Reg.No: 210701266

Installation guide for R and RStudio

Step 1 – Install R

1. Download the R installer from https://cran.r---project.org/

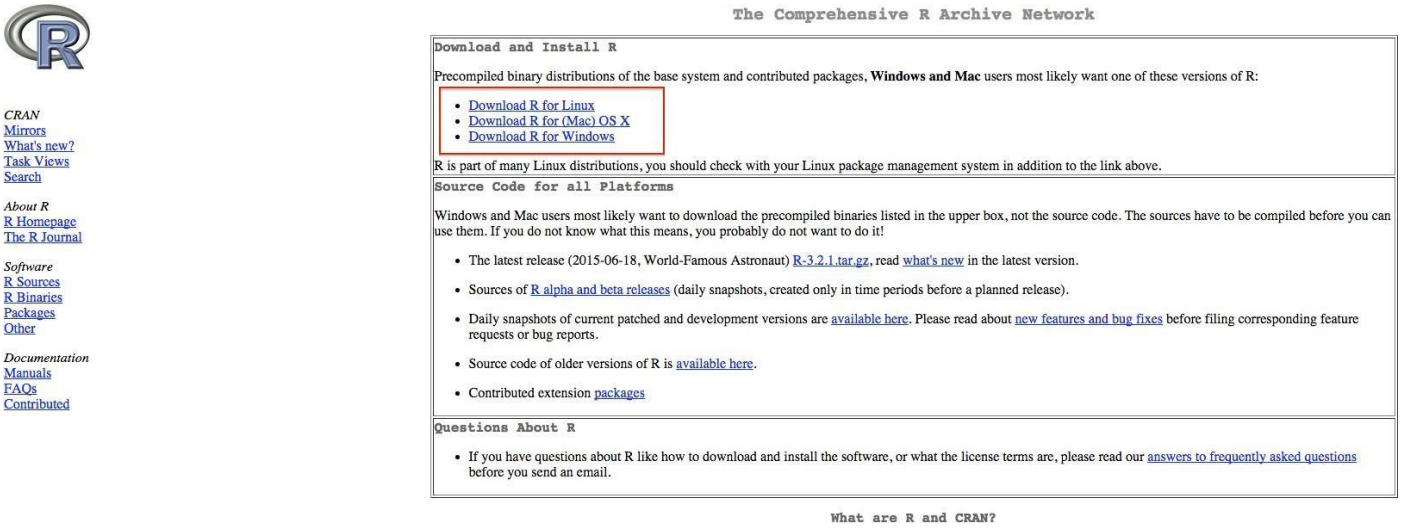

Figure 1. Screenshot of http://cran.csiro.au/

2. Run the installer. Default settings are fine. If you do not have admin rights on your laptop, then ask you local IT support. In that case, it is important that you also ask them to give you full permissions to the R directories. Without this, you will not be able to install additional packages later

Step 2 – Install RStudio

1. Download RStudio: https://www.rstudio.com/products/rstudio/download/

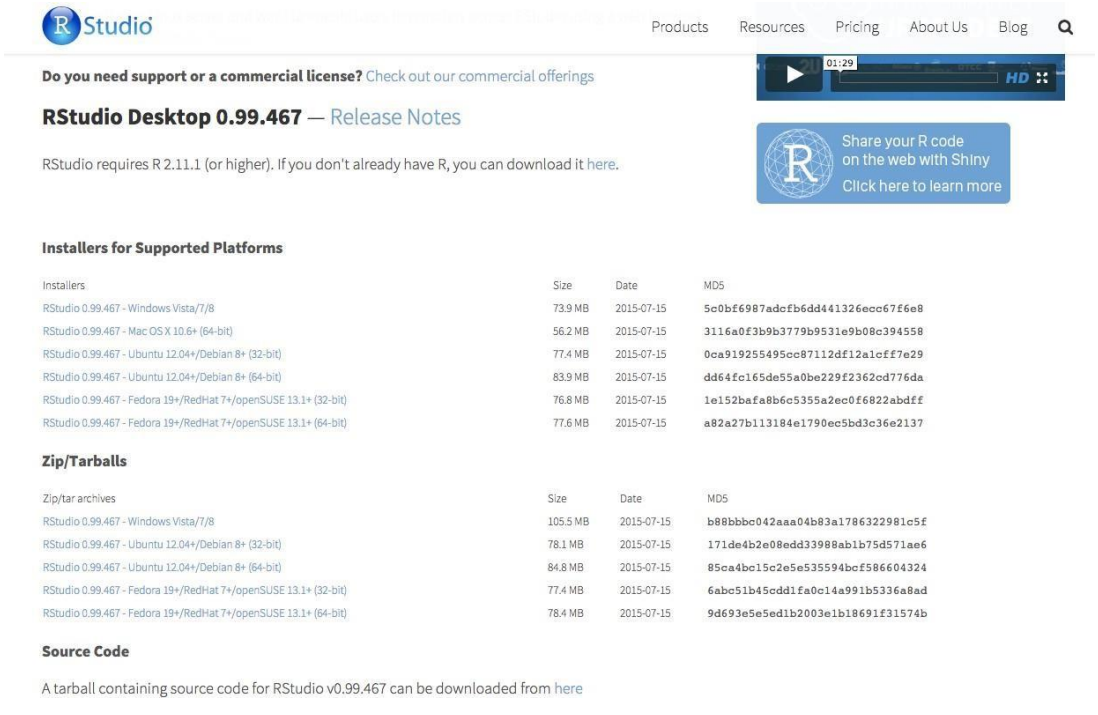

Figure 2. Download RStudio on https://www.rstudio.com/products/rstudio/download/

2. Once the installation of R has completed successfully (and not before), run the RStudio installer.
3. If you do not have administrative rights on your laptop, step 2 may fail. Ask your IT Support or download a pre---built zip archive of RStudio which doesn't need installing. The link for this is towards the bottom of the download page, highlighted in Image 2.

    a. Download the appropriate archive for your system (Windows/Linux only – the Mac version can be installed into your personal "Applications" folder without admin rights).

    b. Double clicking on the zip archive should automatically unpack it on most Windows machines.

Step 3 – Check that R and RStudio are working

1. Open RStudio. It should open a window that looks similar to image 3 below.

2. In the left hand window, by the '>'sign, type '4+5'(without the quotes) and hit enter. An output line reading '[1] 9' should appear. This means that R and RStudio are working.

3. If this is not successful, contact us or your local IT support for further advice

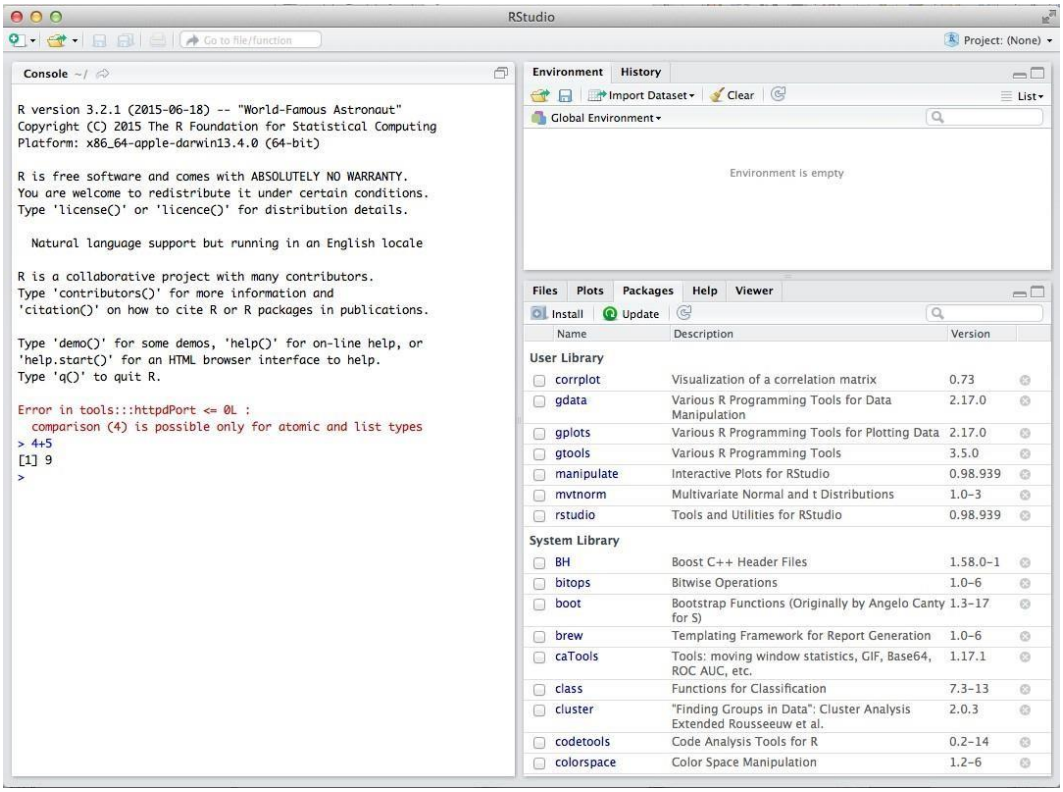

Figure 3. Running R with RStudio

Step 4 – Install R packages required for the workshop

1. Click on the tab ‘ Packages’ then ‘Install’ as shown in Image 4. Or Tools ---> Install packages.
2. Install the following packages: mixOmics version 6.1.0, mvtnorm, RColorBrewer, corrplot, igraph (see Image 4). For apple mac users, if you are unable to install the mixOmics imported library rgl, you will need to install the XQuartz software first https://www.xquartz.org/
3. Check that the packages are installed by typing ‘library(mixOmics)’ (without the quotes) in the prompt and press enter (see Image 5).
4. Then type ‘sessionInfo()’ and check that mixOmics version 6.1.0 has been installed (image 6).

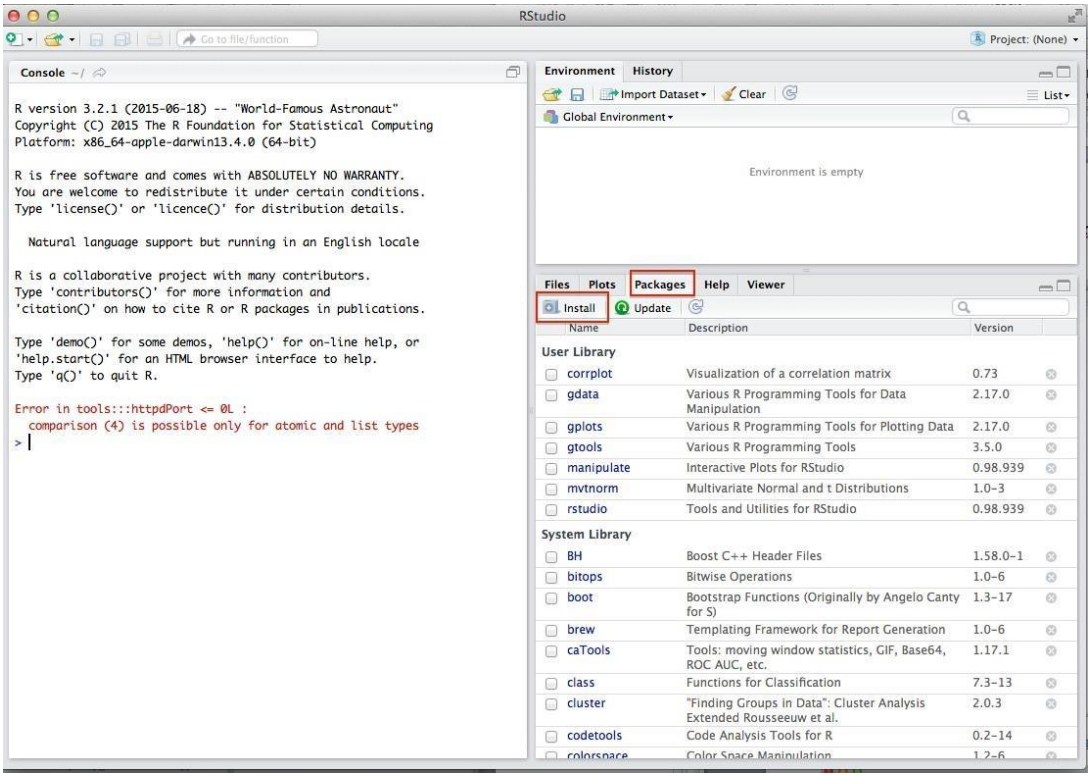

Figure 4. Click on Install to install R packages.

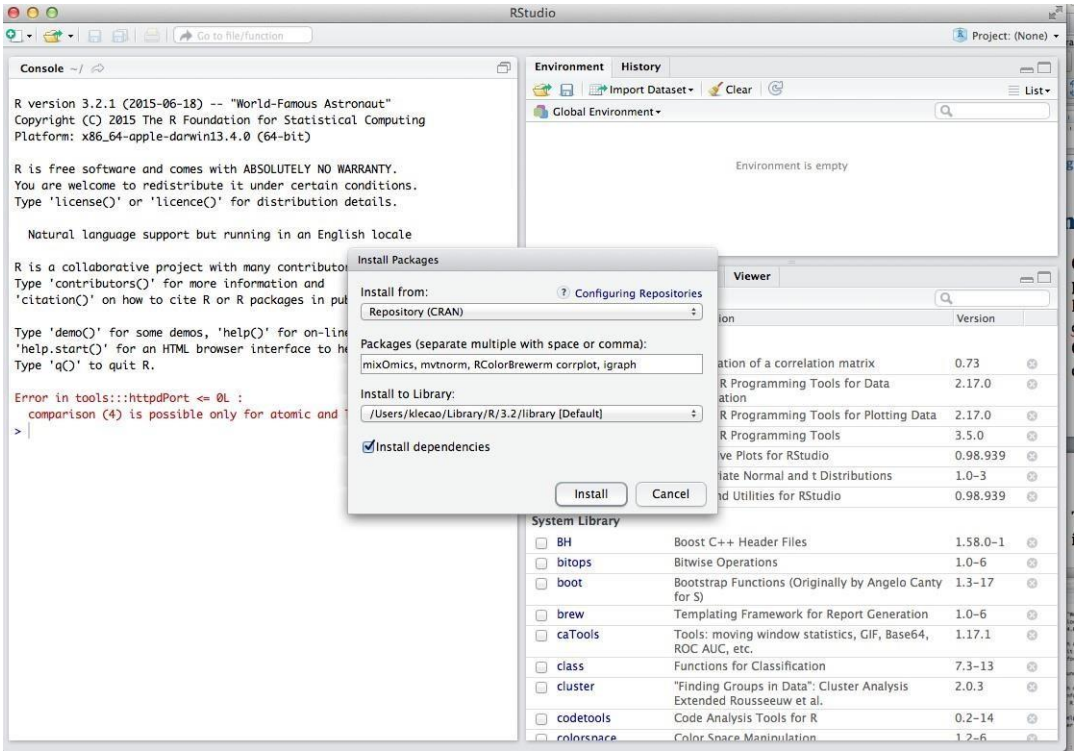

Figure 5. Specify the list of packages to be installed

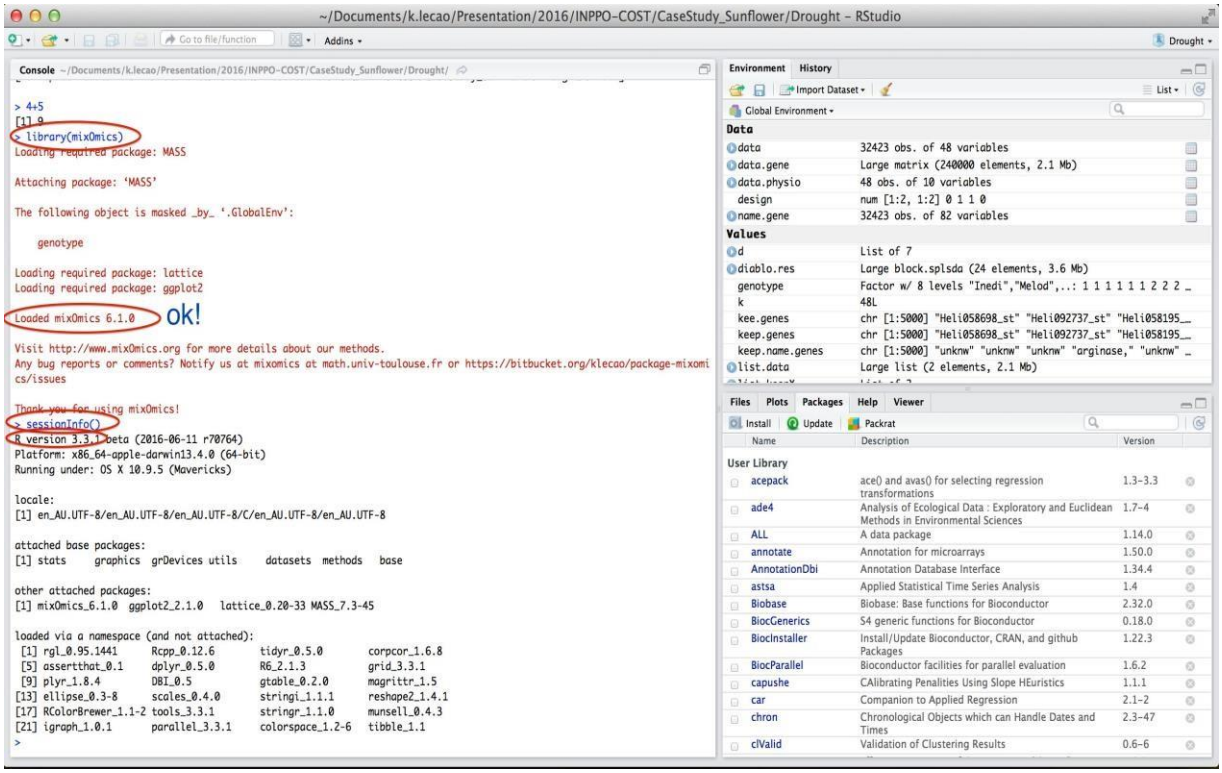

Figure 6. Check that the package mixOmics is installed and has the version 6.1.0.

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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.

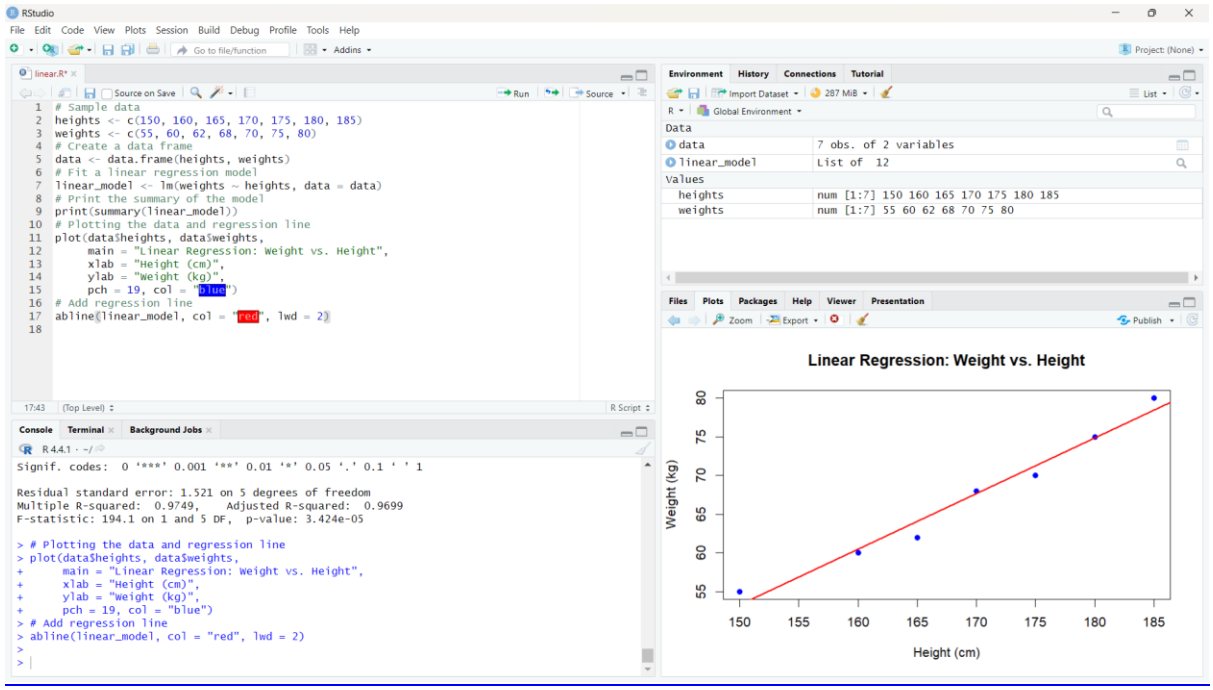
PROGRAM CODE:

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:

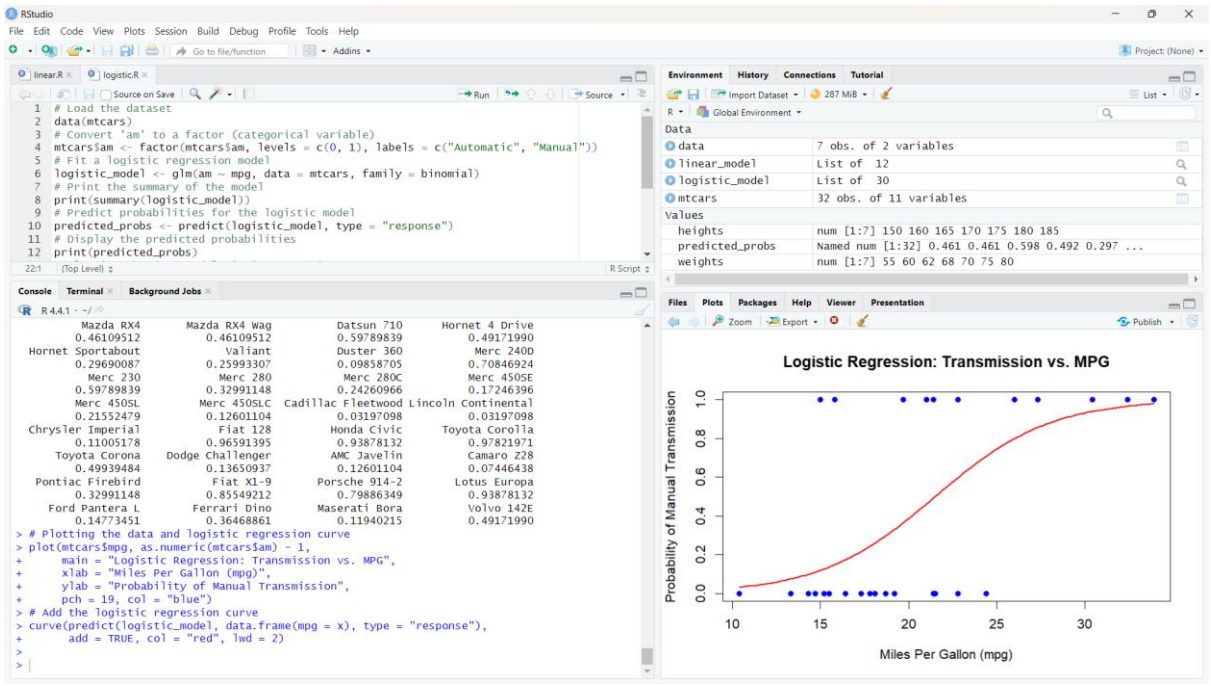


b) Logistic regression

```
# 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.