Exp.No: 7

Implement Linear and Logistic Regression in R

AIM:

To Implement Linear and Logistic Regression using R

PROCEDURE:

- Load the dataset from external sources, such as CSV files or databases, using appropriate libraries.
- Perform data cleaning and preprocessing, addressing missing values and encoding categorical variables as needed.
- Split the dataset into training and testing sets to evaluate model performance.
- Standardize or normalize the dataset to ensure all features are on a consistent scale.
- Select the most suitable model, such as Linear Regression for predicting continuous values.
- Train the selected model on the training set using the fit function.
- Generate predictions on the test set using the predict function.
- Assess the model's accuracy using metrics like Mean Squared Error (MSE) for regression or a confusion matrix and accuracy score for classification models.
- Visualize model results using relevant graphs, such as scatter plots for regression or decision boundaries for classification.
- Improve the model's performance by tuning hyperparameters or applying regularization methods.

PROGRAM:

LinearRegression.R:

```
# Sample data
heights <- c(150, 160, 165, 170, 175, 180, 185)
weights <- c(55, 60, 62, 68, 70, 75, 80)
# Create a data frame
data <- data.frame(heights, weights)
# Fit a linear regression model
linear_model <- lm(weights ~ heights, data = data)
# Print the summary of the model
print(summary(linear_model))
# Plotting the data and regression line
plot(data$heights, data$weights,
```

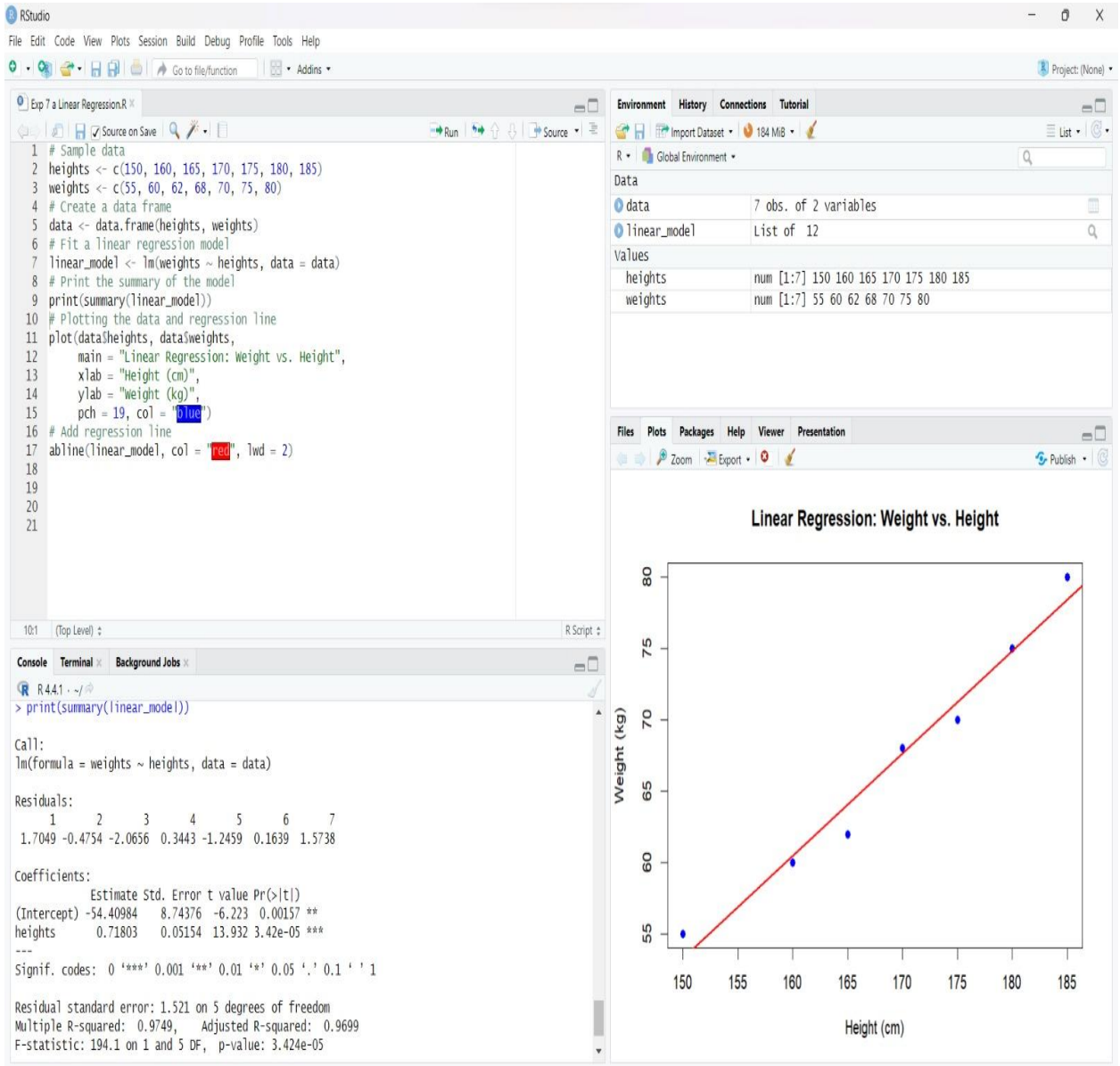
```
    main = "Linear Regression: Weight vs. Height",
    xlab = "Height (cm)",
    ylab = "Weight (kg)",
    pch = 19, col = "blue")
# Add regression line
abline(linear_model, col = "red", lwd = 2)
```

LogisticRegression.R:

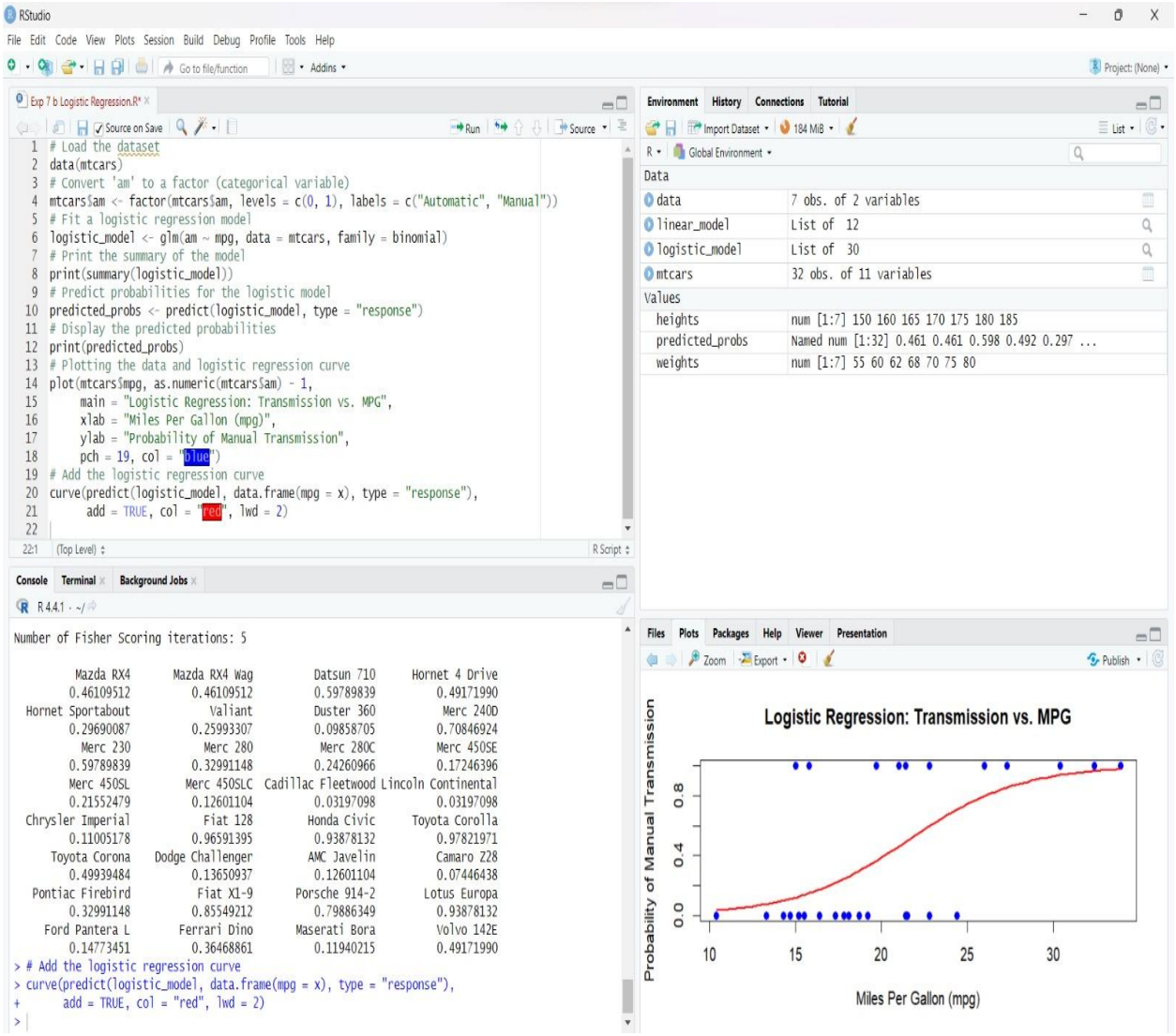
```
# Load the dataset
data(mtcars)
# Convert 'am' to a factor (categorical variable)
mtcars$am <- factor(mtcars$am, levels = c(0, 1), labels = c("Automatic", "Manual"))
# Fit a logistic regression model
logistic_model <- glm(am ~ mpg, data = mtcars, family = binomial)
# Print the summary of the model
print(summary(logistic_model))
# Predict probabilities for the logistic model
predicted_probs <- predict(logistic_model, type = "response")
# Display the predicted probabilities
print(predicted_probs)
# Plotting the data and logistic regression curve
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")
# Add the logistic regression curve
curve(predict(logistic_model, data.frame(mpg = x), type = "response"),
     add = TRUE, col = "red", lwd = 2)
```

OUTPUT:

Linear Regression:



Logistic Regression:



RESULT:

Thus Linear and Logistic Regression using R has been successfully executed.