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:192125063
Name: Krishvanth Kumar E

LINEAR REGRESSION ANALYSIS IN R

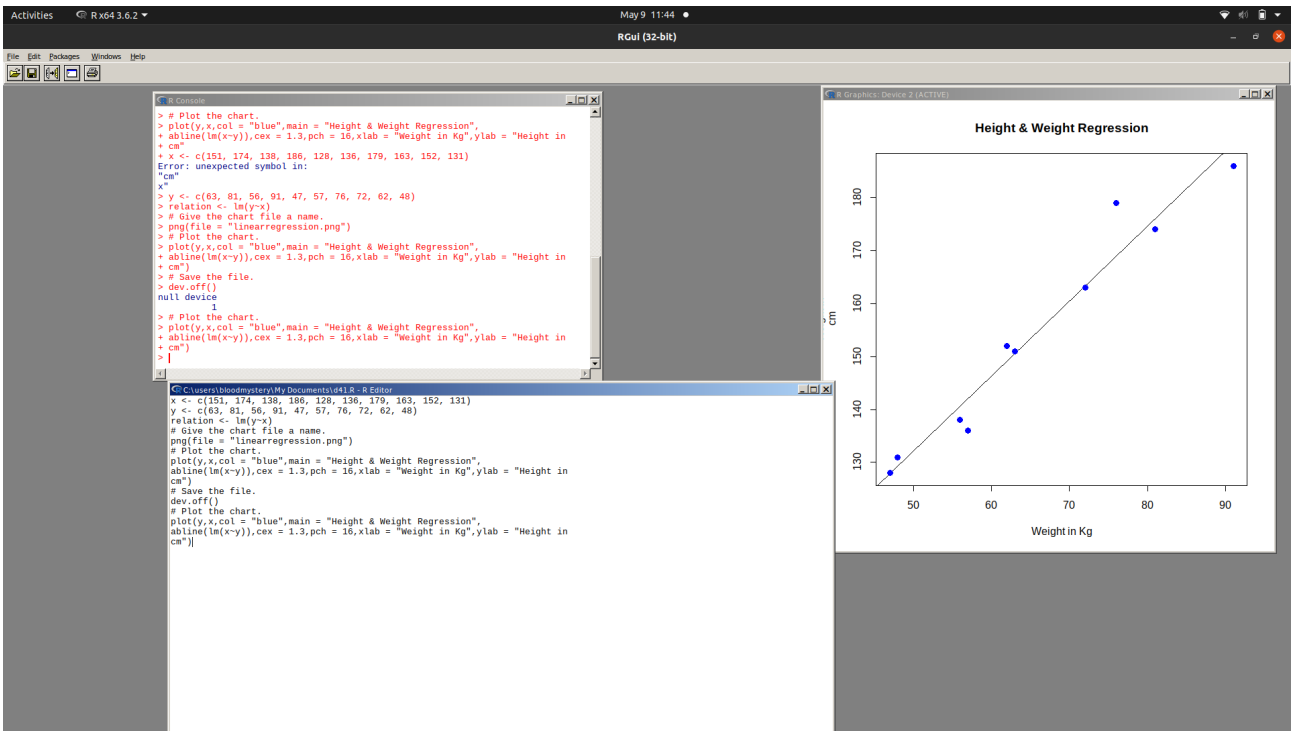
Exercise :

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:

```
x <- c(151, 174, 138, 186, 128, 136, 179, 163, 152, 131)
y <- c(63, 81, 56, 91, 47, 57, 76, 72, 62, 48)
relation <- lm(y~x)
# Give the chart file a name.
png(file = "linearregression.png")
# Plot the chart.
plot(y,x,col = "blue",main = "Height & Weight Regression",
abline(lm(x~y)),cex = 1.3,pch = 16,xlab = "Weight in Kg",ylab =
"Height in
cm")

# Save the file.

dev.off()

# Plot the chart.

plot(y,x,col = "blue",main = "Height & Weight Regression",
abline(lm(x~y)),cex = 1.3,pch = 16,xlab = "Weight in Kg",ylab =
"Height in
cm")
```

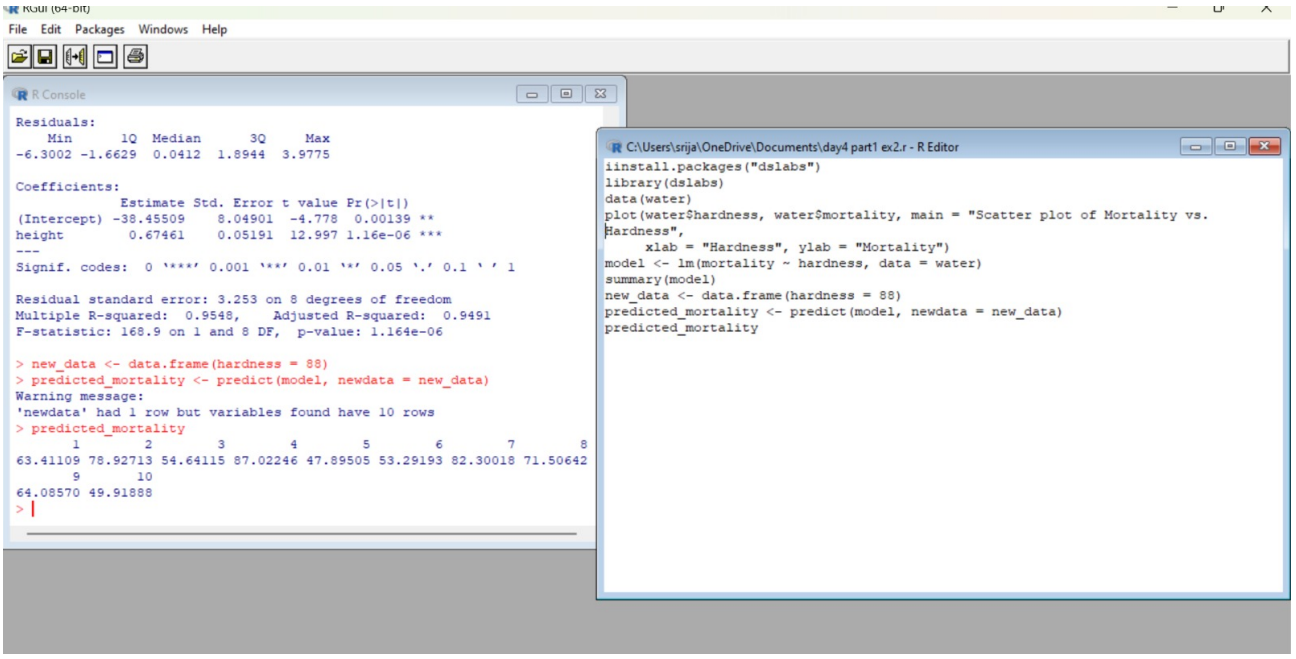
output :



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:

```
iinstall.packages("dslabs")
library(dslabs)
data(water)
plot(water$hardness, water$mortality, main = "Scatter plot of Mortality vs.
Hardness",
     xlab = "Hardness", ylab = "Mortality")
model <- lm(mortality ~ hardness, data = water)
summary(model)
new_data <- data.frame(hardness = 88)
predicted_mortality <- predict(model, newdata = new_data)
predicted_mortality
```



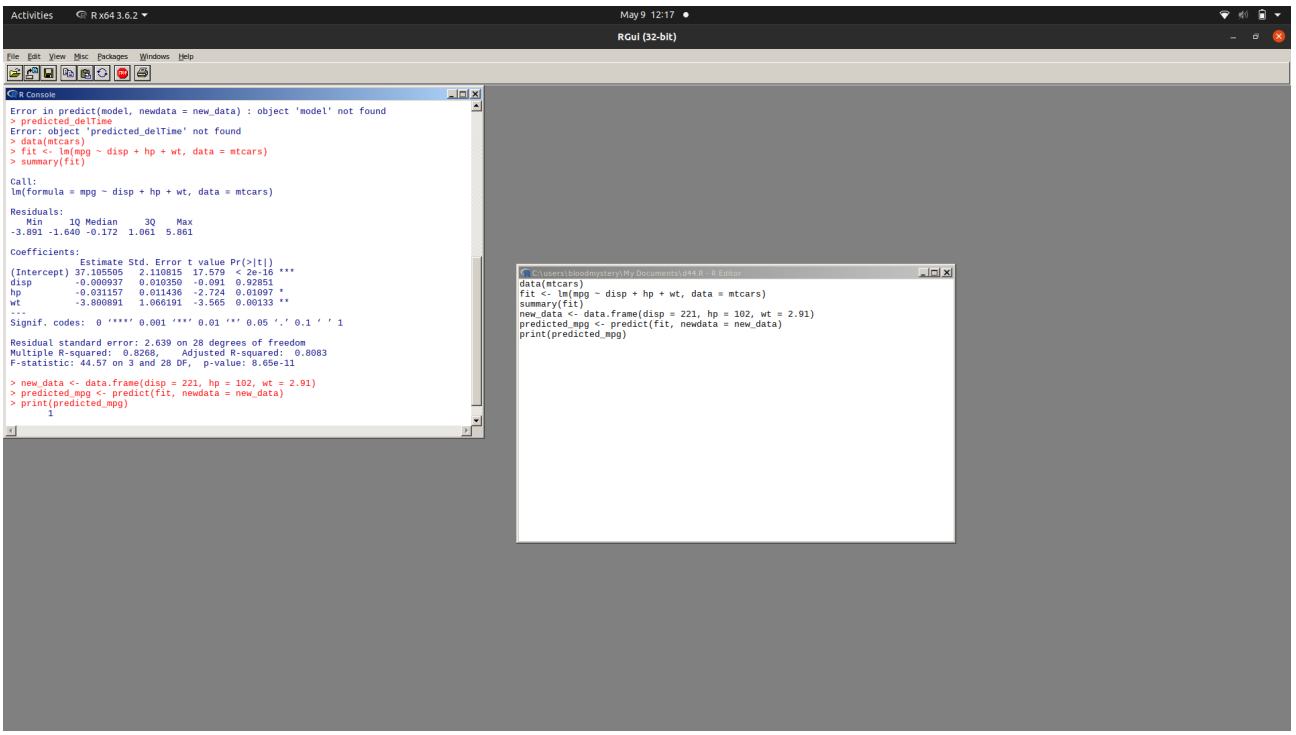
MULTIPLE REGRESSION ANALYSIS IN R

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:

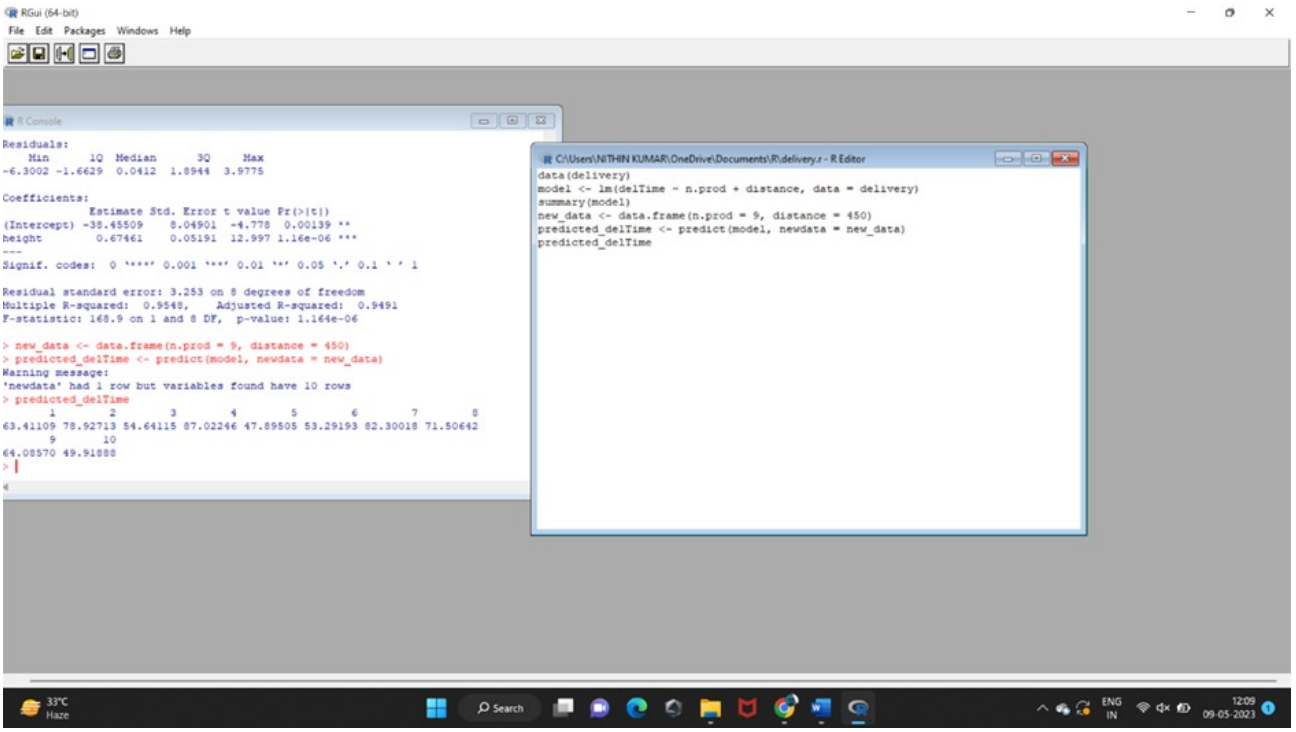
```
data(mtcars)
model <- lm(mpg ~ disp + hp + wt, data = mtcars)
summary(model)
new_data <- data.frame(disp = 221, hp = 102, wt = 2.91)
predicted_mpg <- predict(model, newdata = new_data)
predicted_mpg
```



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

PROGRAM:

```
data(delivery)
model <- lm(delTime ~ n.prod + distance, data = delivery)
summary(model)
new_data <- data.frame(n.prod = 9, distance = 450)
predicted_delTime <- predict(model, newdata = new_data)
predicted_delTime
```


RGui (64-bit)
File Edit Packages Windows Help
R Console
Residuals:
Min 1Q Median 3Q Max
-6.3002 -1.6629 0.0412 1.8944 3.9775
Coefficients:
Estimate Std. Error t value Pr(>|t|)
(Intercept) -38.45509 8.04901 -4.778 0.00139 **
height 0.67461 0.05191 12.997 1.16e-06 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 3.253 on 8 degrees of freedom
Multiple R-squared: 0.9548, Adjusted R-squared: 0.9491
F-statistic: 168.9 on 1 and 8 DF, p-value: 1.164e-06
> new_data <- data.frame(n.prod = 9, distance = 450)
> predicted_delTime <- predict(model, newdata = new_data)
Warning message:
'newdata' had 1 row but variables found have 10 rows
> predicted_delTime
1 2 3 4 5 6 7 8
63.41109 78.92713 54.64115 87.02246 47.89505 53.29193 82.30018 71.50642
9 10
64.08570 49.91888
>
C:\Users\NITHIN KUMAR\OneDrive\Documents\R\delivery.r - R Editor
data(delivery)
model <- lm(delTime ~ n.prod + distance, data = delivery)
summary(model)
new_data <- data.frame(n.prod = 9, distance = 450)
predicted_delTime <- predict(model, newdata = new_data)
predicted_delTime
33°C
Haze
Search
ENG
IN
12:09
09-05-2023