- read.csv('diabetes.csv')
plot(data$Age, data$BloodPressure)
barplot(data$BloodPressure)
```

Output: