NAME: Hammad Ansari **ROLL NO: 2018450002**

Experiment No. 3

Title: Loop functions, debugging tools, Mathematical Functions in R, Exploratory data analysis in R

List of programs:

1. Find the sum of every column in matrix using apply()

   Code:

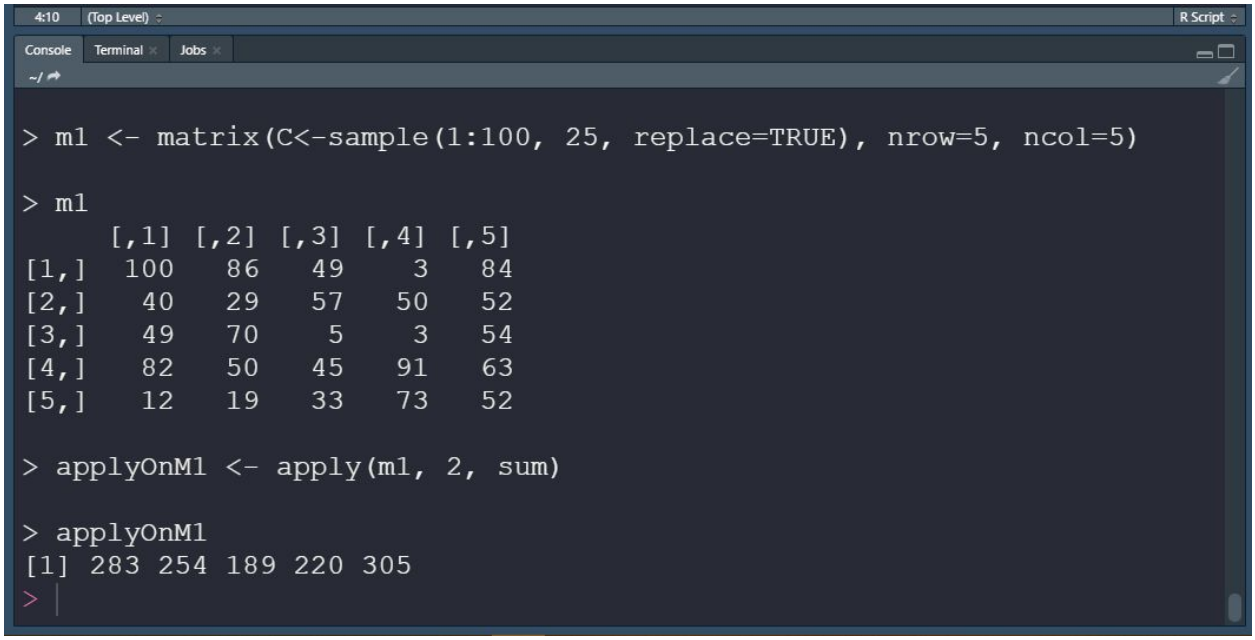
   ```
   m <- matrix(C<-sample(1:100, 25, replace=TRUE), nrow=5, ncol=5)

   m

   applyOnM1 <- apply(m, 2, sum)

   applyOnM1
   ```

   Screenshot:



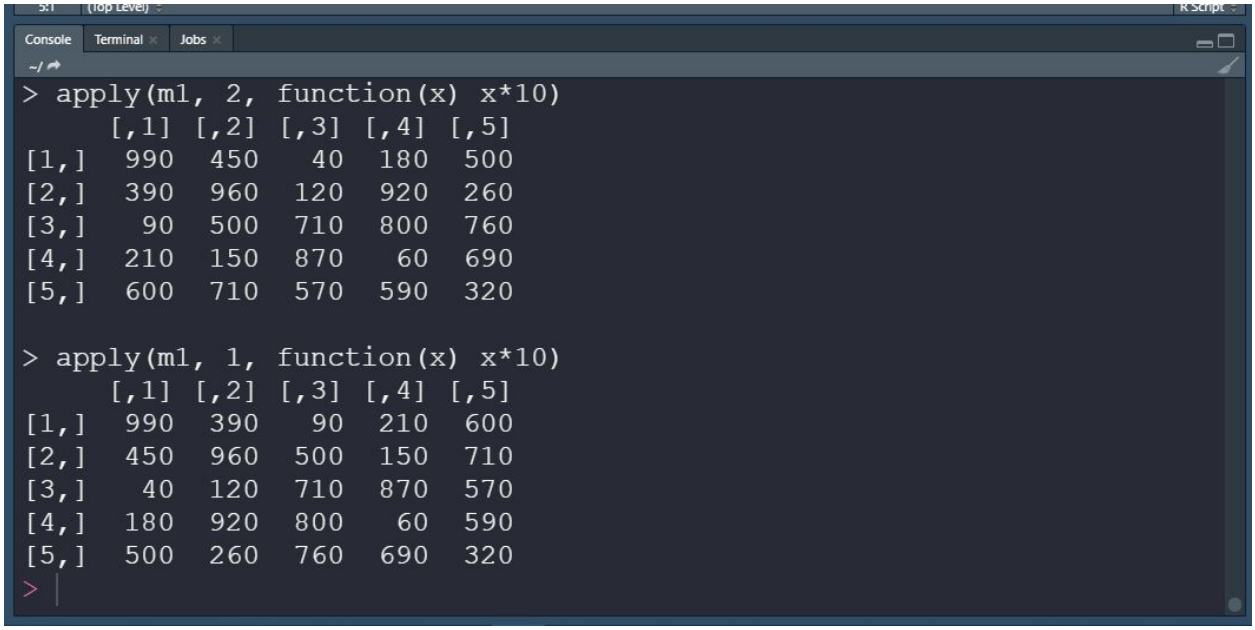
2. Create user-defined function multiply no by 10, and use to multiply each no of a matrix in apply function

   Code:

apply(m1, 2, function(x) x*10)

apply(m1, 1, function(x) x*10)

Screenshot:



3. Measure the minimum speed and stopping distances of cars from the cars dataset using sapply(). [Use cars dataset]

Code:

dt <- cars

lmn_cars <- lapply(dt, min)

smn_cars <- sapply(dt, min)

lmn_cars

smn_cars

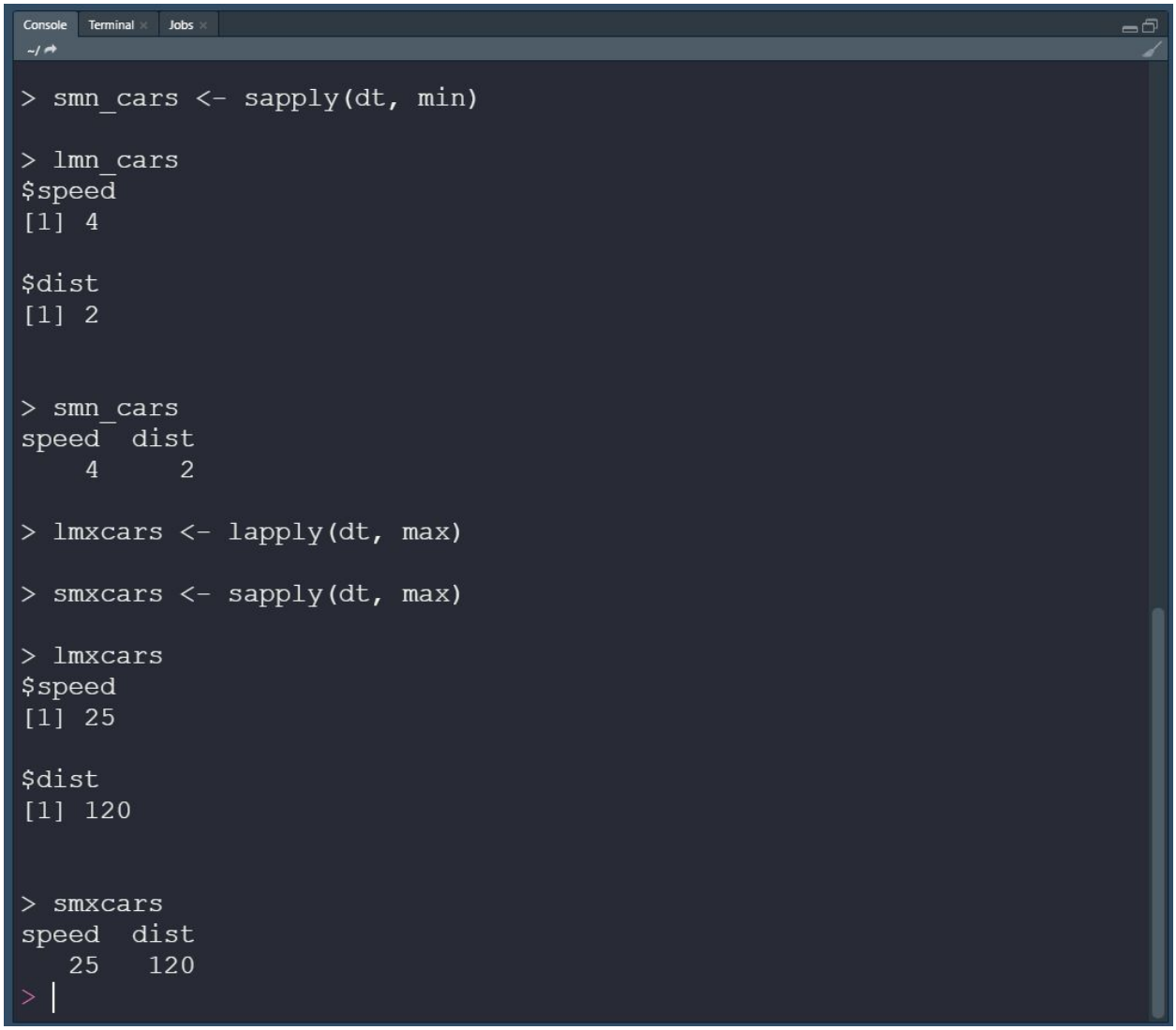
lmxcars <- lapply(dt, max)

smxcars <- sapply(dt, max)

lmxcars

smxcars

Screenshot:



4. Generate dataset for 100 patients and find out average no of patients diabetic or with heart disease using tapply() function

Code:

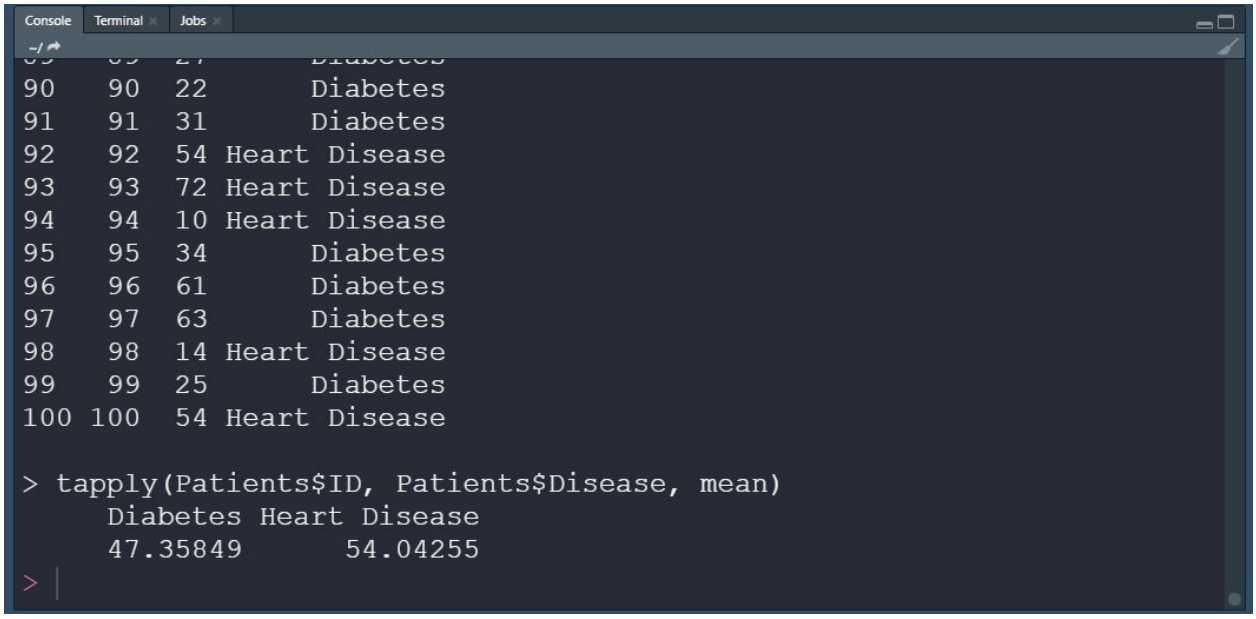
Disease <- c("Diabetes", "Heart Disease")

```
Patients <- data.frame("ID" = 1:100, "Age" = c(sample(10:80, 100,
replace=TRUE)), "Disease" = c(sample(Disease, 100, replace=TRUE)))

Patients
```

```
tapply(Patients$ID, Patients$Disease, mean)
```

Screenshot:



5. Make use of debugging tools in R

Code:

Screenshot:

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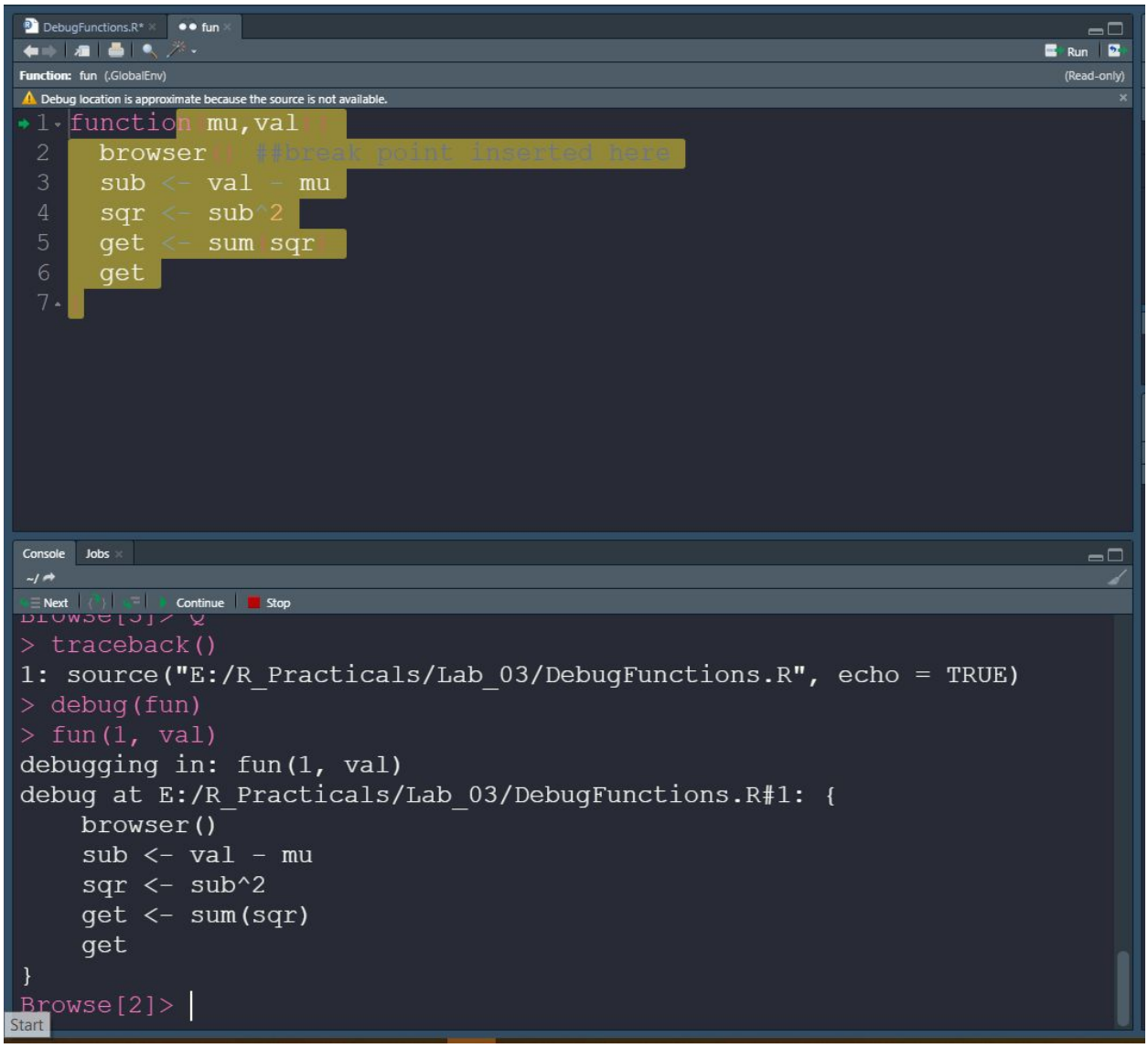

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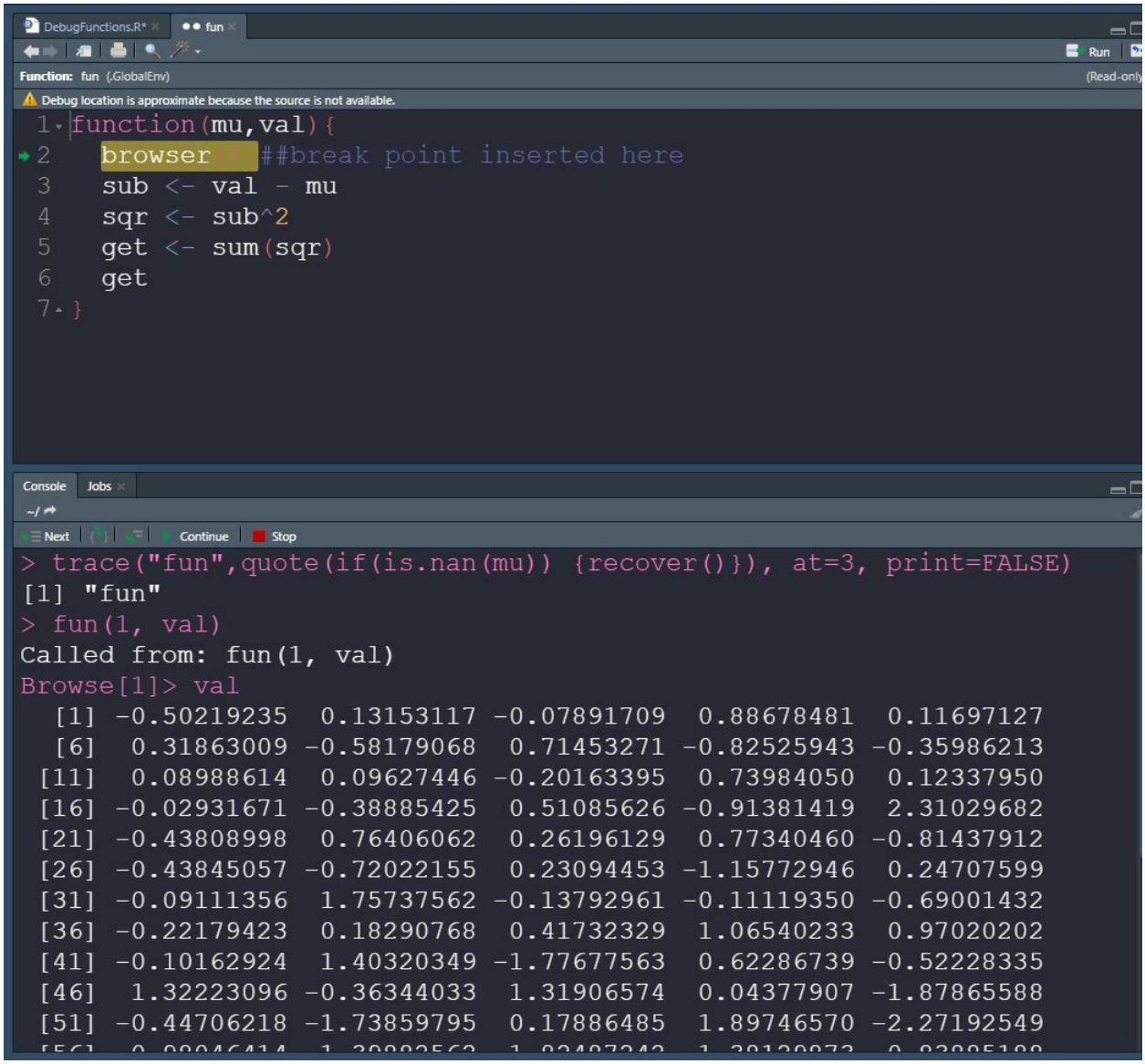
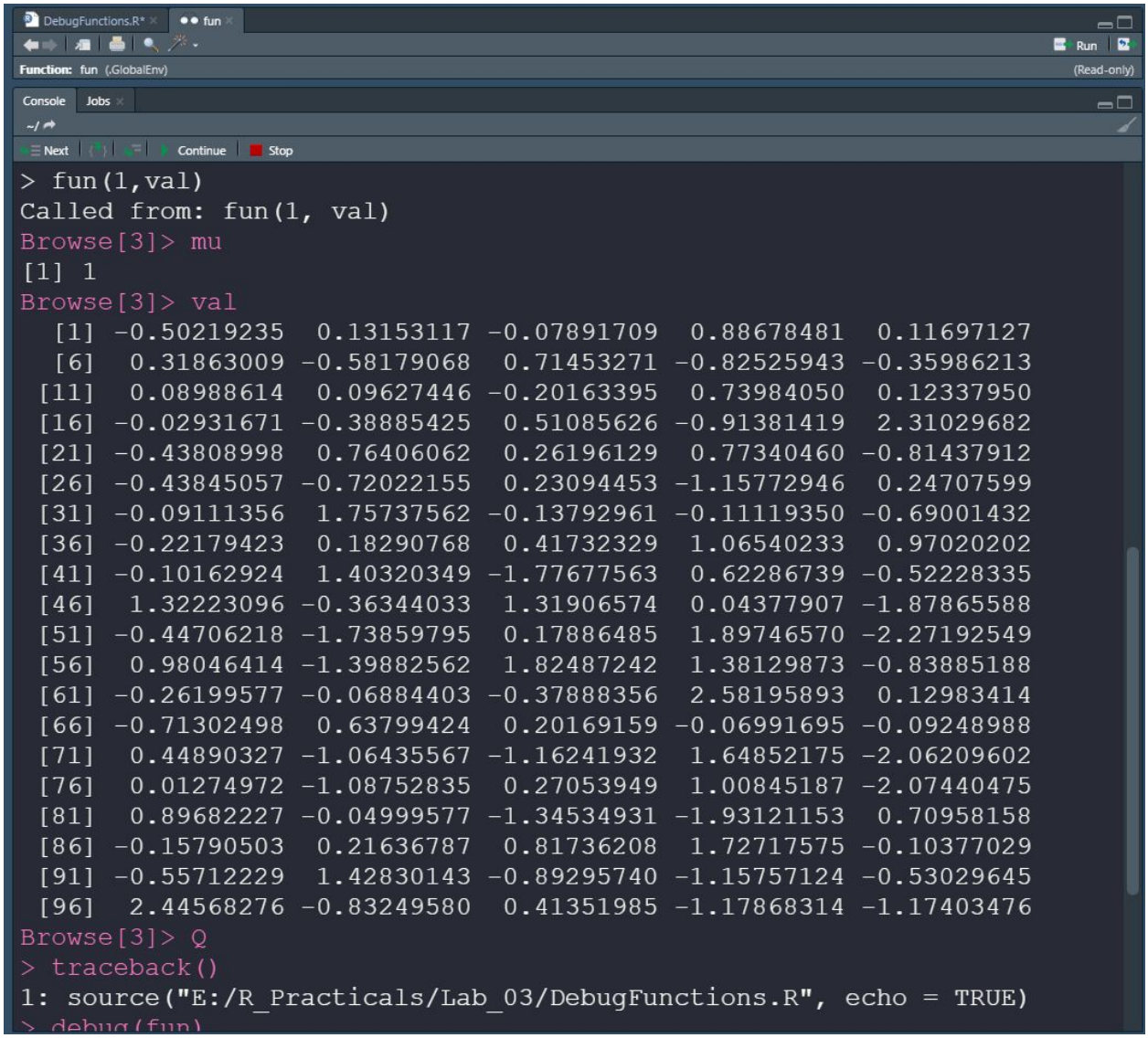




6. Create different plots using ggplot2

   Use the dataset mtcars and create the following plots

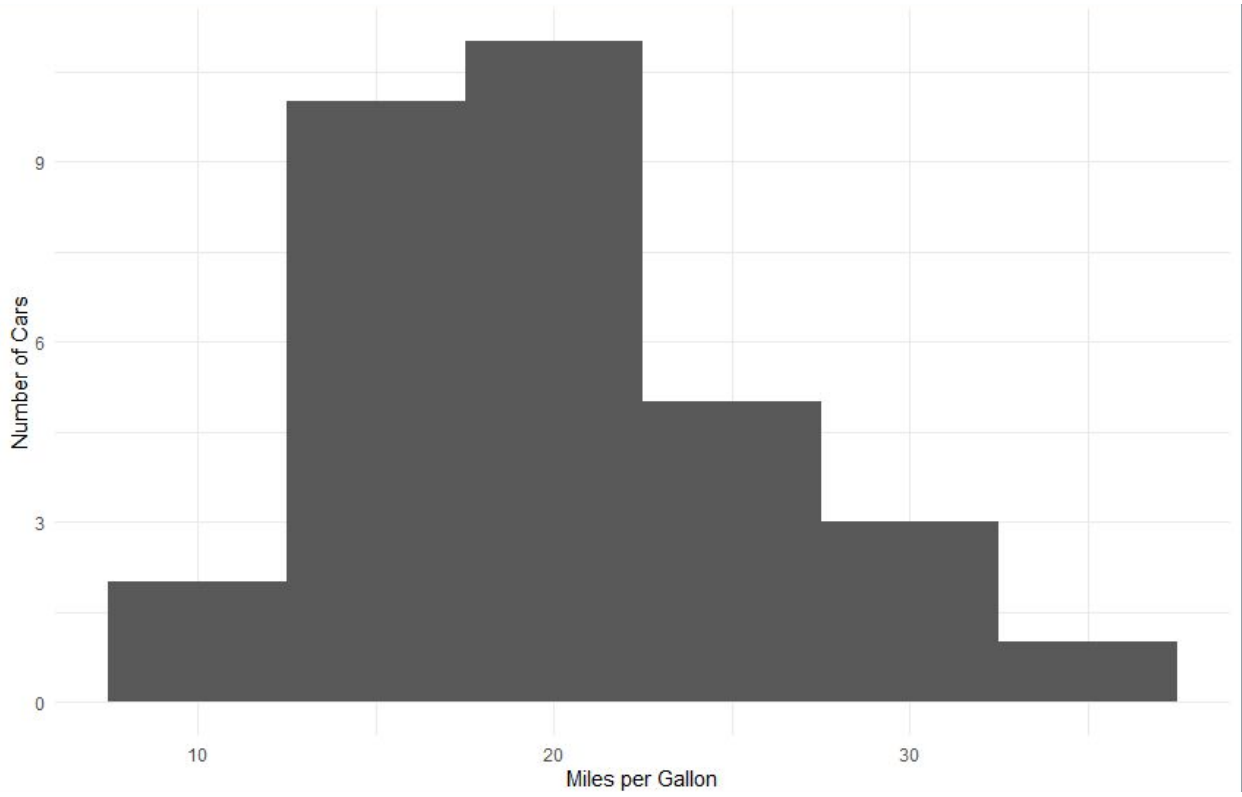
   a. Histograms

      Code:

      my_histogram <- ggplot(mtcars,aes(x=mpg)) +
      geom_histogram(binwidth=5)

my_histogram + xlab('Miles per Gallon') + ylab('Number of Cars') + theme_minimal()

Screenshot:

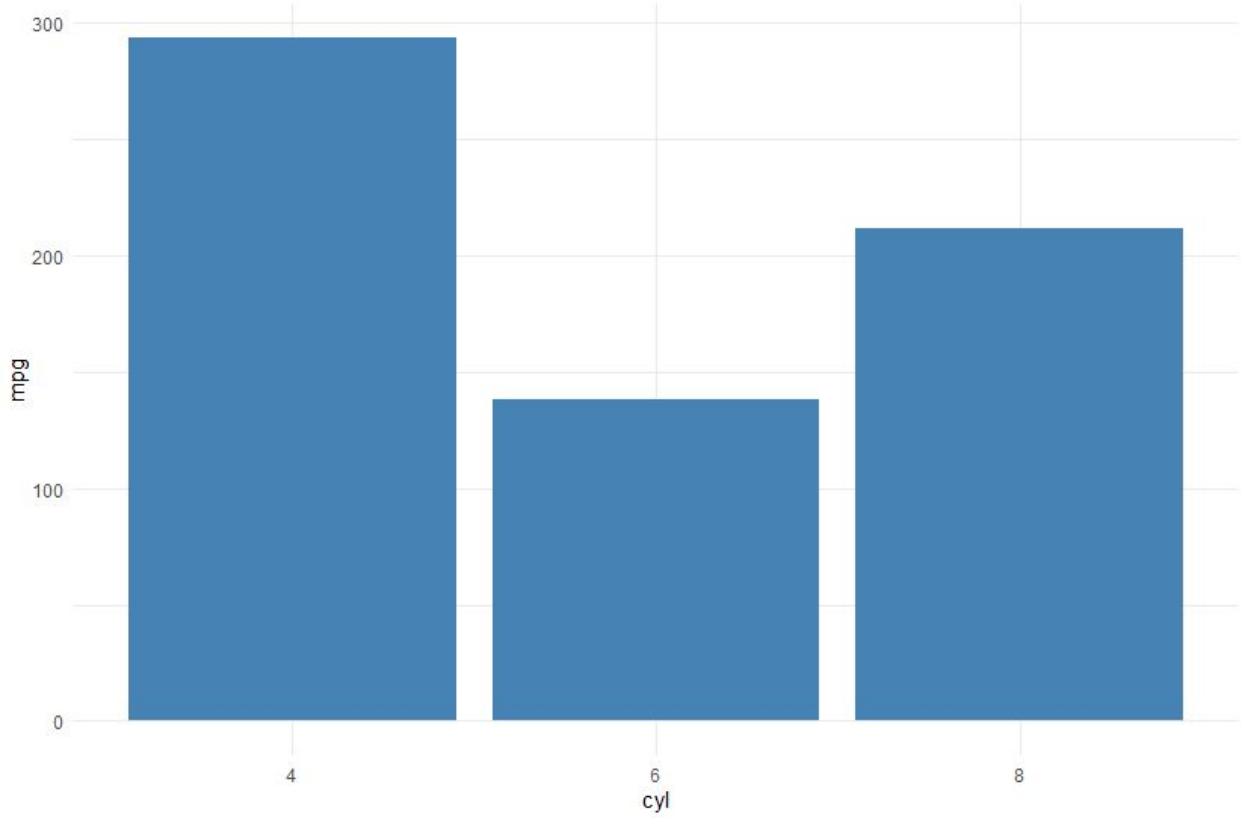


b. Bar and Column Chart

Code:

```
my_barplot<-ggplot(data=mtcars, aes(x=mpg, y=cyl)) +
 geom_bar(stat="identity", fill="steelblue")+
 theme_minimal()
my_barplot + coord_flip()
```

Screenshot:



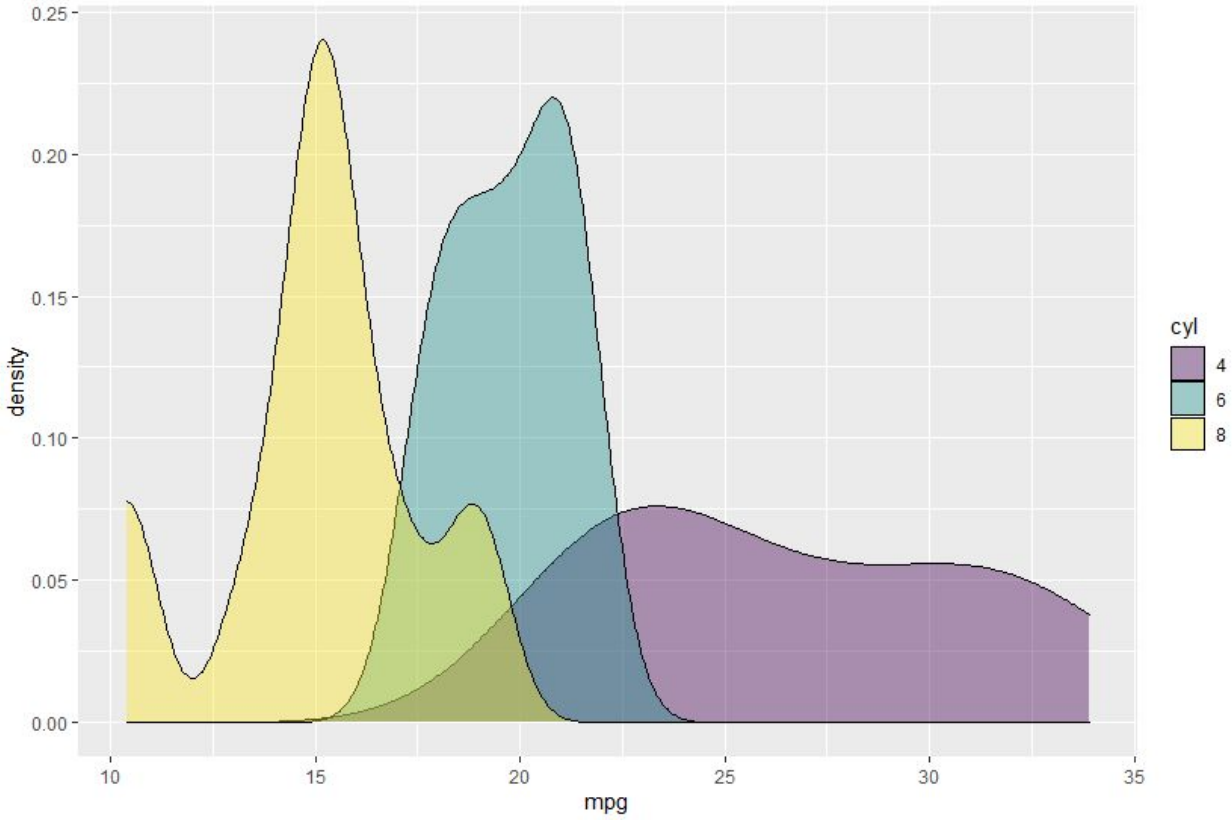
c. Density Chart

Code:

```
ggplot(data=mtcars, aes(x=mpg, fill=cyl)) +
  geom_density(alpha=0.4)


p+geom_vline(data=mtcars, aes(xintercept=mpg.mean, color=cyl),
             linetype="dashed")
```

Screenshot:



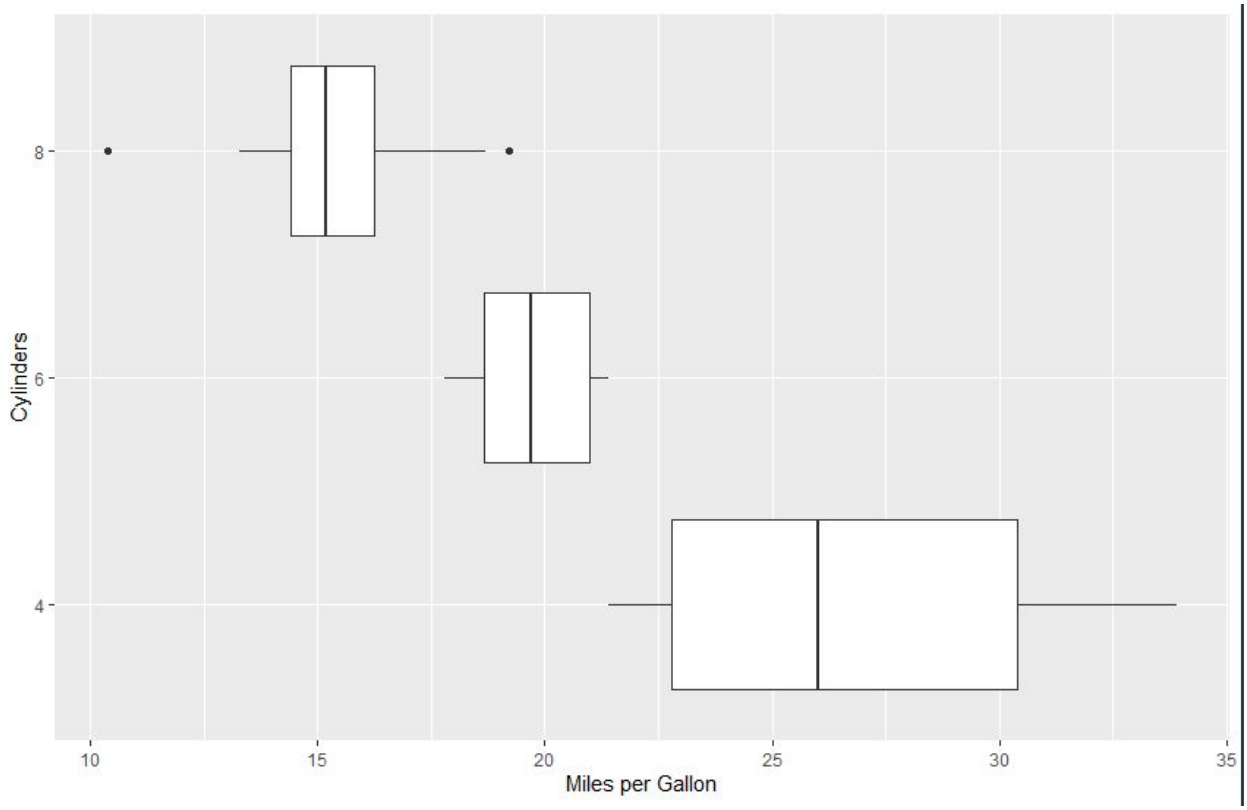
d. Box Plot

Code:

```
my_boxplot <- ggplot(mtcars,aes(x=cyl,y=mpg)) + geom_boxplot() +
xlab('Cylinders') + ylab('Miles per Gallon')

my_boxplot + coord_flip()
```

Screenshot:



e. Scatter Plot

Code:

```
my_scatplot <- ggplot(mtcars,aes(x=wt,y=mpg)) + geom_point()

my_scatplot + xlab('Weight (x 1000lbs)') + ylab('Miles per Gallon')
```

Screenshot:

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