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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.

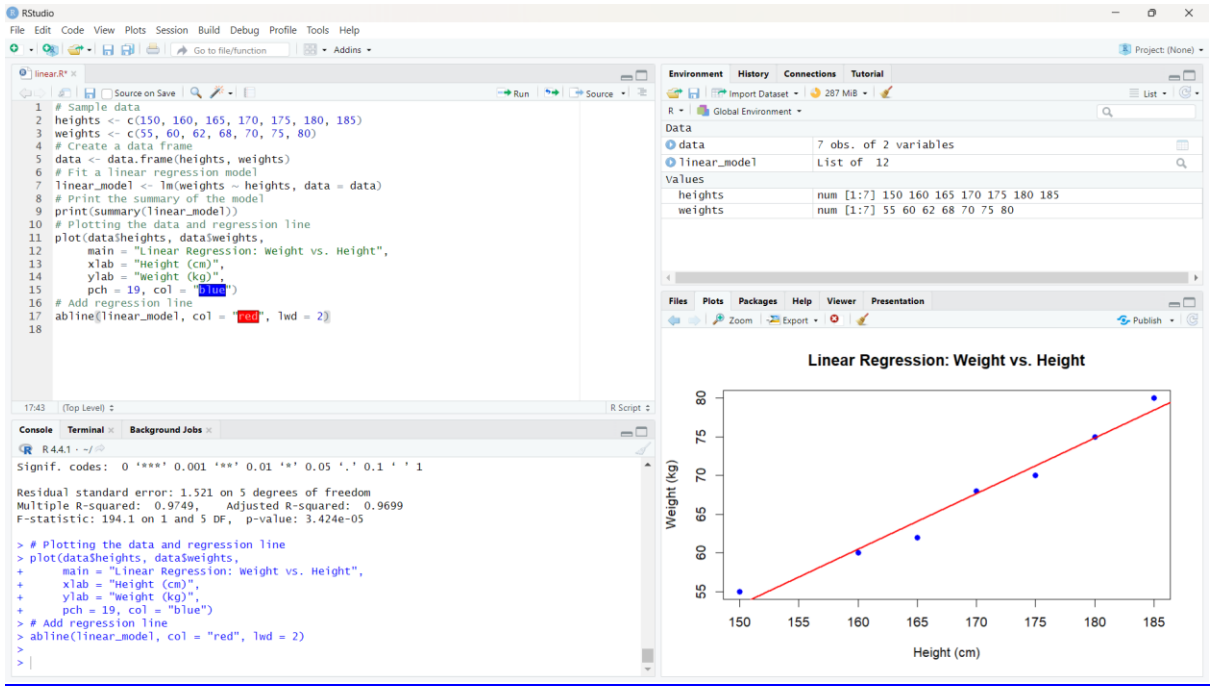
PROGRAM CODE:

a)<u>Linear regression</u>

```
# 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:

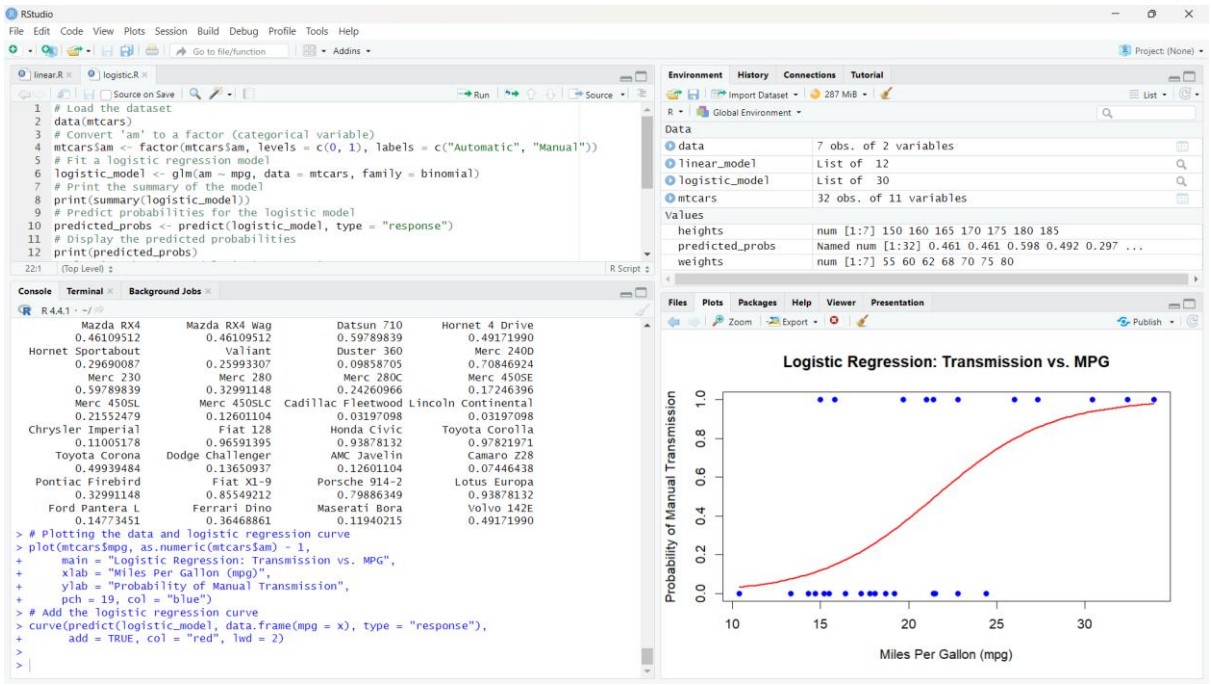


b) Logistic regression

```
# 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 executed and verified successfully.