Ex No: 7

IMPLEMENT LINEAR AND LOGISTIC REGRESSION

AIM:

To write an R code to implement linear and logistic regression.

PROCEDURE:

1. Create sample data for heights and weights, fit a linear regression model, and plot the data with the regression line.
2. Use the sample data to create a data frame for the regression model.
3. Fit the linear regression model using the `lm()` function and display the summary.
4. Plot the data points and add the regression line using the `plot()` and `abline()` functions.
5. Load the `mtcars` dataset, convert the 'am' variable to a factor, fit a logistic regression model using the `glm()` function, and plot the probabilities.

PROGRAM CODE:

a) **Linear regression**

```
# Linear Regression

heights <- c(150, 160, 165, 170, 175, 180, 185)

weights <- c(55, 60, 62, 68, 70, 75, 80)

data <- data.frame(heights, weights)

linear_model <- lm(weights ~ heights, data = data)

print(summary(linear_model))


# Plotting Linear Regression

plot(data$heights, data$weights,

    main = "Linear Regression: Weight vs. Height",

    xlab = "Height (cm)",

    ylab = "Weight (kg)",

    pch = 19, col = "blue")

abline(linear_model, col = "red", lwd = 2)
```
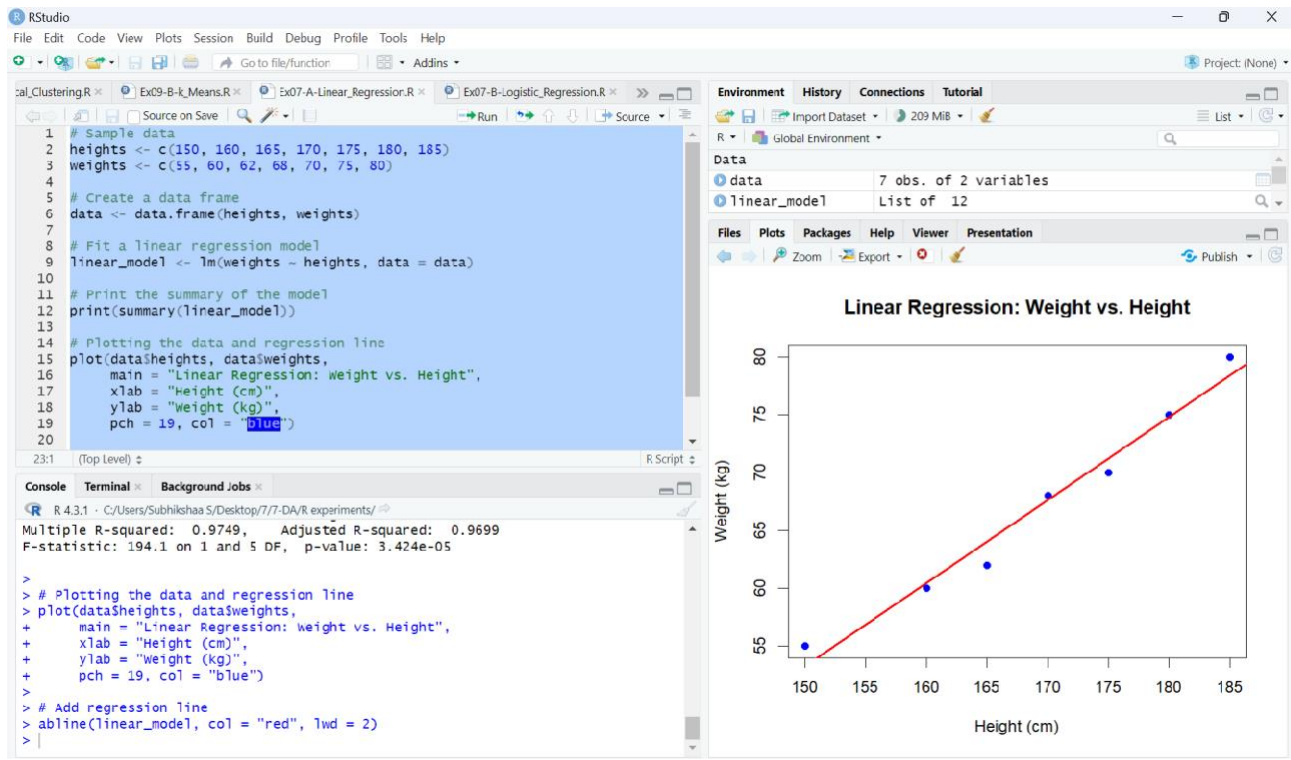
OUTPUT:

b) Logistic regression

Logistic Regression

data(mtcars)

mtcars$am <- factor(mtcars$am, levels = c(0, 1), labels = c("Automatic", "Manual"))

logistic_model <- glm(am ~ mpg, data = mtcars, family = binomial)

print(summary(logistic_model))

Plotting Logistic Regression

predicted_probs <- predict(logistic_model, type = "response")

print(predicted_probs)

plot(mtcars$mpg, as.numeric(mtcars$am) - 1,

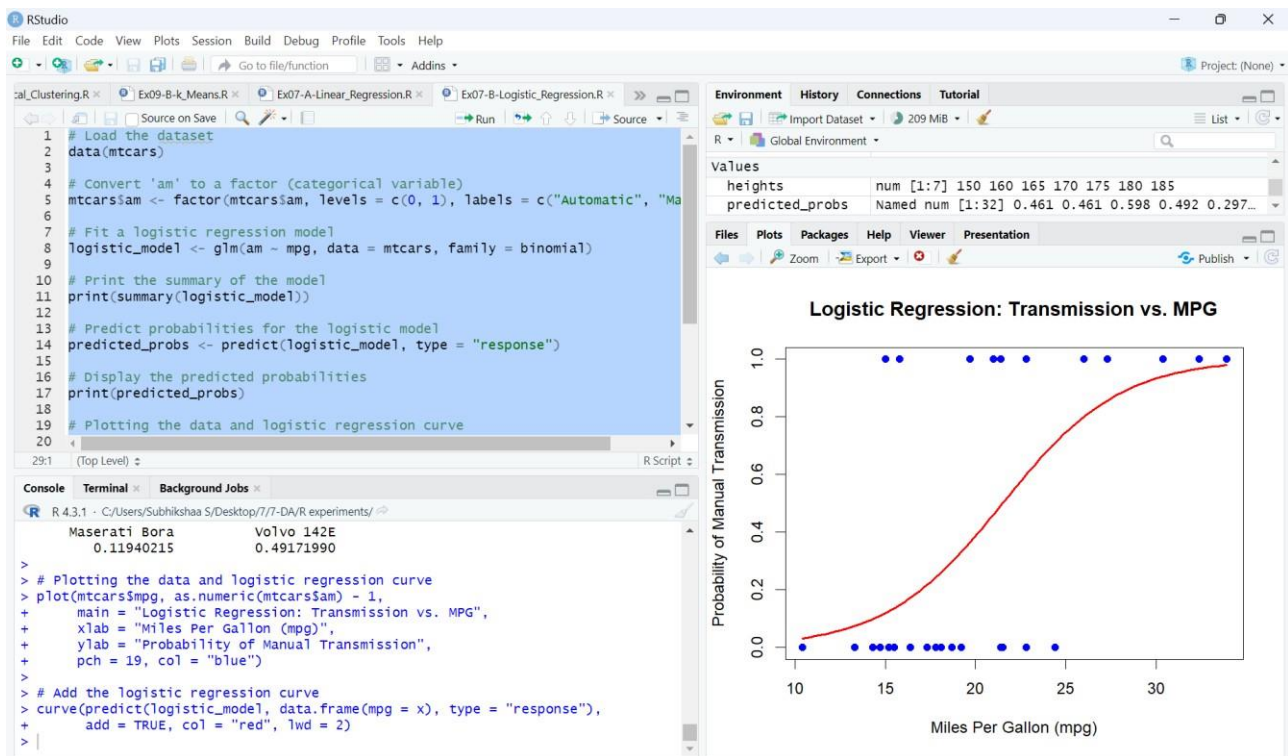   main = "Logistic Regression: Transmission vs. MPG",

   xlab = "Miles Per Gallon (mpg)",

   ylab = "Probability of Manual Transmission",

   pch = 19, col = "blue")

curve(predict(logistic_model, data.frame(mpg = x), type = "response"),

                        add = TRUE, col = "red", lwd = 2)

OUTPUT:

RESULT:

Thus the R program to implement Linear and Logistic Regression has been Ex ecuted and verified successfully.