SAVEETHA SCHOOL OF ENGINEERING

SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES

ITA 0443 - STATISTICS WITH R PROGRAMMING FOR REAL TIME PROBLEM

DAY 4– LAB MANUAL

Reg No:192124039

Name:ramya sri.v

LINEAR REGRESSION ANALYSIS IN R

Exercise

1. Using linear regression analysis establish a relationship between height and weight of a person using the input vector given below.

   # Values of height

   151, 174, 138, 186, 128, 136, 179, 163, 152, 131

   # Values of weight.

   63, 81, 56, 91, 47, 57, 76, 72, 62, 48

   Predict the weight of a person with height 170. Visualize the regression graphically.

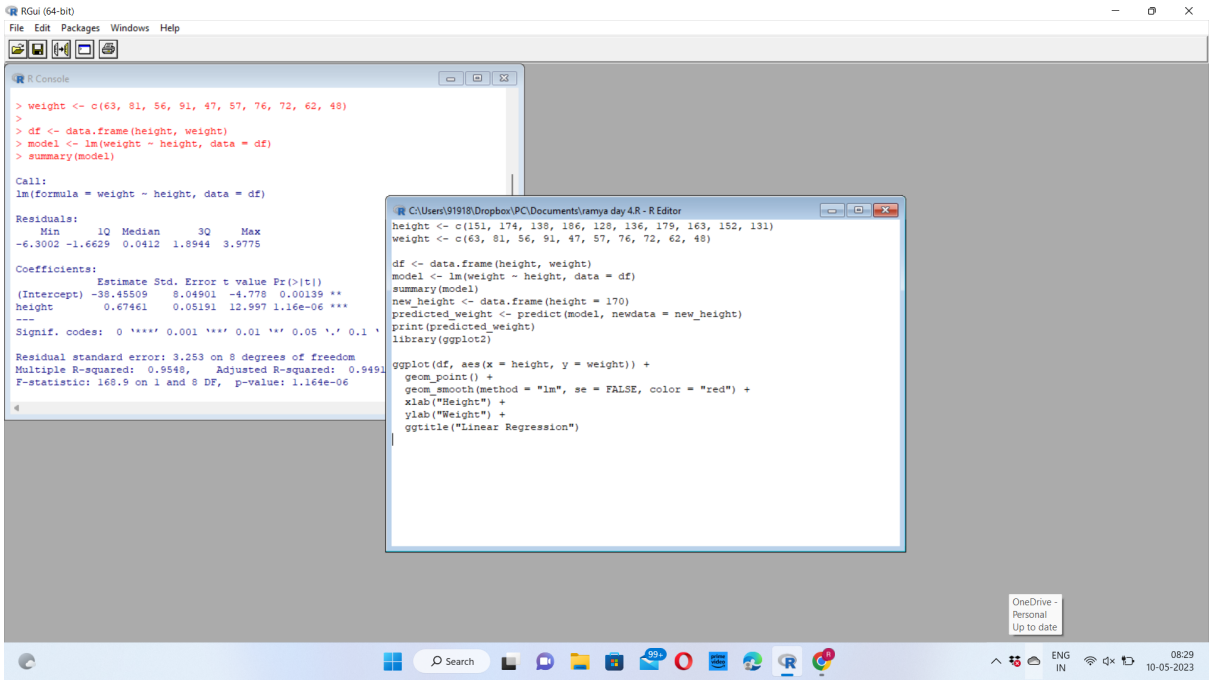
   program:

```
height <- c(151, 174, 138, 186, 128, 136, 179, 163, 152, 131)
weight <- c(63, 81, 56, 91, 47, 57, 76, 72, 62, 48)

df <- data.frame(height, weight)
model <- lm(weight ~ height, data = df)
summary(model)
new_height <- data.frame(height = 170)
predicted_weight <- predict(model, newdata = new_height)
print(predicted_weight)
library(ggplot2)

ggplot(df, aes(x = height, y = weight)) +
```

```
geom_point() +
geom_smooth(method = "lm", se = FALSE, color = "red") +
xlab("Height") +
ylab("Weight") +
ggtitle("Linear Regression")
```



2. Download the Dataset "water" From Rdataset Link.Find out whether there is a linear relation between attributes"mortality" and"hardness" by plot function.Fit the Data into the Linear Regression model.Predict the mortality for the hardness=88

program:

```
install.packages("ggplot2")
library(ggplot2)
install.packages("dplyr")
library(dplyr)
install.packages("MASS")
library(MASS)
data(water)
str(water)
```

'data.frame': 61 obs. of 4 variables:

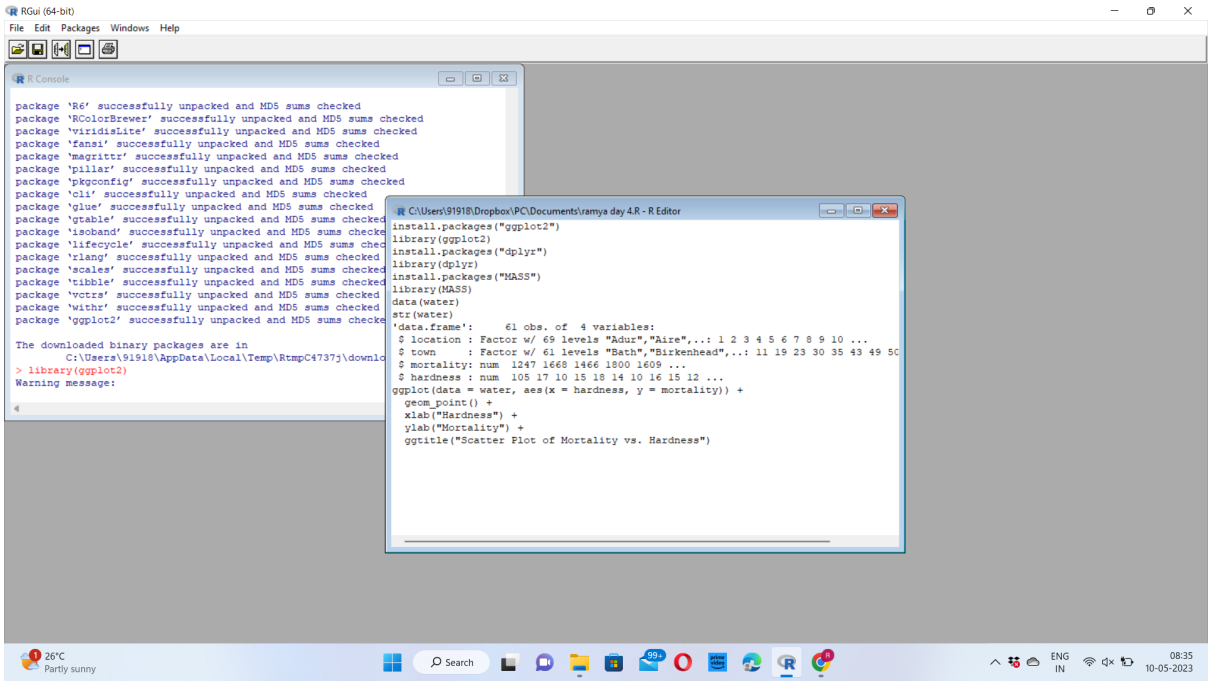
 $ location : Factor w/ 69 levels "Adur","Aire",..: 1 2 3 4 5 6 7 8 9 10 ...

 $ town   : Factor w/ 61 levels "Bath","Birkenhead",..: 11 19 23 30 35 43 49 50 52 54 ...

 $ mortality: num 1247 1668 1466 1800 1609 ...

 $ hardness : num 105 17 10 15 18 14 10 16 15 12 ...

```
ggplot(data = water, aes(x = hardness, y = mortality)) +
  geom_point() +
  xlab("Hardness") +
  ylab("Mortality") +
  ggtitle("Scatter Plot of Mortality vs. Hardness")
```



MULTIPLE REGRESSION ANALYSIS IN R

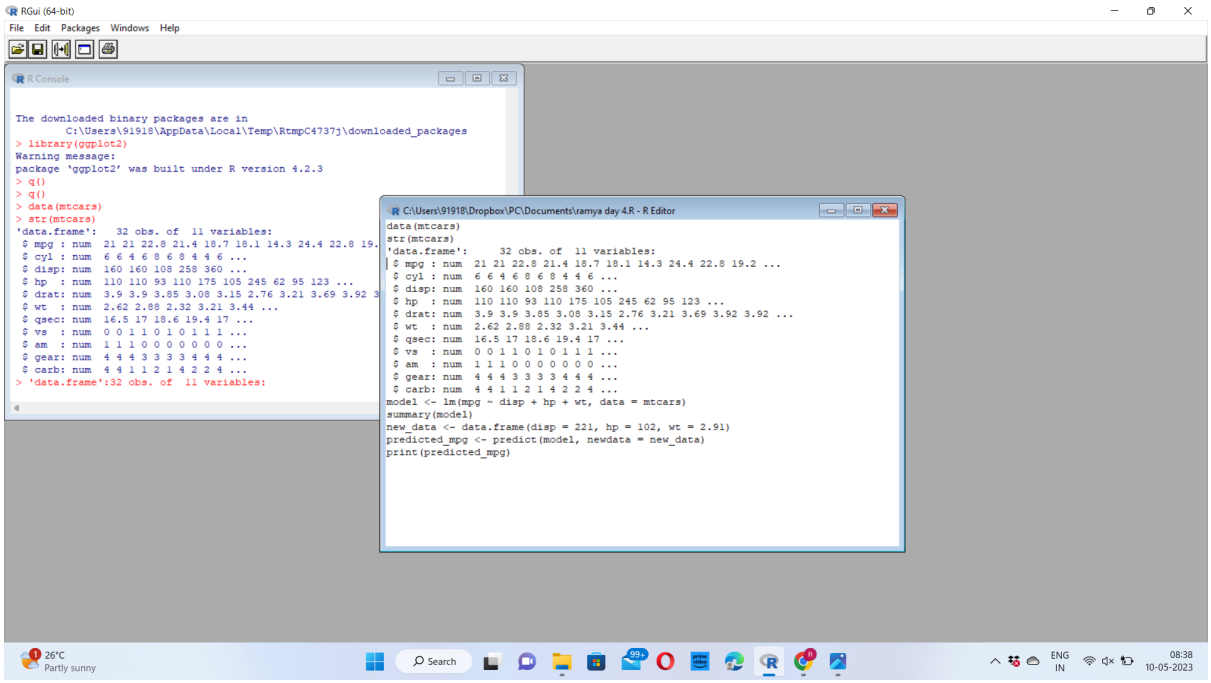
Exercise:

3.Generate a multiple regression model using the built in dataset mtcars.It gives a comparison between different car models in terms of mileage per gallon (mpg), cylinder displacement("disp"), horse power("hp"), weight of the car("wt") and some more parameters.

Establish the relationship between "mpg" as a response variable with "disp","hp" and "wt" as predictor variables. Predict the mileage of the car with dsp=221,hp=102 and wt=2.91.

program:

```
data(mtcars)
str(mtcars)
'data.frame':    32 obs. of  11 variables:
 $ mpg : num  21 21 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 ...
 $ cyl : num  6 6 4 6 8 6 8 4 4 6 ...
 $ disp: num  160 160 108 258 360 ...
 $ hp  : num  110 110 93 110 175 105 245 62 95 123 ...
 $ drat: num  3.9 3.9 3.85 3.08 3.15 2.76 3.21 3.69 3.92 3.92 ...
 $ wt  : num  2.62 2.88 2.32 3.21 3.44 ...
 $ qsec: num  16.5 17 18.6 19.4 17 ...
 $ vs  : num  0 0 1 1 0 1 0 1 1 1 ...
 $ am  : num  1 1 1 0 0 0 0 0 0 0 ...
 $ gear: num  4 4 4 3 3 3 3 4 4 4 ...
 $ carb: num  4 4 1 1 2 1 4 2 2 4 ...
model <- lm(mpg ~ disp + hp + wt, data = mtcars)
summary(model)
new_data <- data.frame(disp = 221, hp = 102, wt = 2.91)
predicted_mpg <- predict(model, newdata = new_data)
print(predicted_mpg)
```



4. Consider the data set "delivery" available in the R environment. It gives a deliverytime (“delTime”)of production materials(number of productions “n.prod”) with the given distance(“distance”) to reach the destination place.

a)Create the model to establish the relationship between "delTime" as a response variable with "n.prod" and "distance" as predictor variables.

b)Predict the delTime for the given number of production(“n.prod”)=9 and distance(“distance”)=450