

Exp No: 7

Implement Linear and Logistic Regression

a) Linear regression

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",
```

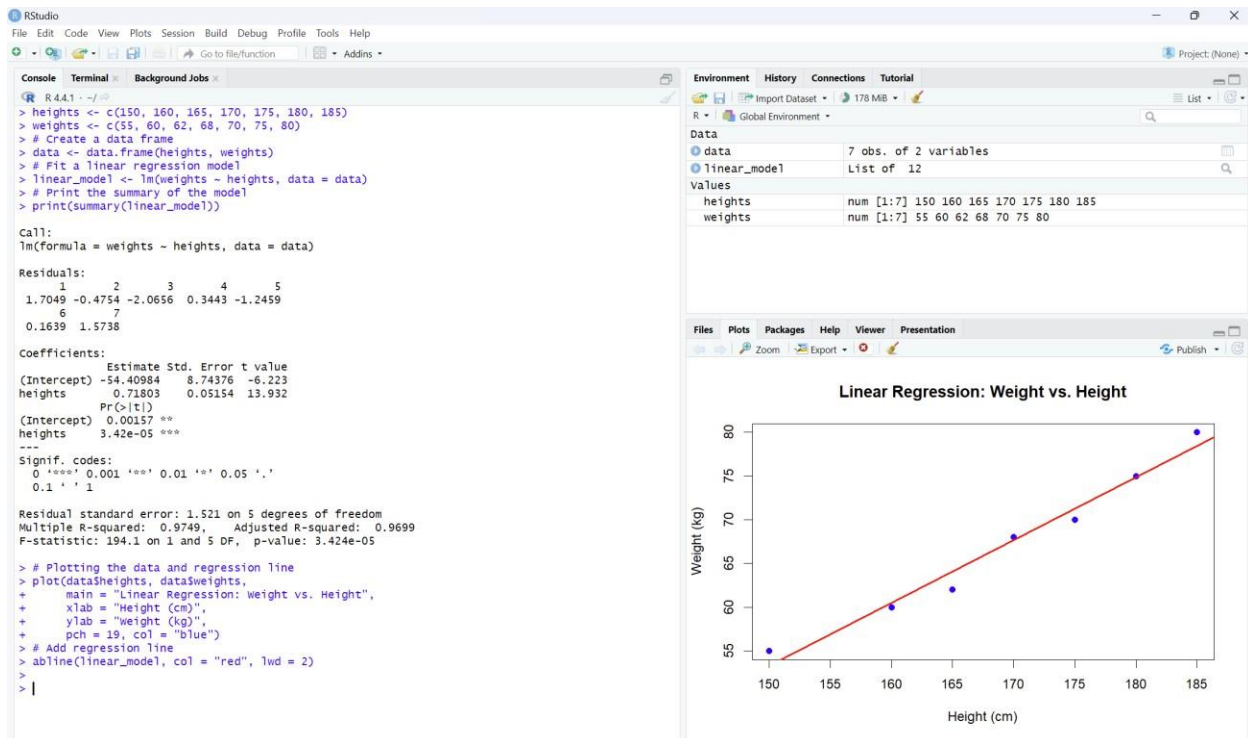
```
  xlab = "Height (cm)",
```

```
  ylab = "Weight (kg)",
```

```
  pch = 19, col = "blue")
```

Add regression line

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



b) Logistic regression

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)
```

