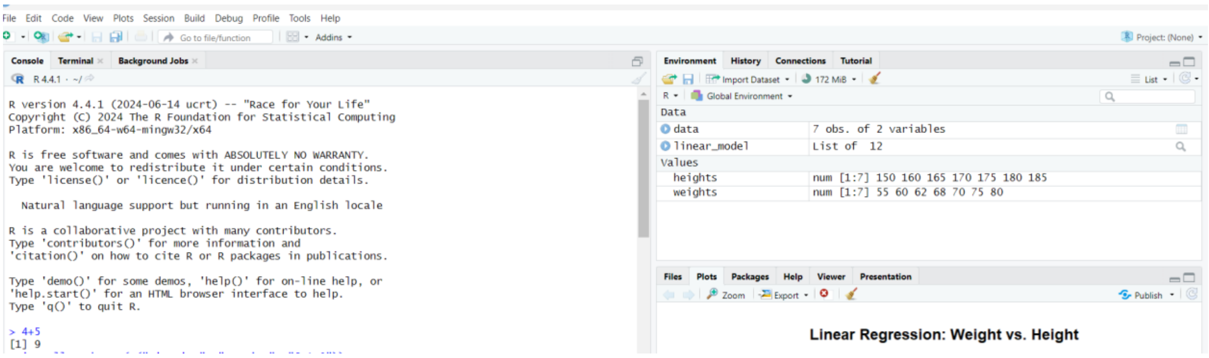
Exp:7

Implement Linear and Logistic Regressiona

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)
```



```
R version 4.4.1 (2024-06-14 ucrt) -- "Race for Your Life"
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Platform: x86_64-w64-mingw32/x64

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'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> 4+5
[1] 9
```
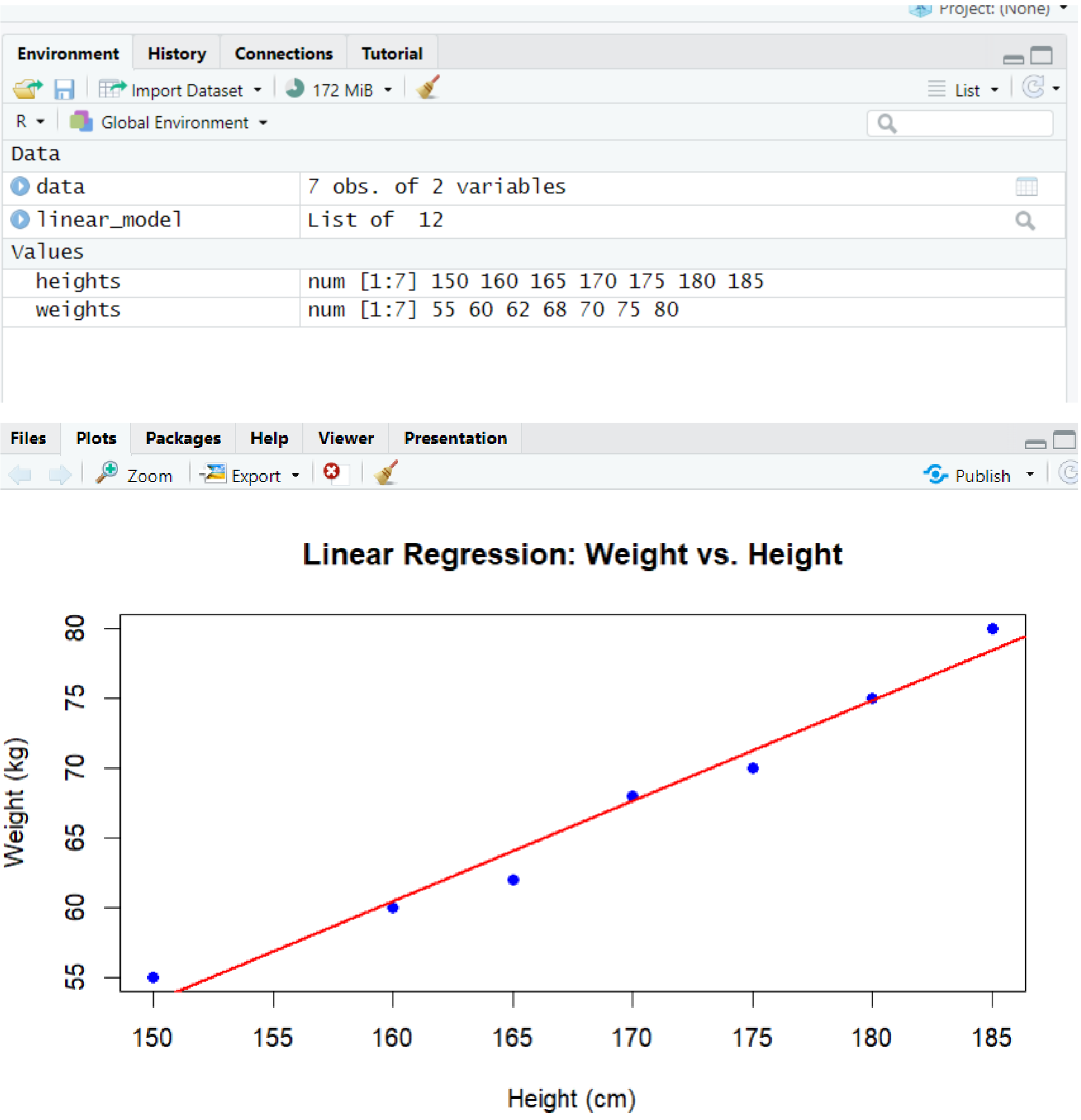

```
Data
data            7 obs. of 2 variables
linear_model    List of  12
Values
  heights       num [1:7] 150 160 165 170 175 180 185
  weights       num [1:7] 55 60 62 68 70 75 80
```

Linear Regression: Weight vs. Height

```
package ‘glue’ successfully unpacked and MD5 sums checked
package ‘cli’ successfully unpacked and MD5 sums checked
package ‘lifecycle’ successfully unpacked and MD5 sums checked
package ‘magrittr’ successfully unpacked and MD5 sums checked
package ‘pkgconfig’ successfully unpacked and MD5 sums checked
package ‘rlang’ successfully unpacked and MD5 sums checked
package ‘vctrs’ successfully unpacked and MD5 sums checked
package ‘cpp11’ successfully unpacked and MD5 sums checked
package ‘igraph’ successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\navya\AppData\Local\Temp\RtmpeAx23o\downloaded_packages
```

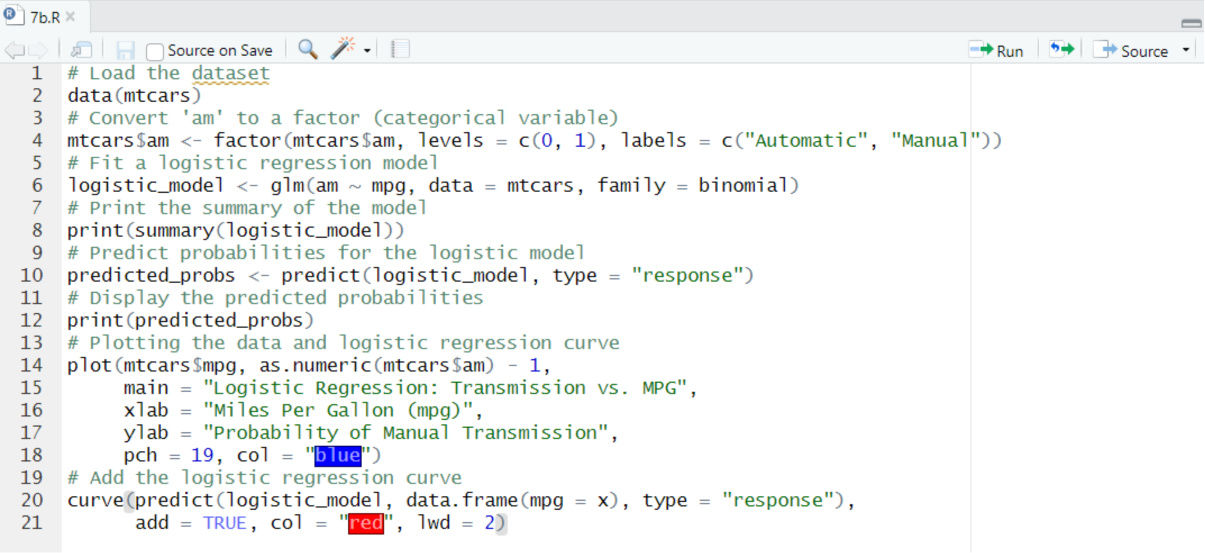


```
Data
data           7 obs. of 2 variables
linear_model   List of  12
Values
heights        num [1:7] 150 160 165 170 175 180 185
weights        num [1:7] 55 60 62 68 70 75 80
```

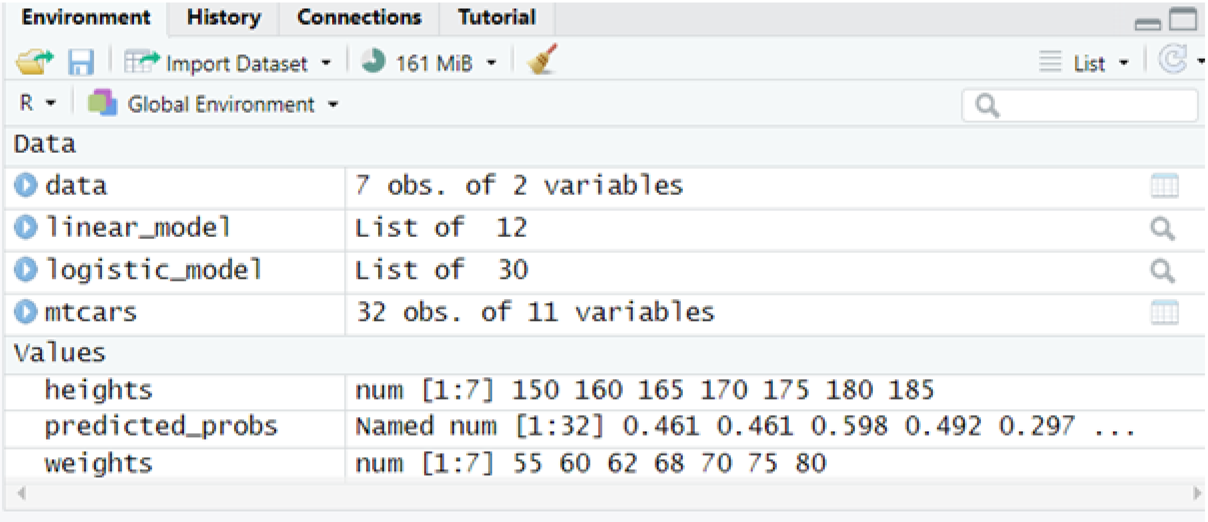
b) Logistic regression

```
# 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)
```

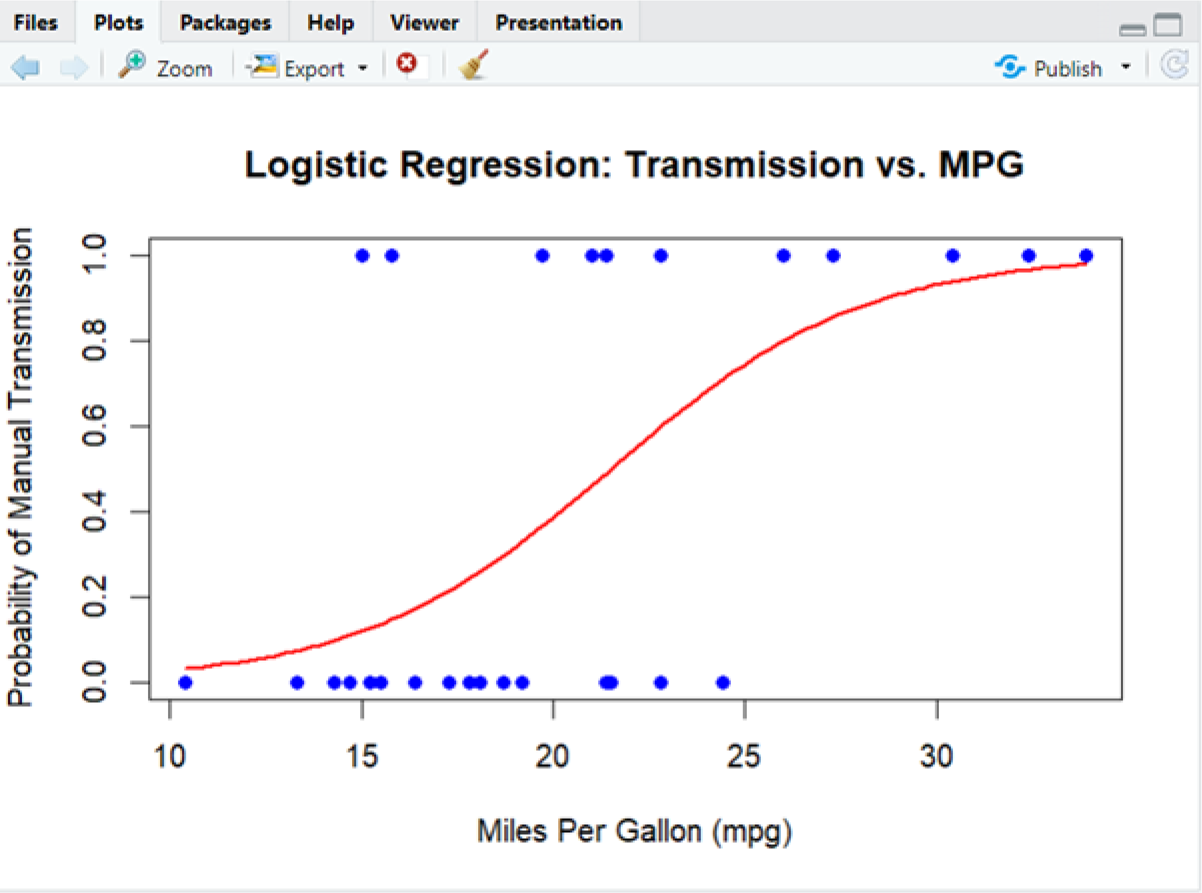
Output



```
# 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)
```



```
Data
data              7 obs. of 2 variables
linear_model      List of  12
logistic_model    List of  30
mtcars            32 obs. of 11 variables
Values
heights           num [1:7] 150 160 165 170 175 180 185
predicted_probs   Named num [1:32] 0.461 0.461 0.598 0.492 0.297 ...
weights           num [1:7] 55 60 62 68 70 75 80
```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Logistic Regression: Transmission vs. MPG
Probability of Manual Transmission
Miles Per Gallon (mpg)