**ECE3502 – IoT Domain Analyst**

**LAB – 11. RStudio to Node Red data transfer**

**Name: Varun Patel**

**Reg. No.: 18BCE1204**

**Faculty: Prof. Rekha D.**

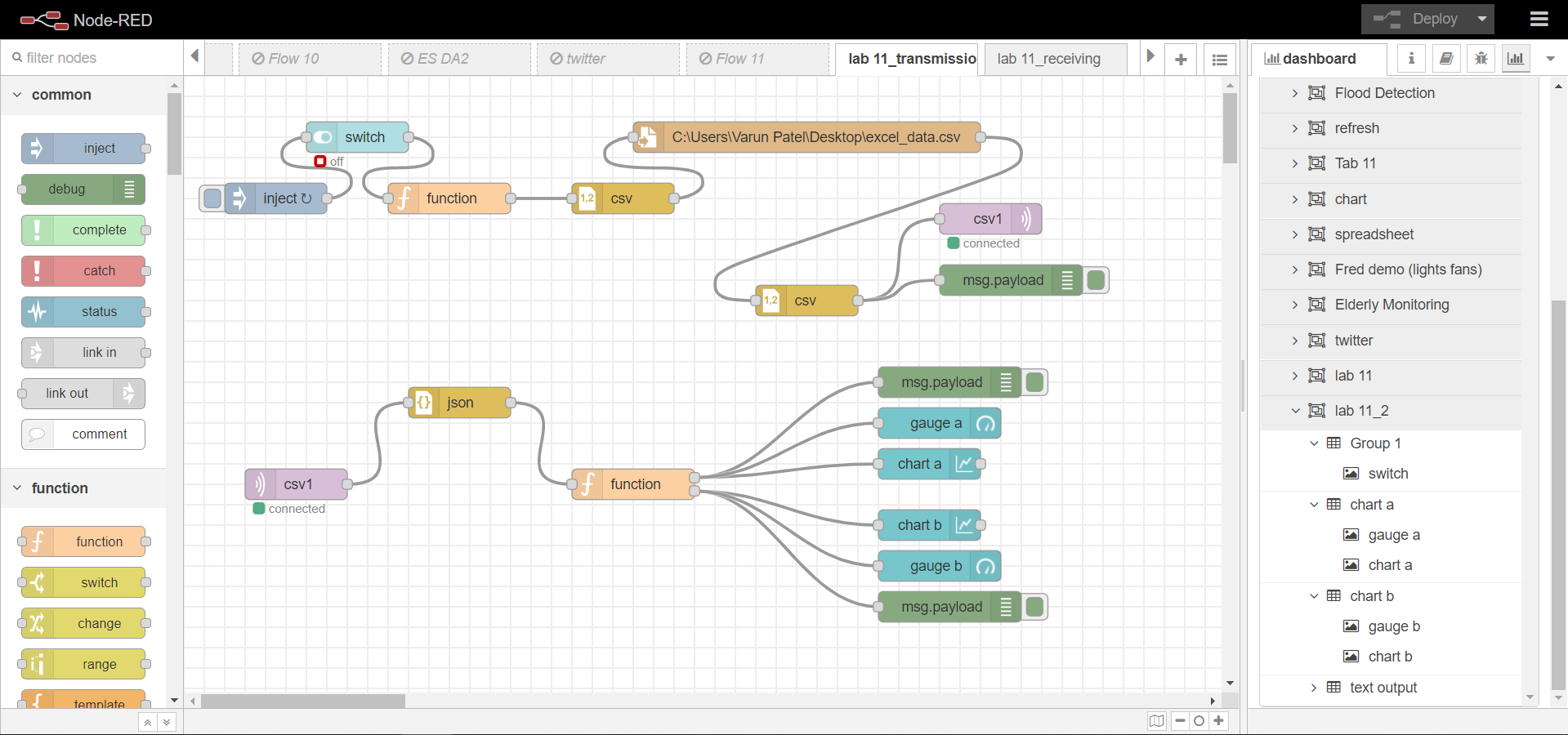
**Date: 01-06-2021**

**Q1. Linear Regression.**

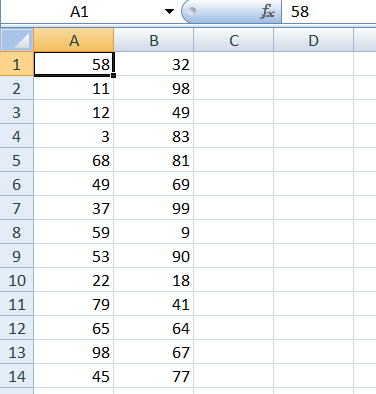
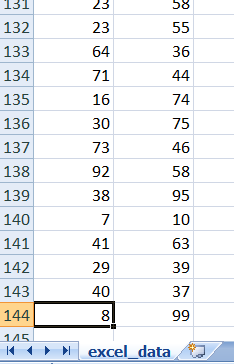
**Generate 2 random values (height, weight) on Node Red and store them onto a csv file. Take this dataset into RStudio and generate a linear regression model to predict height at a given weight value. Send this predicted output to Node Red to display on dashboard.**

**Ans.**

**Node Red flow:**

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**Dataset (2 random numbers between 1 – 100):**

**RStudio (Script Code):**

#put csv file in current working directory("Documents")

#create dataframe of csv file

setwd("C:/Users/Varun Patel/Desktop")

print(getwd())

hw <- read.csv("excel\_data.csv", header = FALSE)

#print(hw)

#separating columns into dataframes

h1 <- hw$V1

w1 <- hw$V2

#print(h1)

#plot graphs

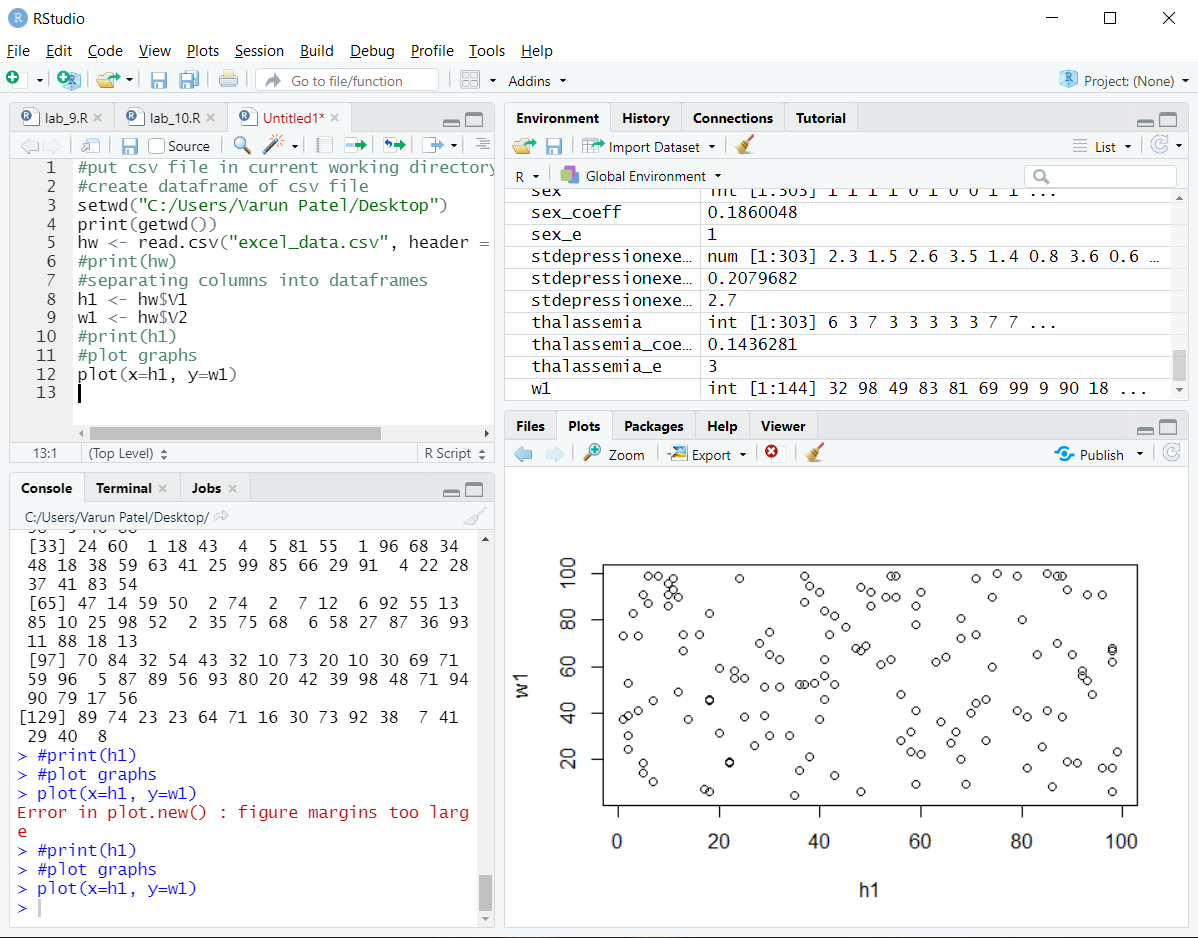
plot(x=h1, y=w1)

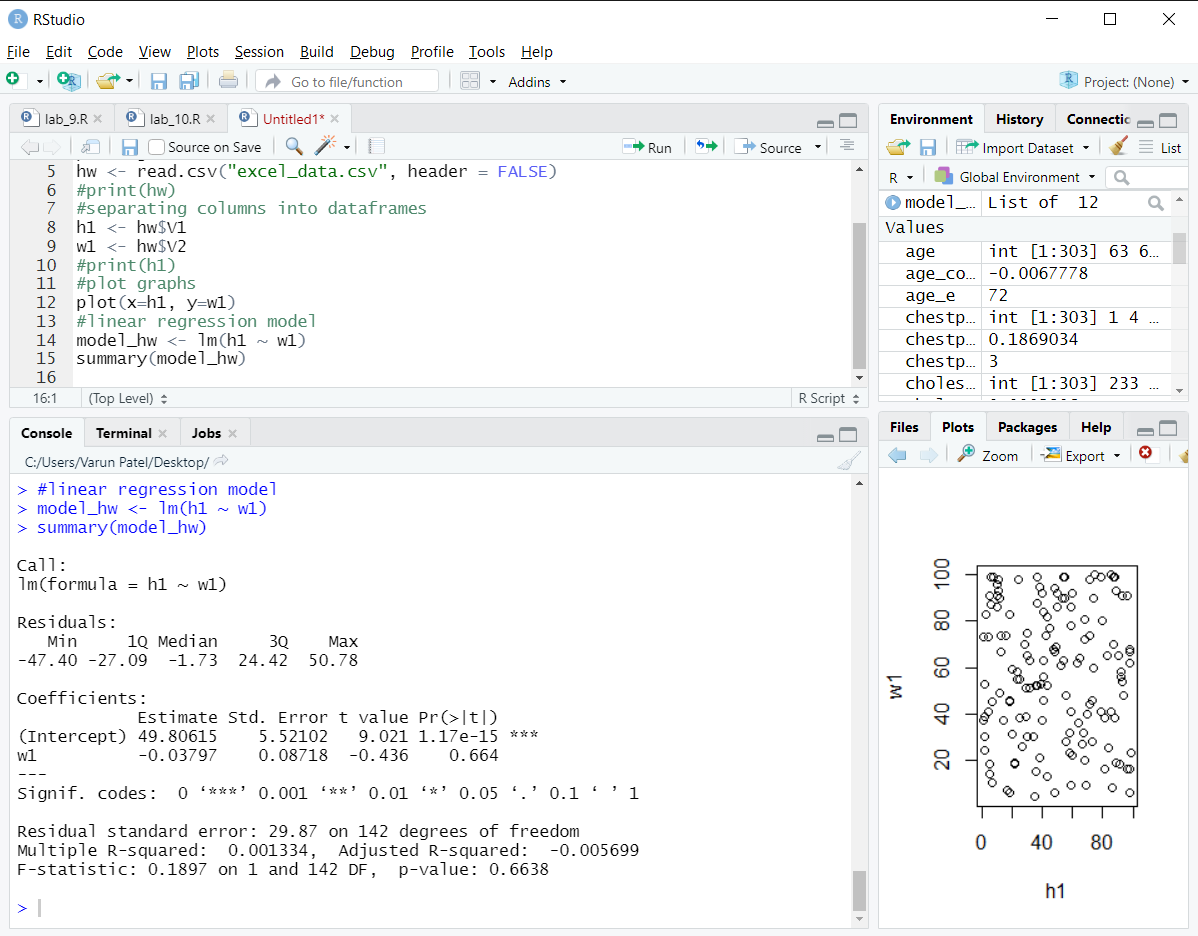
#linear regression model

model\_hw <- lm(h1 ~ w1)

summary(model\_hw)

**Screenshots:**





**Console Code (Prediction and saving output in a .txt file):**

> # save output in file

> sink(file = "pred.txt")

> print("#prediction")

> print(intercept:)

Error: unexpected ')' in "print(intercept:)"

> print("intercept:")

> intercept = 49.80615

> intercept

> print("w coefficient:")

> w\_coeff = -0.03797

> w\_coeff

> # w random value

> w\_rand = 37

> print("w random value:")

> w\_rand

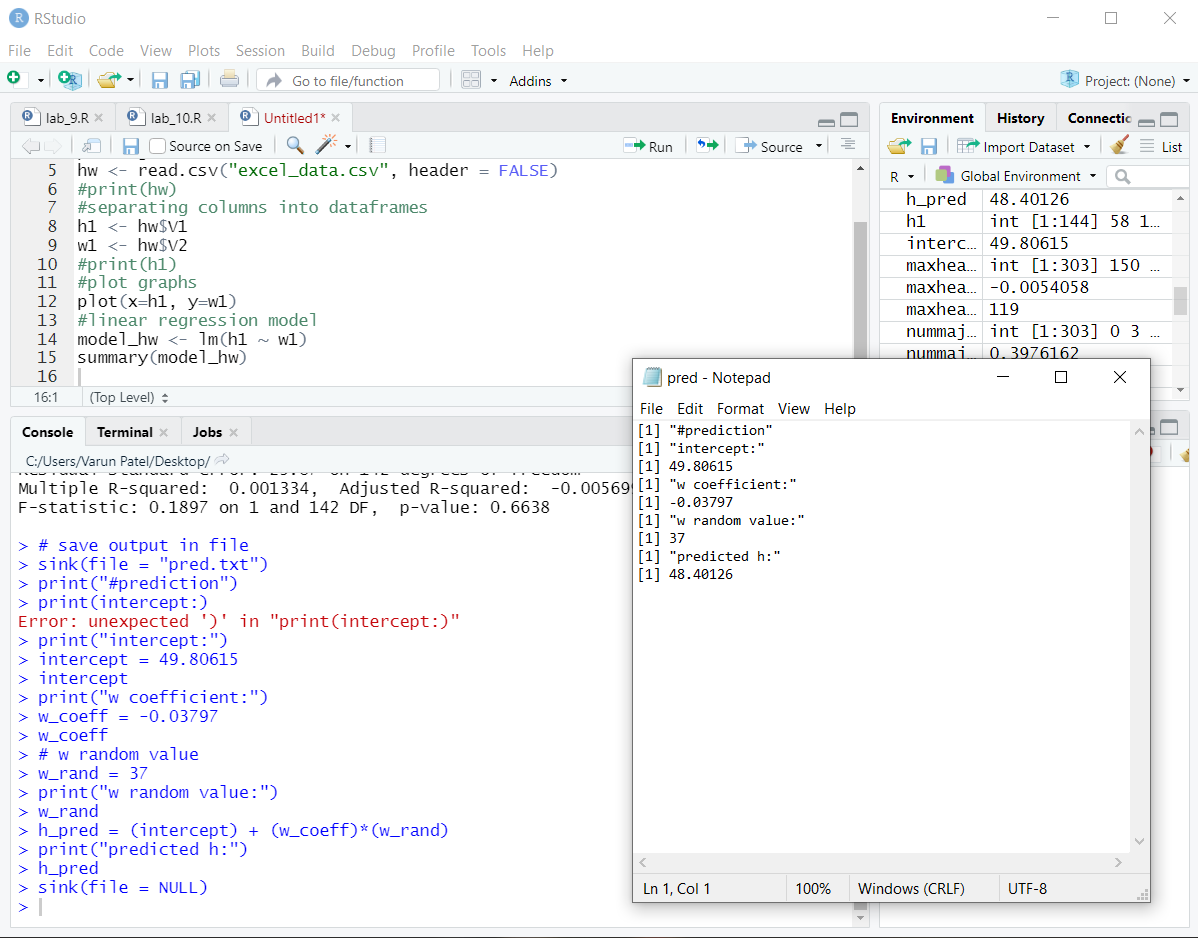
> h\_pred = (intercept) + (w\_coeff)\*(w\_rand)

> print("predicted h:")

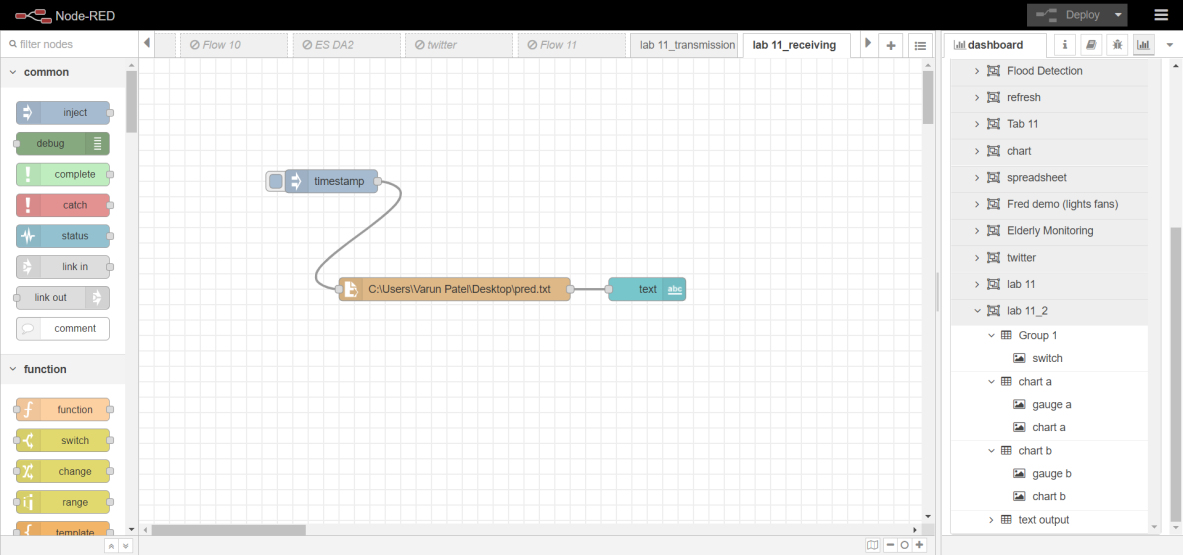
> h\_pred

> sink(file = NULL)

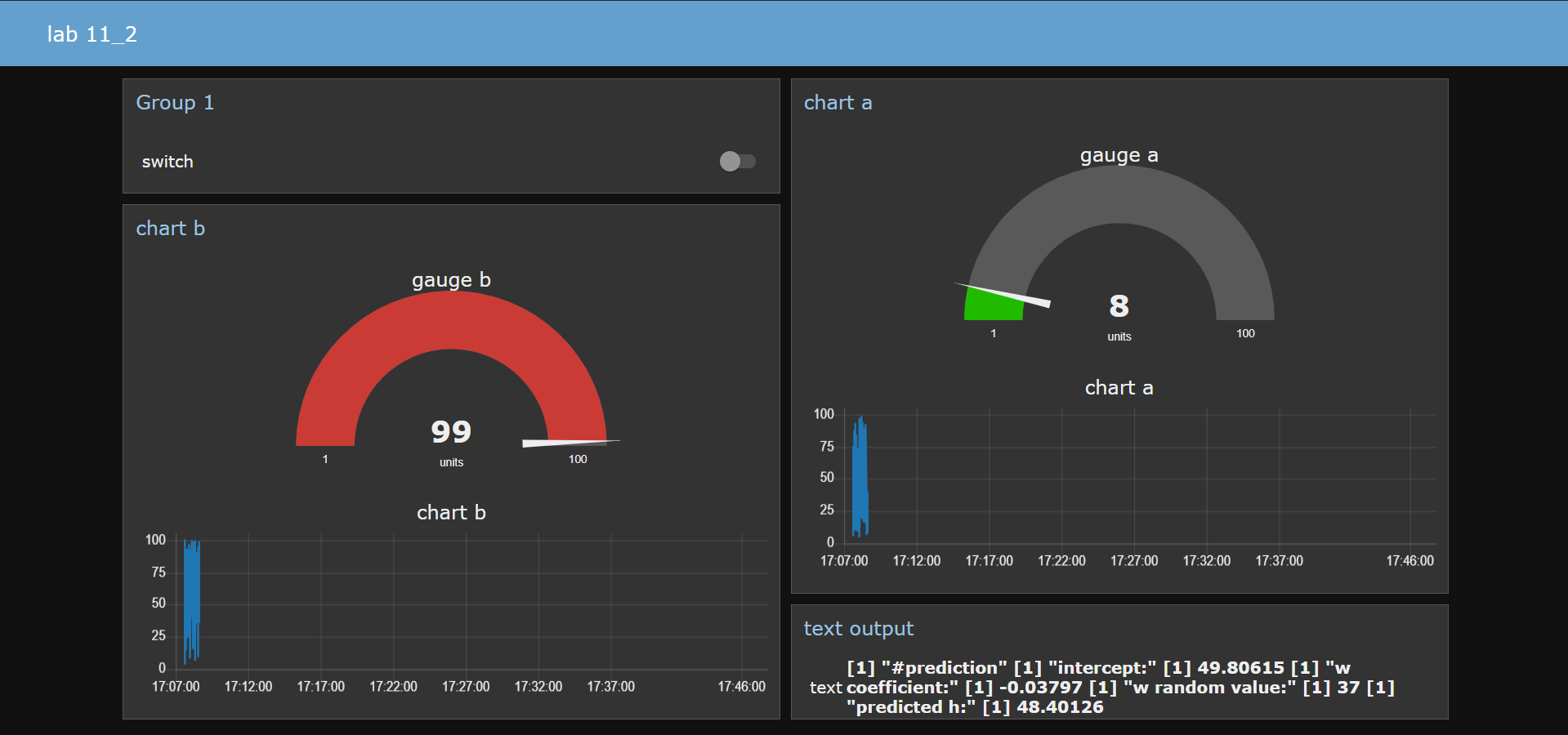
**Output:**



**Node Red flow for receiving data and display on dashboard:**

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**Dashboard output:**

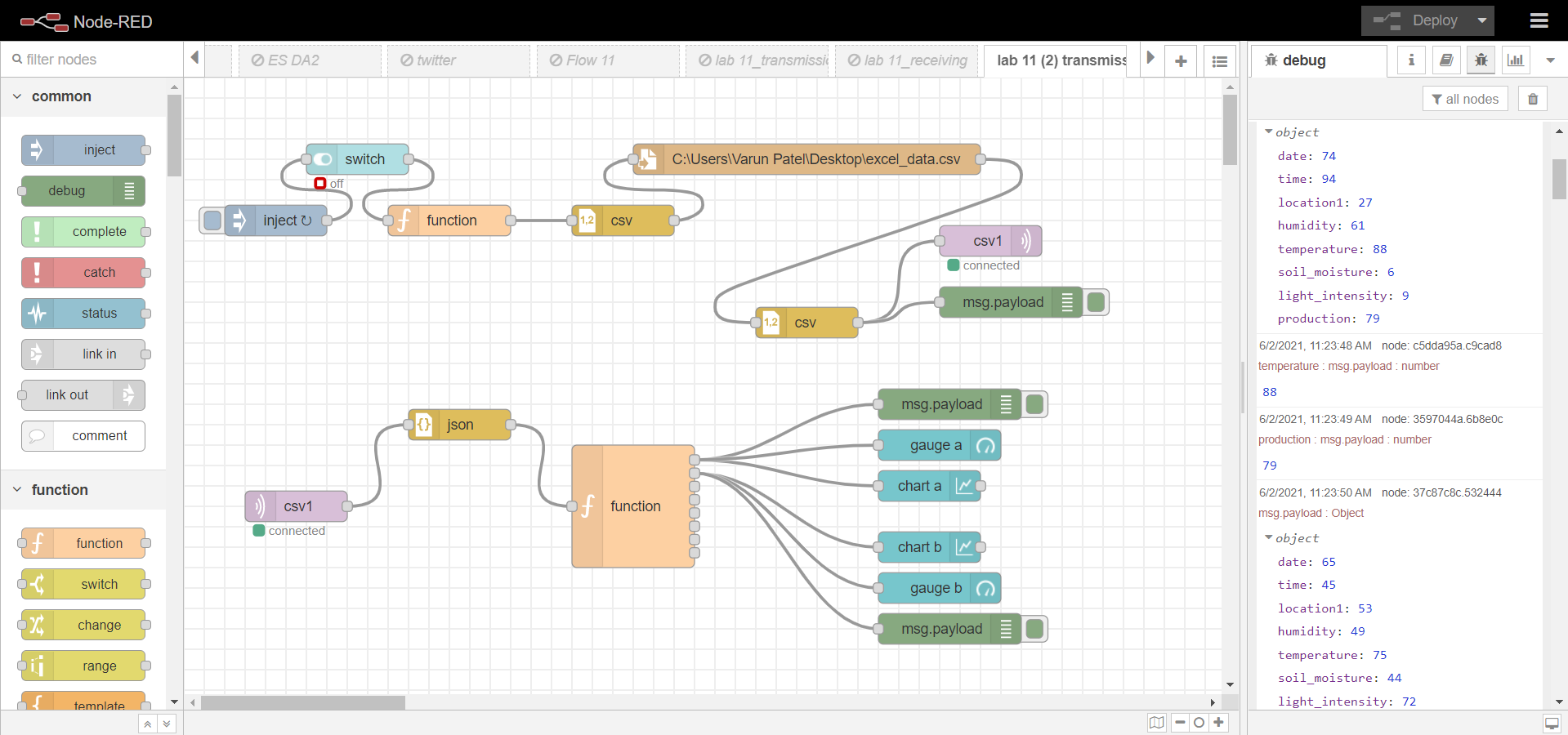
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**Q2. Multiple Linear Regression.**

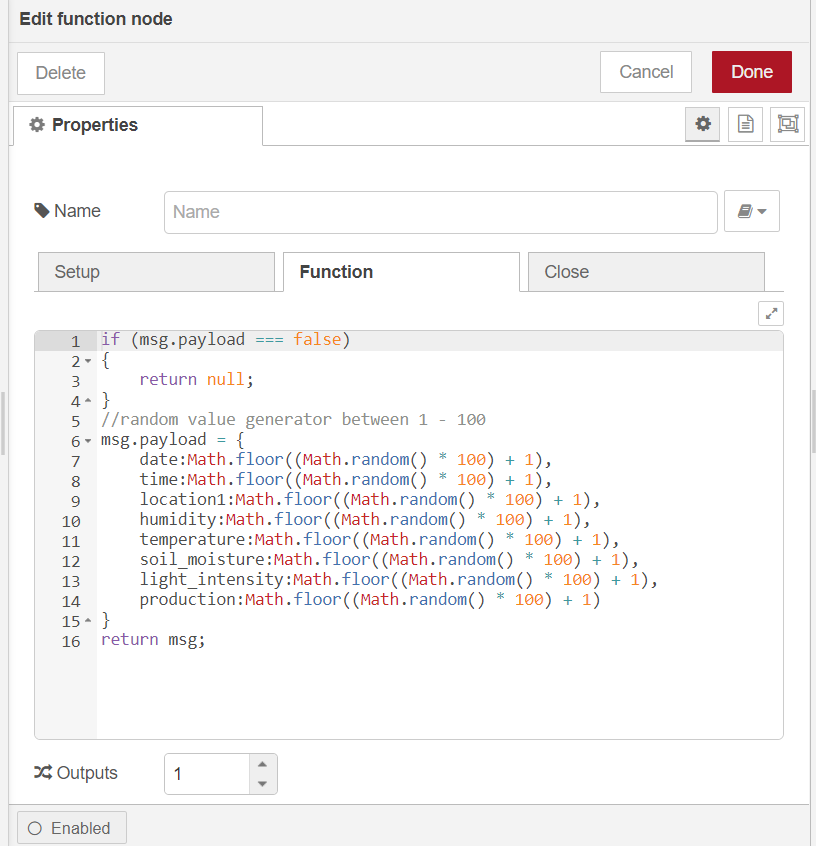
**Generate 8 random values (date, time, location, humidity, temperature, soil\_moisture, light\_intensity, production) on Node Red and store them onto a csv file. Take this dataset into RStudio and generate a multiple linear regression model to predict production at given values of the independent variables (date, time, location, humidity, temperature, soil\_moisture, light\_intensity). Send this predicted output to Node Red to display on dashboard.**

**Ans.**

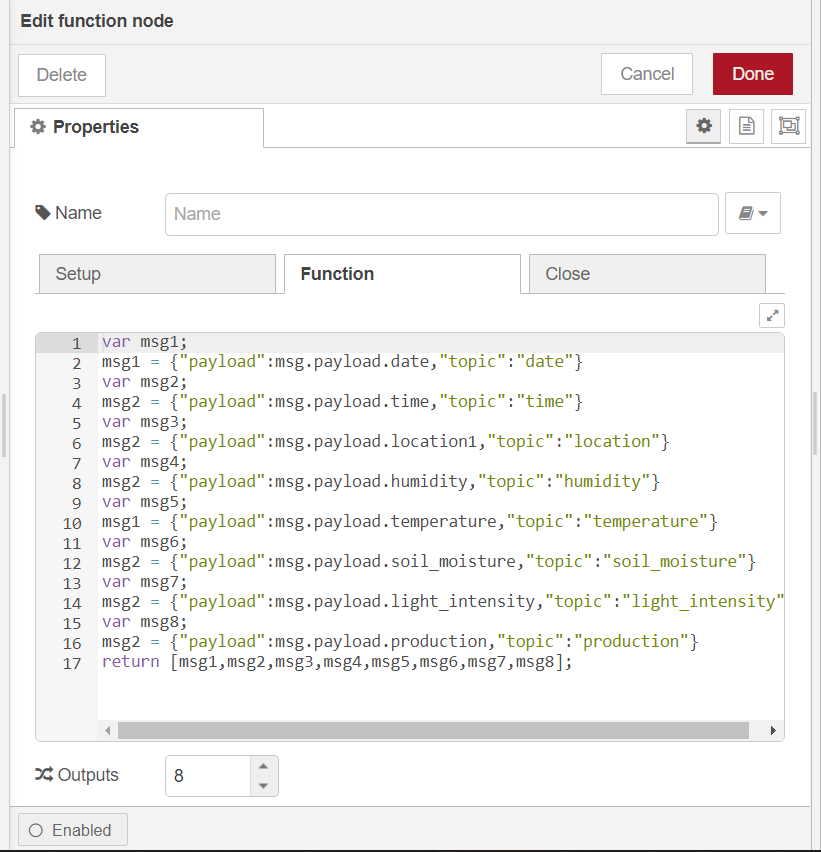
**Node Red flow:**

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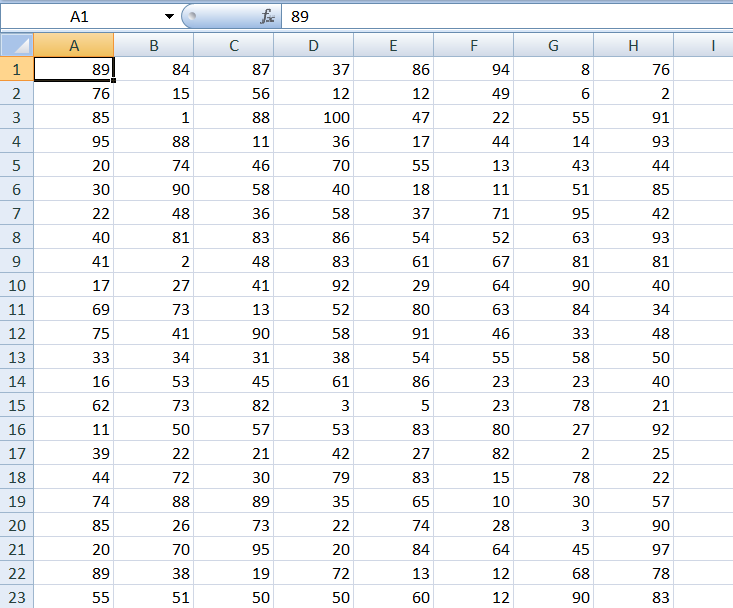
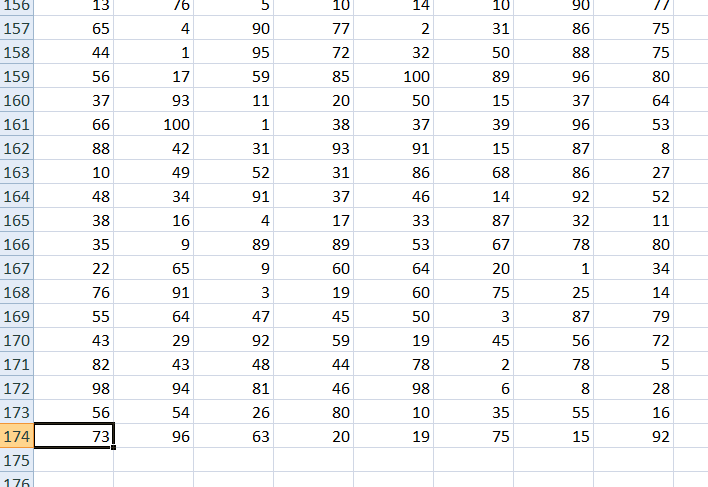
**Function node (value generation):**

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**Function node (collection):**

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**Dataset:**

**RStudio (Script Code):**

#put csv file in current working directory("Documents")

#create dataframe of csv file

setwd("C:/Users/Varun Patel/Desktop")

print(getwd())

plant <- read.csv("excel\_data.csv", header = FALSE)

#print(plant)

#separating columns into dataframes

date <- plant$V1

time <- plant$V2

location <- plant$V3

humidity <- plant$V4

temperature <- plant$V5

soil\_moisture <- plant$V6

light\_intensity <- plant$V7

production <- plant$V8

#plot graphs

plot(x=production, y=temperature)

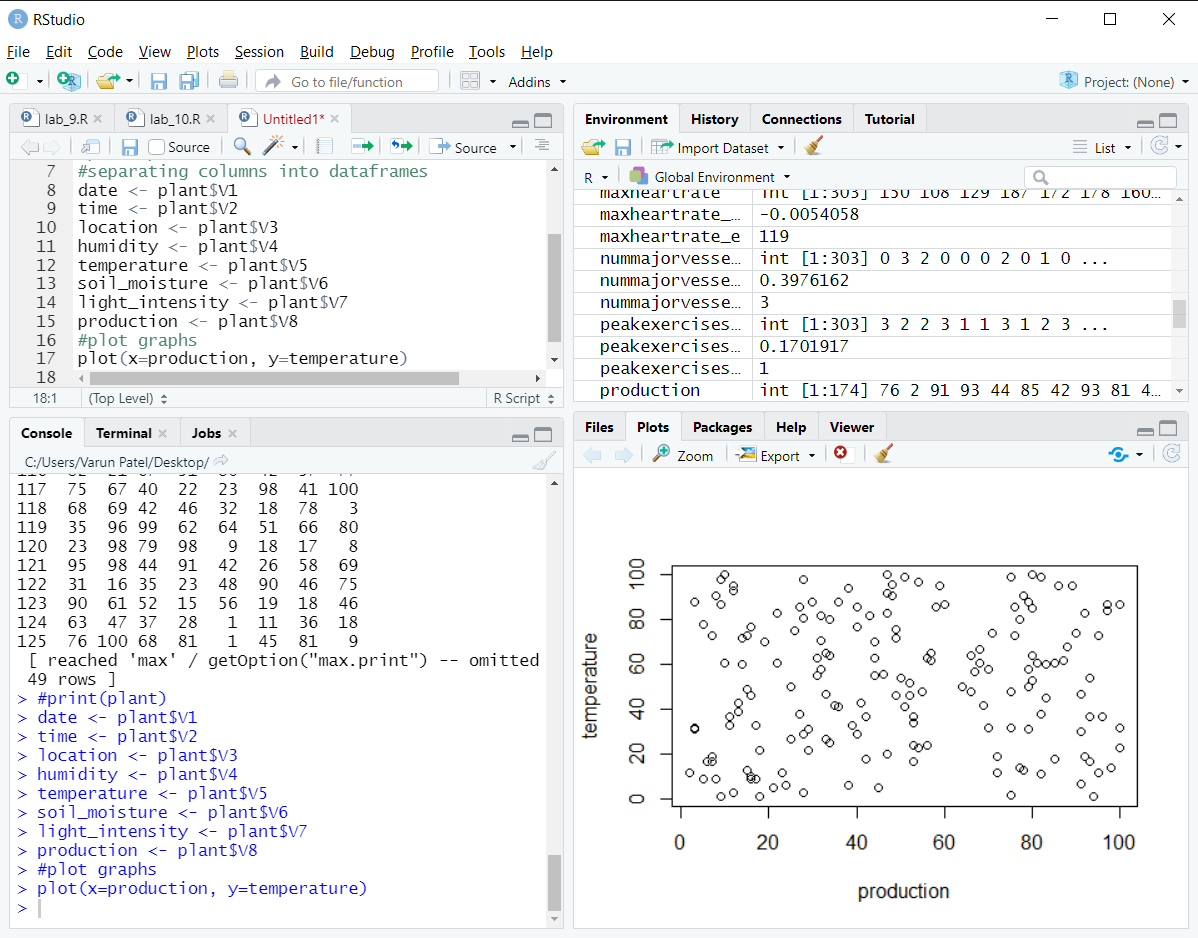
plot(x=production, y=light\_intensity)

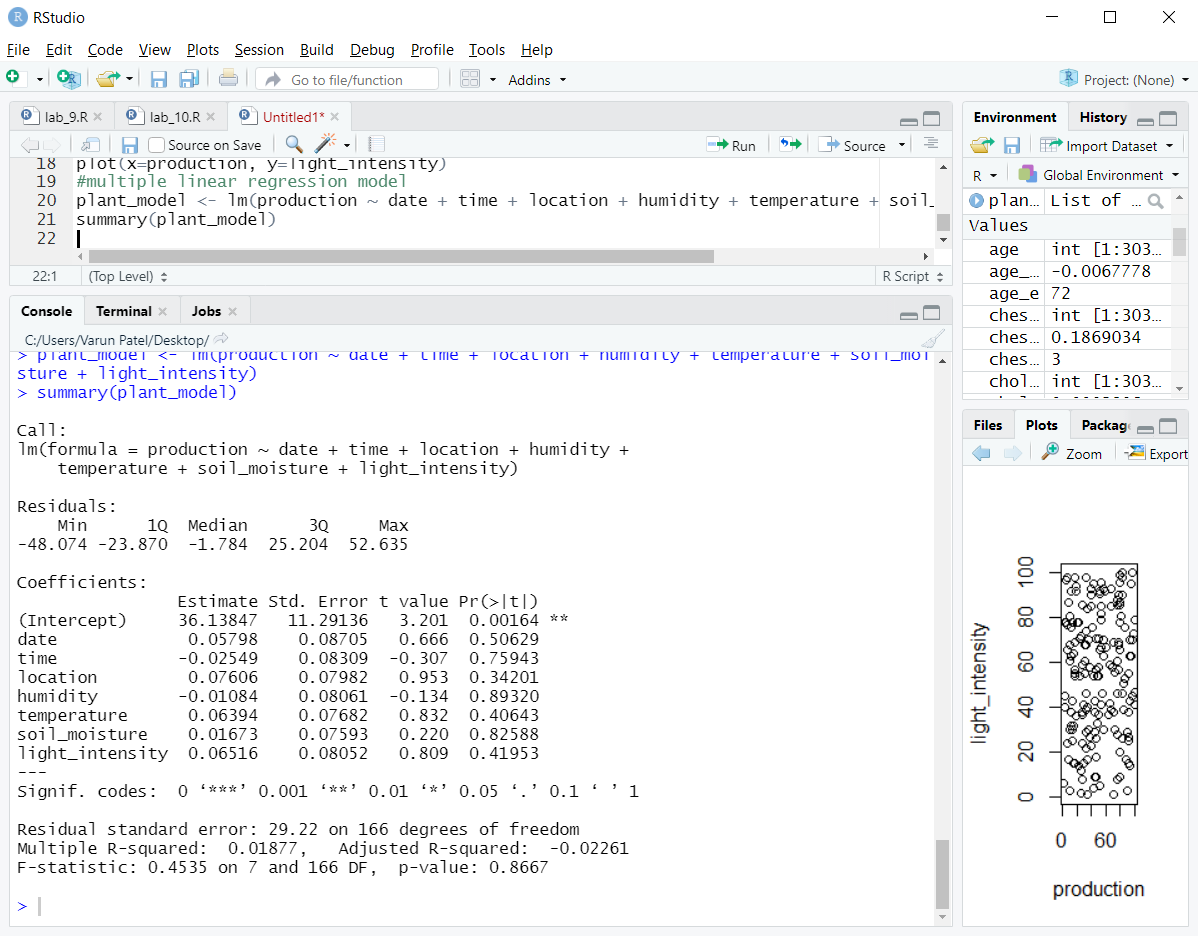
#multiple linear regression model

plant\_model <- lm(production ~ date + time + location + humidity + temperature + soil\_moisture + light\_intensity)

summary(plant\_model)

**Screenshots:**

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**Console Code (Prediction and saving output in a .txt file):**

> sink(file = "lab\_11\_plant.txt")

> print("Model summary")

> intercept = 36.13847

> cat("Intercept: " , intercept, "\n")

> date\_coeff = 0.05798

> cat("Date coeff: " , date\_coeff, "\n")

> time\_coeff = -0.02549

> cat("Time coeff: " , time\_coeff, "\n")

> location\_coeff = 0.07606

> cat("Location coeff: " , location\_coeff, "\n")

> humidity\_coeff = -0.01084

> cat("Humidity coeff: " , humidity\_coeff, "\n")

> temperature\_coeff = 0.06394

> cat("Temperature coeff: " , temperature\_coeff, "\n")

> soil\_moisture\_coeff = 0.01673

> cat("Soil moisture coeff: " , soil\_moisture\_coeff, "\n")

> light\_intensity\_coeff = 0.06516

> cat("Light intensity coeff: " , light\_intensity\_coeff, "\n")

> # independent variables random values

> print("Random values")

> date\_e = 89

> cat("Date: " , date\_e, "\n")

> time\_e = 12

> cat("Time: " , time\_e, "\n")

> location\_e = 45

> cat("Location: " , location\_e, "\n")

> humidity\_e = 65

> cat("Humidity: " , humidity\_e, "\n")

> temperature\_e = 5

> cat("Temperature: " , temperature\_e, "\n")

> soil\_moisture\_e = 99

> cat("Soil moisture: " , soil\_moisture\_e, "\n")

> light\_intensity\_e = 19

> cat("Light intensity: " , light\_intensity\_e, "\n")

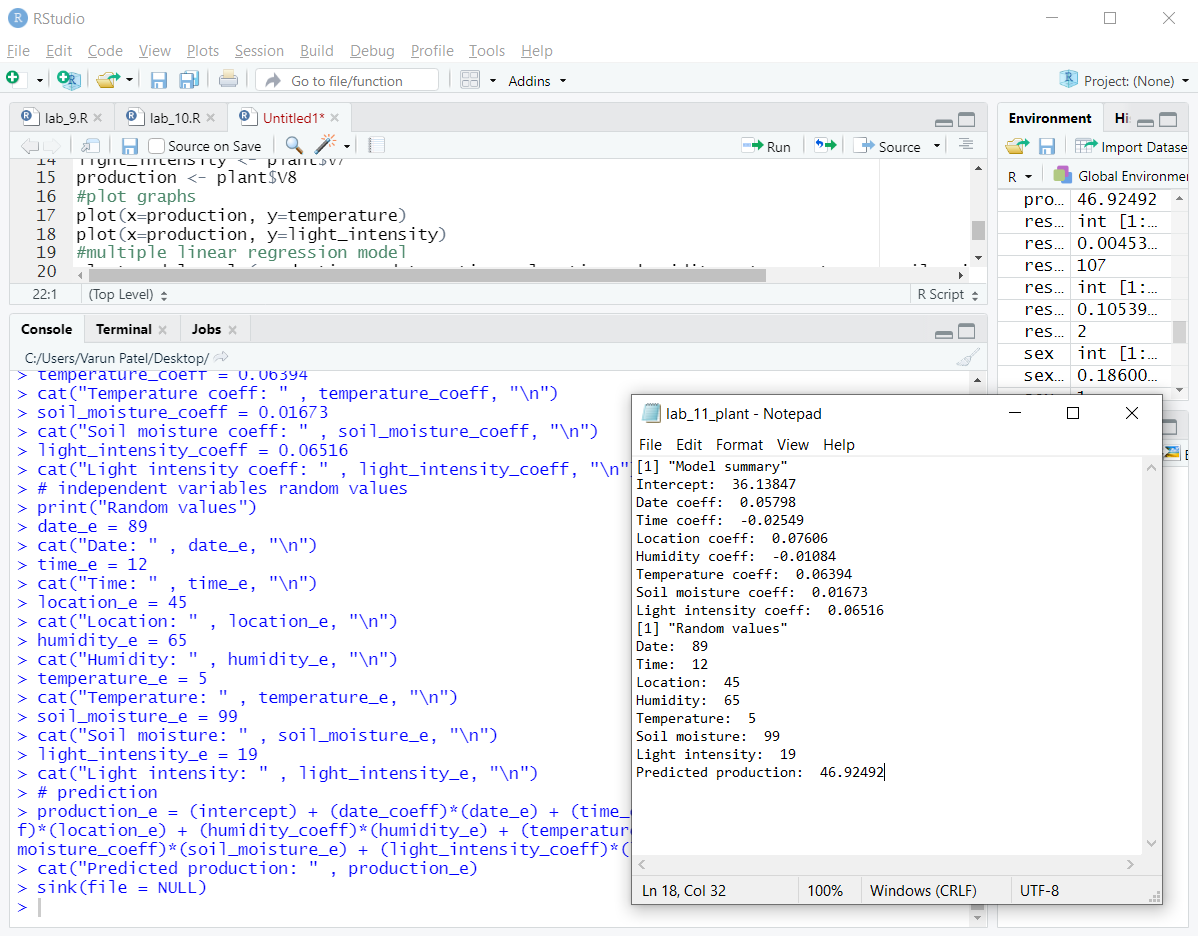
> # prediction

> production\_e = (intercept) + (date\_coeff)\*(date\_e) + (time\_coeff)\*(time\_e) + (location\_coeff)\*(location\_e) + (humidity\_coeff)\*(humidity\_e) + (temperature\_coeff)\*(temperature\_e) + (soil\_moisture\_coeff)\*(soil\_moisture\_e) + (light\_intensity\_coeff)\*(light\_intensity\_e)

> cat("Predicted production: " , production\_e)

> sink(file = NULL)

**Output:**



**Node Red output:**

