BIG DATA ANALYTICS

ASSIGNMENT-3

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Q1) Write a R program to perform below operations using R User-Defined Functions –
(a) Creating and Calling User-Define Function
(b) Number of Arguments
(c) Default Arguments
(d) Return Values
(e) Nested Functions
(f) Recursion

a)

```
> x <- function(fname="neeraj"){
+   paste(fname,"Kumar")
+ }
> x()
[1] "neeraj Kumar"
```

b)

```
> x <-function(fname,lname)
+ {
+   paste(fname,lname)
+ }
> x("Anish","Khandelwal")
[1] "Anish Khandelwal"
>
```

c)

```
> x <-function(fname,cname)
+ {
+   paste("My name is " ,fname ," and i am from ",cname)
+ }
> x("Anish Khandelwl" , "India")
[1] "My name is  Anish Khandelwl  and i am from  India"
>
```

d)

```
> y <-function(a){
+   return(a*a)
+ }
> y(10)
[1] 100
>
```

e)

```
> x <- function(a){
+   return(a)
+ }
> y <- function(b){
+   print(x(a)+b)
+ }
> x(5)
[1] 5
> y(12)
[1] 17
>
```

f)

```
> factorial <- function(a)
+ {
+   if(a==1){
+     return(a)
+   }else{
+     return(a*factorial(a-1))
+   }
+
+ }
> factorial(7)
[1] 5040
>
```

2) Write a R program to perform below operations using Data Frames –
(a) Create Data Frame
(b) Summarize the Data
(c) Access Items
(d) Add Rows & Columns
(e) Remove Rows and Columns
(f) Amount of Rows and Columns
(g) Data Frame Length
(h) Combining Data Frames

a)

```
R 4.2.1 · ~/
> a <- data.frame(
+   Training = c("Strength", "Stamina", "Other"),
+   Pulse = c(100, 150, 120),
+   Duration = c(60, 30, 45)
+ )
> print(a)
  Training Pulse Duration
1 Strength   100       60
2  Stamina   150       30
3    Other   120       45
>
```

b)

```
> summary(a)
   Training             Pulse          Duration
 Length:3           Min.   :100.0   Min.   :30.0
 Class :character   1st Qu.:110.0   1st Qu.:37.5
 Mode  :character   Median :120.0   Median :45.0
                    Mean   :123.3   Mean   :45.0
                    3rd Qu.:135.0   3rd Qu.:52.5
                    Max.   :150.0   Max.   :60.0
>
```

c)

```
> a[1]
  Training
1 Strength
2  Stamina
3    Other
> a[["Training"]]
[1] "Strength" "Stamina"  "Other"
> a#Training
  Training Pulse Duration
1 Strength   100       60
2  Stamina   150       30
3    Other   120       45
> 
```

d)

```
> New_row_DF <- rbind(a, c("Strength", 11
> b <- rbind(a, c("Strength", 110, 110))
> print(b)
  Training Pulse Duration
1 Strength   100       60
2  Stamina   150       30
3    Other   120       45
4 Strength   110      110
> 
```

e)

```
> d <-  a[-c(1), -c(1)]
> print(d)
  Pulse Duration
2   150       30
3   120       45
> 
```

f)

```
> dim(a)
[1] 3 3
> 
```

g)

```
+ )
> length(a)
[1] 3
> 
```

h)

```
> a <- data.frame(
+   Training = c("Strength", "Stamina", "Other"),
+   Pulse = c(100, 150, 120),
+   Duration = c(60, 30, 45)
+ )
> b <- data.frame (
+   Training = c("Stamina", "Stamina", "Strength"),
+   Pulse = c(140, 150, 160),
+   Duration = c(30, 30, 20)
+ )
>
> b <- rbind(a, b)
> print(b)
  Training Pulse Duration
1 Strength   100       60
2  Stamina   150       30
3    Other   120       45
4  Stamina   140       30
5  Stamina   150       30
6 Strength   160       20
>
```

Q3) Write a R program to perform below operations using R Factors – (a) Create a factor (b) Factor Length (c) Access Factors (d) Change Item Value (e) Print the levels using levels( ) function:

a)

```
> a <- factor(c("Jazz", "Rock", "Classic", "Classic", "Pop", "Jazz", "Rock", "Jazz"))
> print(a)
[1] Jazz    Rock    Classic Classic Pop     Jazz    Rock    Jazz
Levels: Classic Jazz Pop Rock
>
```

b)

```
> a <- factor(c("Jazz", "Rock", "Classic", "Classic", "Pop", "Jazz", "Rock", "Jazz"))
> length(a)
[1] 8
>
```

c)

```
> a <- factor(c("Jazz", "Rock", "Classic", "Classic", "Pop", "Jazz", "Rock", "Jazz"))
> a[2]
[1] Rock
Levels: Classic Jazz Pop Rock
```

d)

```
> print(a)
[1] Jazz    <NA>    Classic Classic Pop     Jazz    Rock    Jazz
Levels: Classic Jazz Pop Rock
>
```

Q4) Create R Factors in Data Frame that prints data with a column of text into categorical form using R Factor.

```
> data <- c("East","West","East","North","North","East","West","West","West","East","North")
>
> print(data)
 [1] "East"  "West"  "East"  "North" "North" "East"  "West"  "West"  "West"  "East"  "North"
> print(is.factor(data))
[1] FALSE
>
>
> factor_data <- factor(data)
>
> print(factor_data)
 [1] East  West  East  North North East  West  West  West  East  North
Levels: East North West
> print(is.factor(factor_data))
[1] TRUE
>
```

GLA UNIVERSITY, MATHURA

Mathura- 281406**, UP -** INDIA

Session:- 2022-2023

Institute Of engineering & technology

Department Of Computer Engineering & Applications

Course Name: **Big Data and Analytics Lab** (Code: **BCSE0183**)

Semester: **5th** Section: **3-C**

Academic Session: **Aug 2022 – Dec 2022**

Lab Assignment – 06

Basic of R Programming Language using R Studio

Submitted to: *Dr. Robin Singh Bhadoria*

Submitted by: *Aniruddha bajpai*

Date: *22-11-2022*

1) **Use 'diamonds' dataset and qplot ( ) of ggplot2 Package for following operations:**

(a) Plot a relationship between parameters like price and carats (weight)

(b) Customize colour, size, & shape

(c) Adding a smoother to a plot using geoms

(d) Boxplots and jittered points using geoms

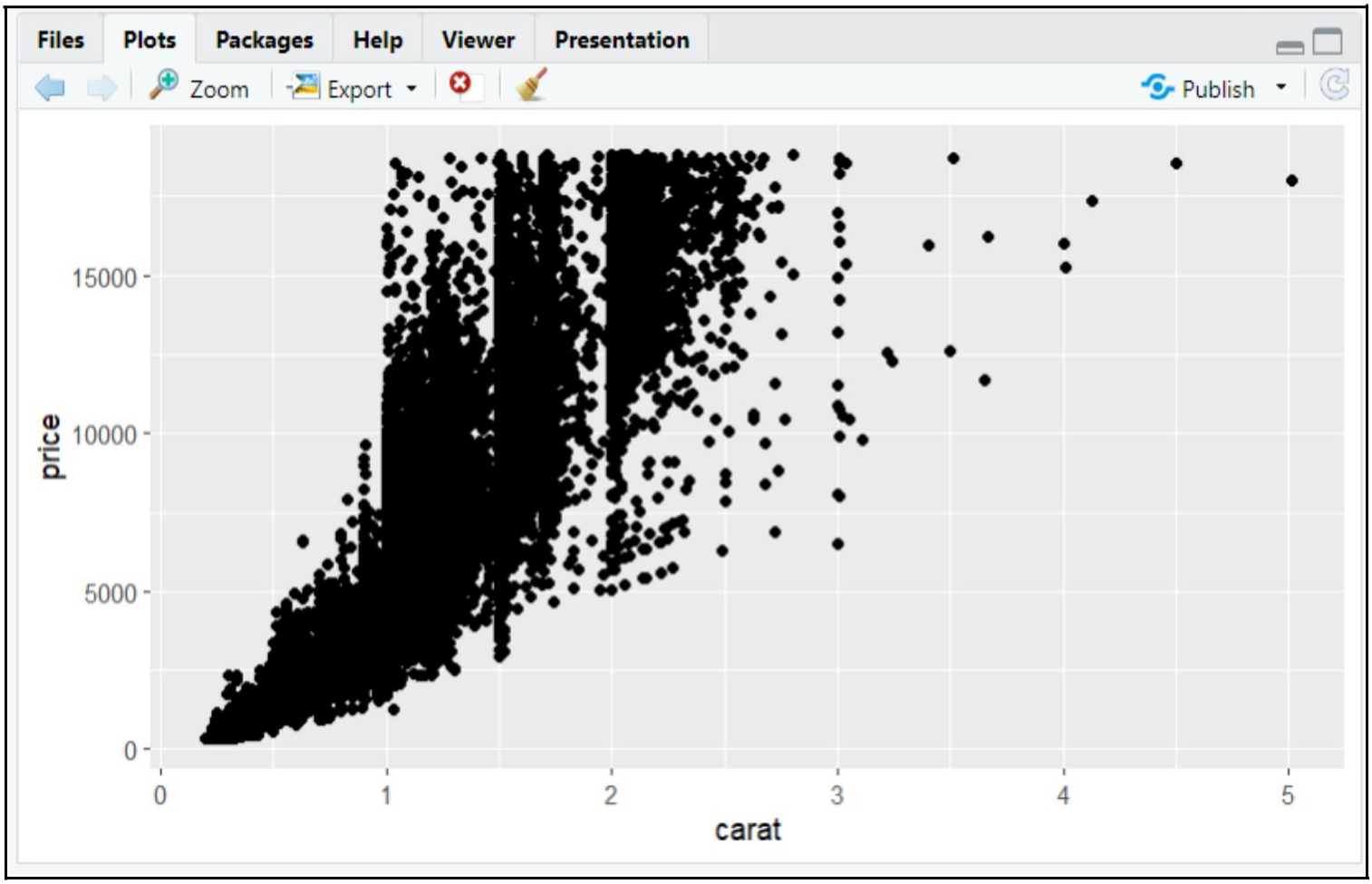
(e) Histogram and density plots using geoms

(f) Bar charts using geoms

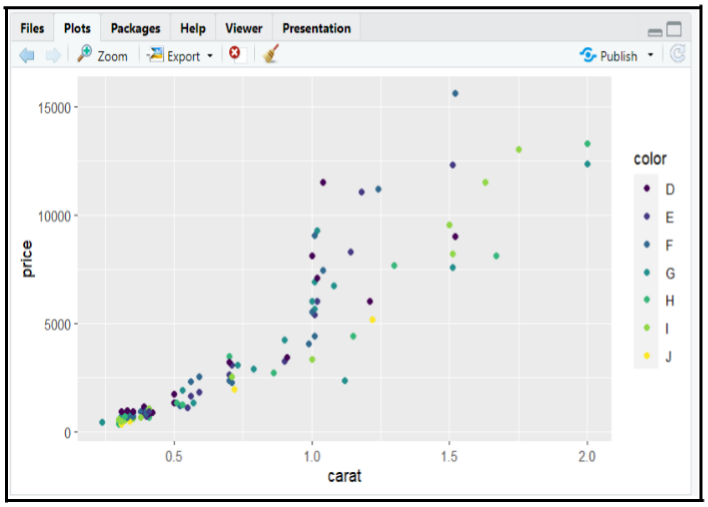
(g) faceting method in qplot()

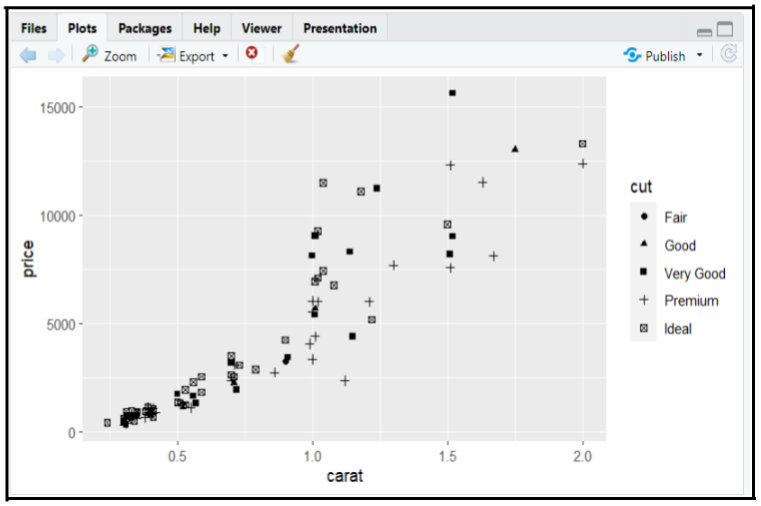
(h) Building a scatterplot using factor ( ) function

```
>
> qplot(carat, price, data = diamonds)
>
>
>
>
>
```

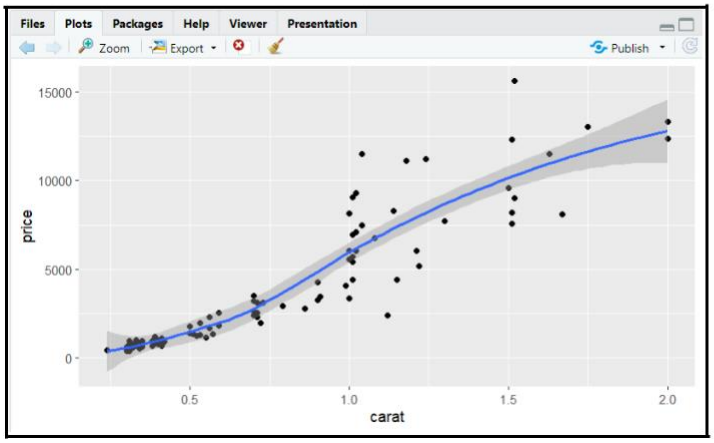


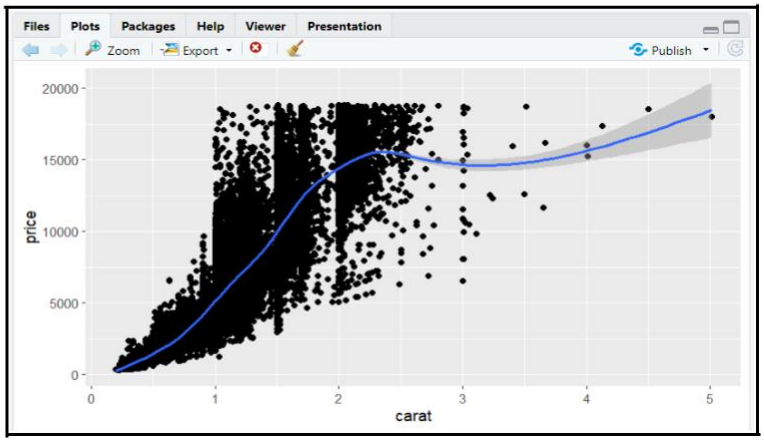
```
>
> qplot(carat, price, data = dsmall, colour = color)
> qplot(carat, price, data = dsmall, shape = cut)
```



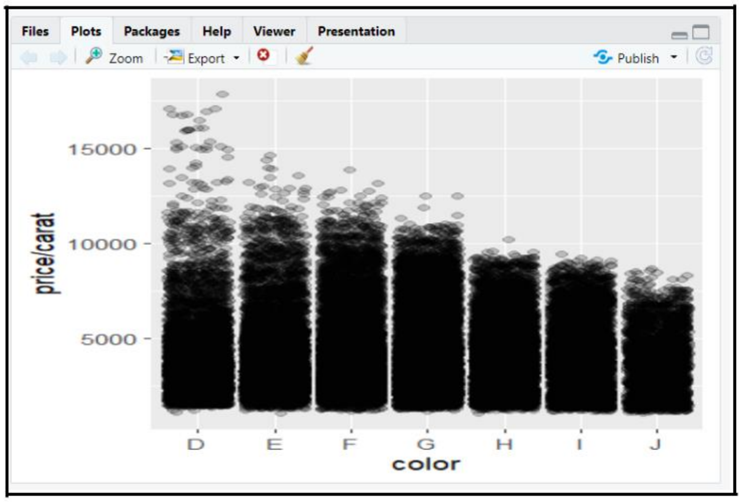


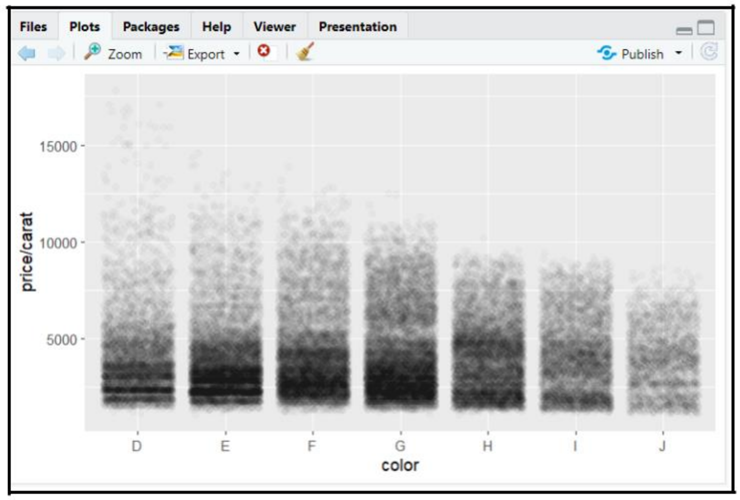

```
> qplot(carat, price, data = dsmall, geom = c("point", "smooth"))
`geom_smooth()` using method = 'loess' and formula = 'y ~ x'
>
> qplot(carat, price, data = diamonds, geom = c("point", "smooth"))
`geom_smooth()` using method = 'gam' and formula = 'y ~ s(x, bs = "cs")'
>
```

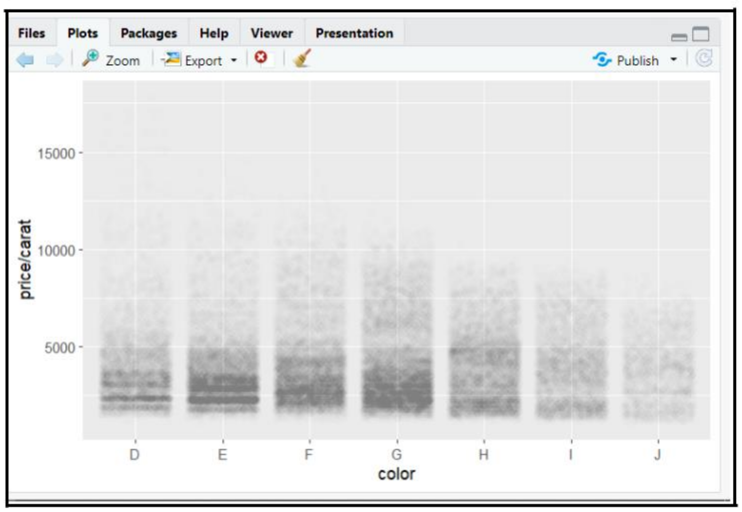




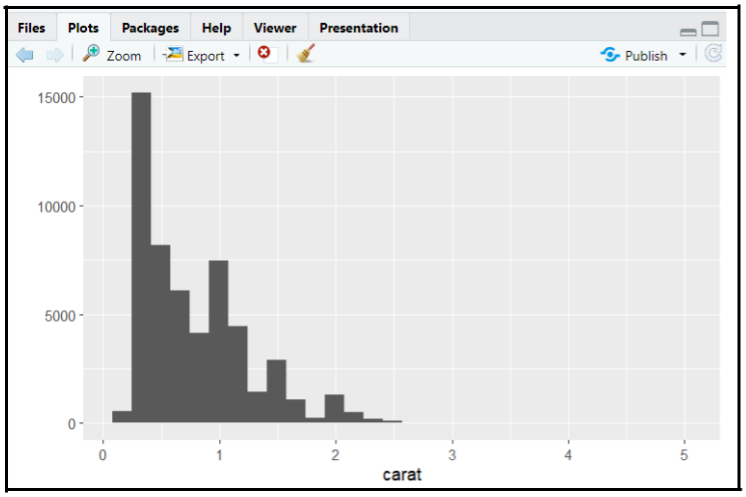
```
package 'ggplot2' was built under R version 4.2.2
> qplot(color, price / carat, data = diamonds, geom = "jitter",alpha = I(1 / 5))
Warning message:
`qplot()` was deprecated in ggplot2 3.4.0.
This warning is displayed once every 8 hours.
Call `lifecycle::last_lifecycle_warnings()` to
see where this warning was generated.
>
> qplot(color, price / carat, data = diamonds, geom = "jitter",alpha = I(1 / 50))
> qplot(color, price / carat, data = diamonds, geom = "jitter",alpha = I(1 / 200))
>
```

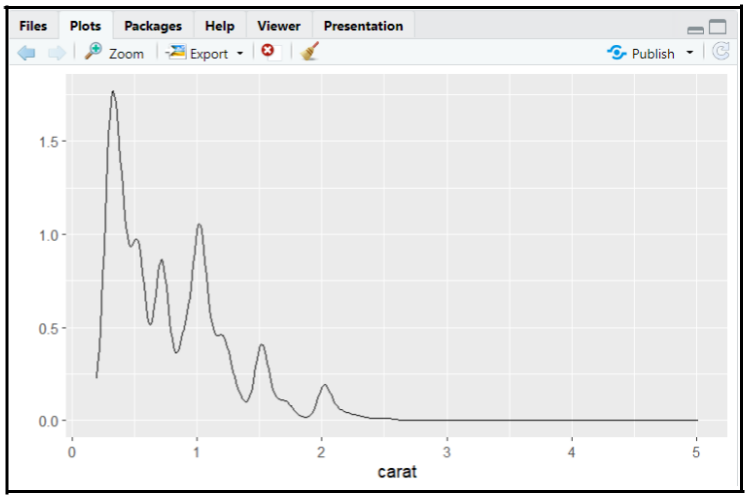


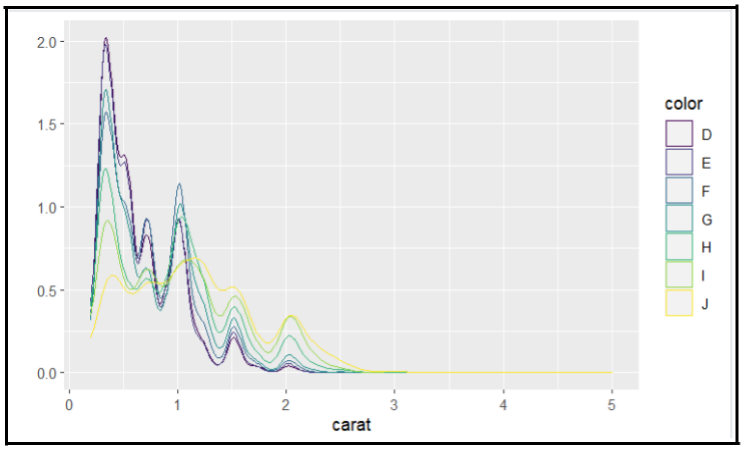


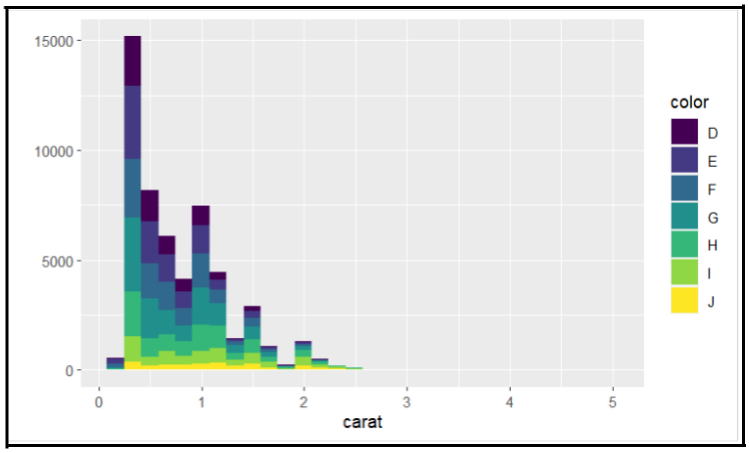


```
> qplot(carat, data = diamonds, geom = "histogram")
`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
> qplot(carat, data = diamonds, geom = "density")
> qplot(carat, data = diamonds, geom = "density", colour = color)
> qplot(carat, data = diamonds, geom = "histogram", fill = color)
`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
>
```

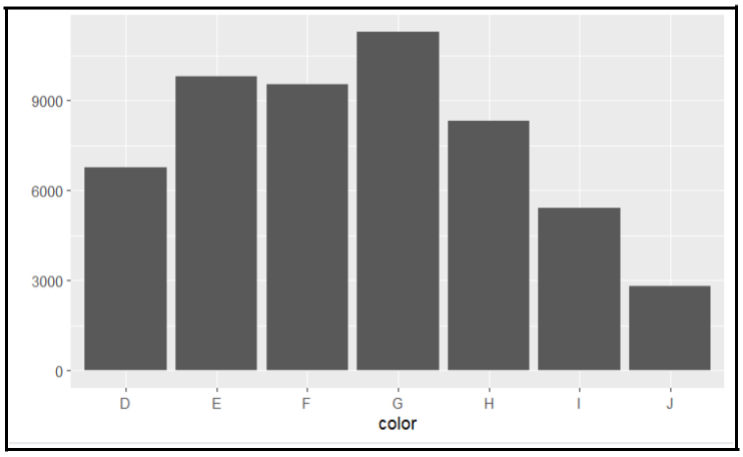


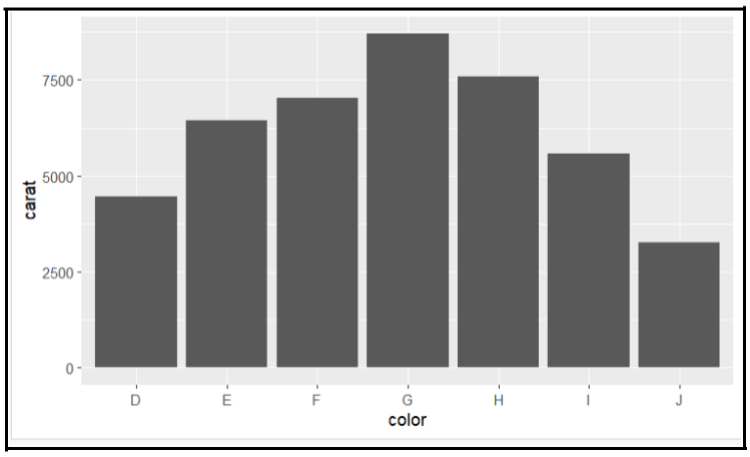




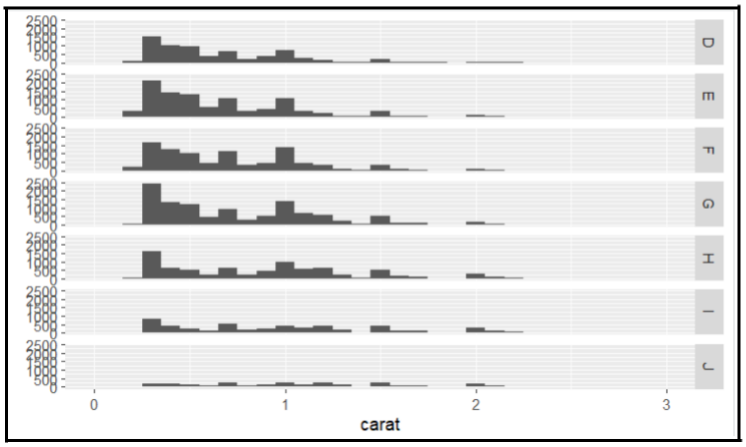


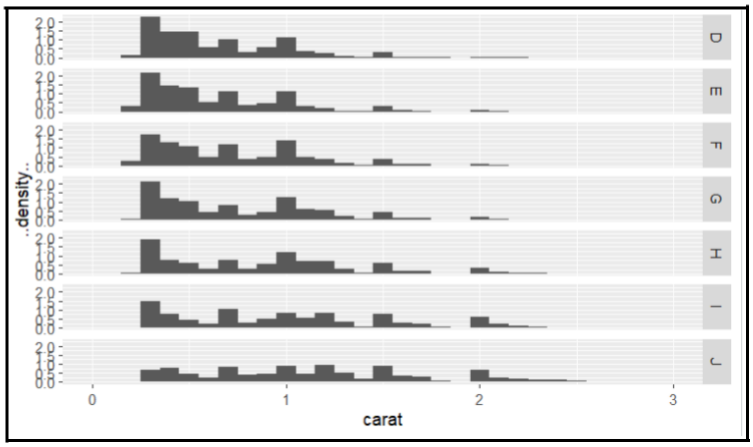
```
>
> qplot(color, data = diamonds, geom = "bar")
> qplot(color, data = diamonds, geom = "bar", weight = carat) + scale_y_continuous("carat")
>
```






```
> qplot(carat, data = diamonds, facets = color ~ .,geom = "histogram", binwidth = 0.1, xlim = c(0, 3))
Warning messages:
1: Removed 32 rows containing non-finite values (`stat_bin()`).
2: Removed 14 rows containing missing values (`geom_bar()`).
> qplot(carat, ..density.., data = diamonds, facets = color ~ .,geom = "histogram", binwidth = 0.1, xlim = c
(0, 3))
Warning messages:
1: The dot-dot notation (`..density..`) was deprecated in ggplot2 3.4.0.
i Please use `after_stat(density)` instead.
This warning is displayed once every 8 hours.
Call `lifecycle::last_lifecycle_warnings()` to see where this warning was generated.
2: Removed 32 rows containing non-finite values (`stat_bin()`).
3: Removed 14 rows containing missing values (`geom_bar()`).
```





2) **Use 'mtcars' dataset and ggplot ( ) of ggplot2 Package for following operations**

(a) Data Layer

(b) Aesthetic Layer

(c) Geometric layer

(d) Adding size

(e) Adding color and shape

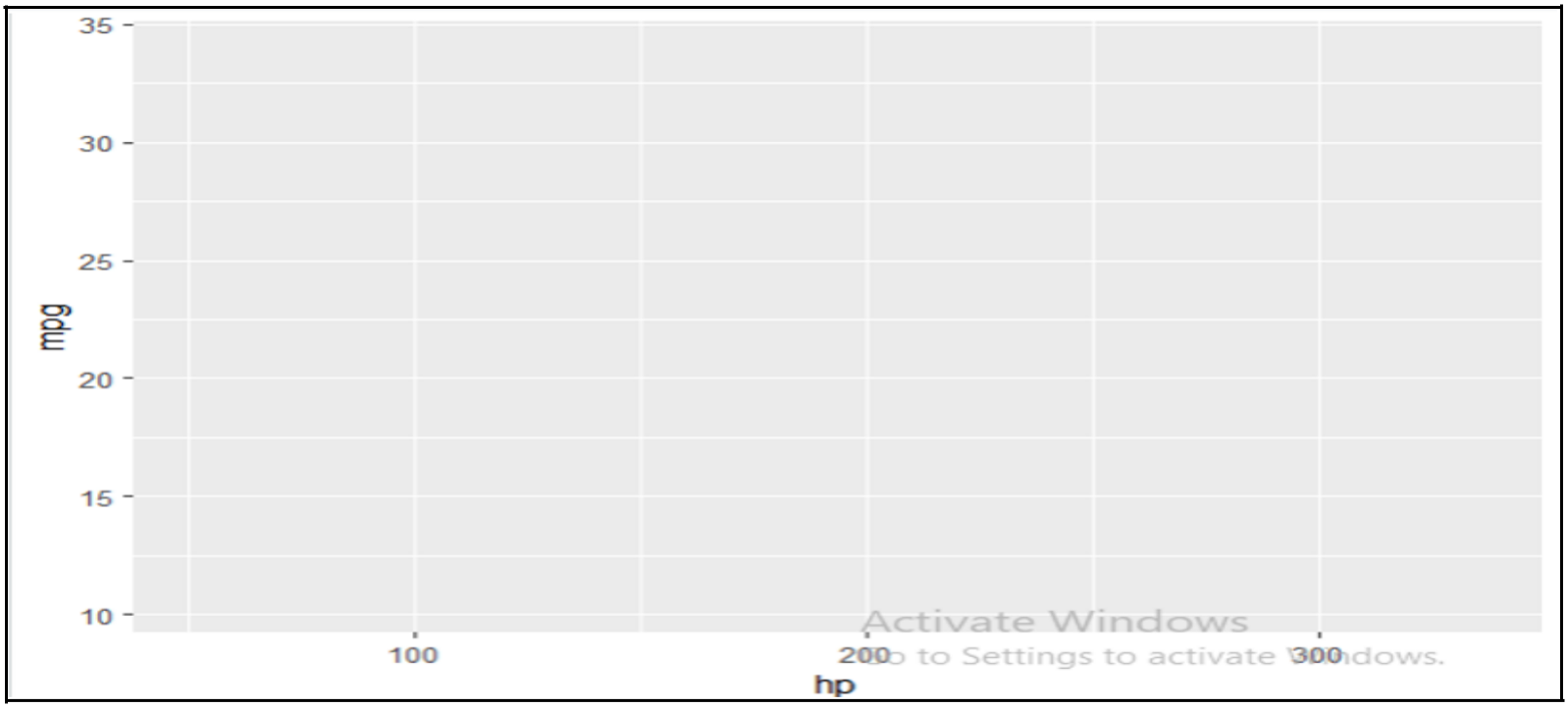
(f) Histogram plot

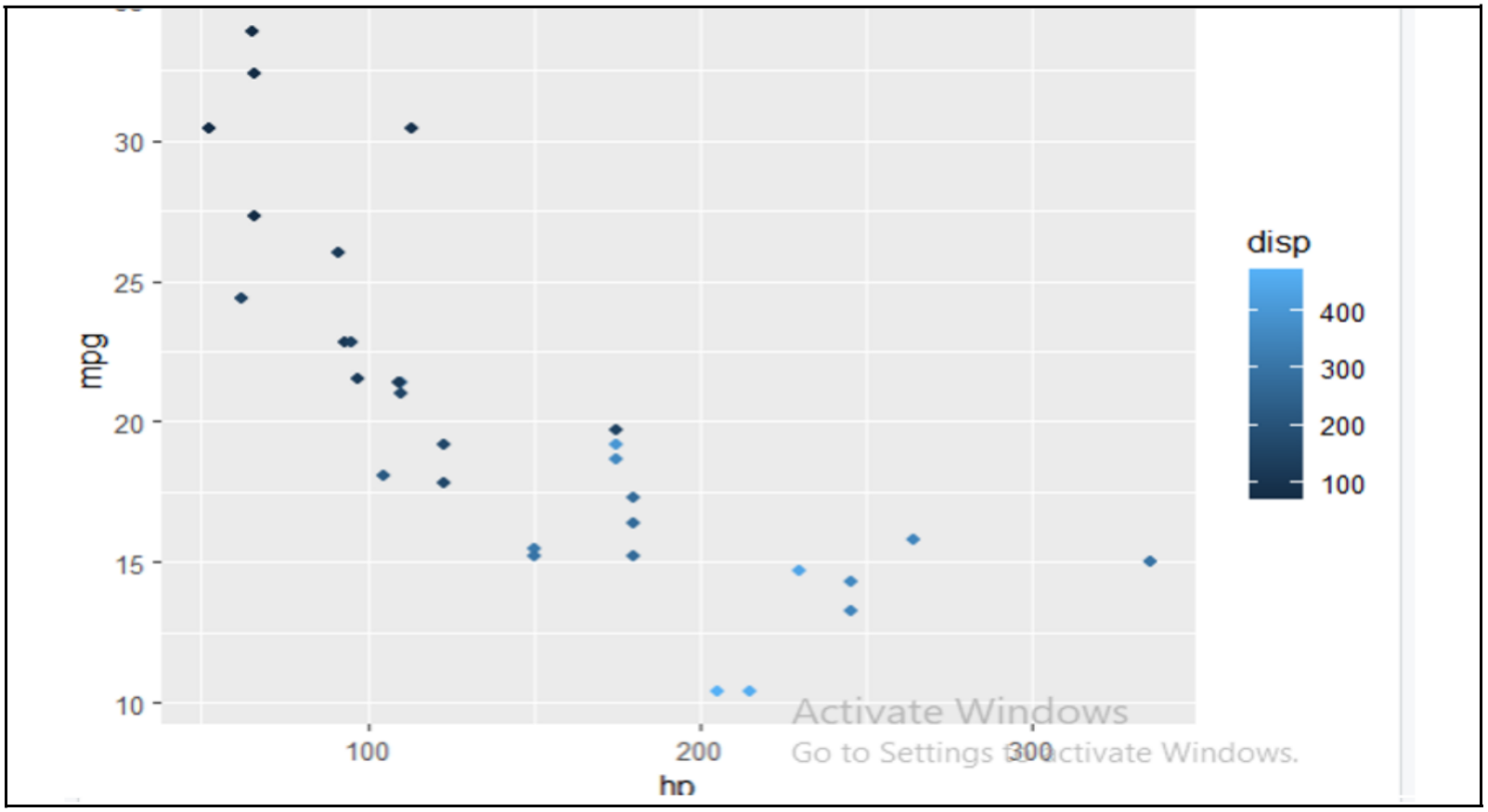
(g) Facet Layer

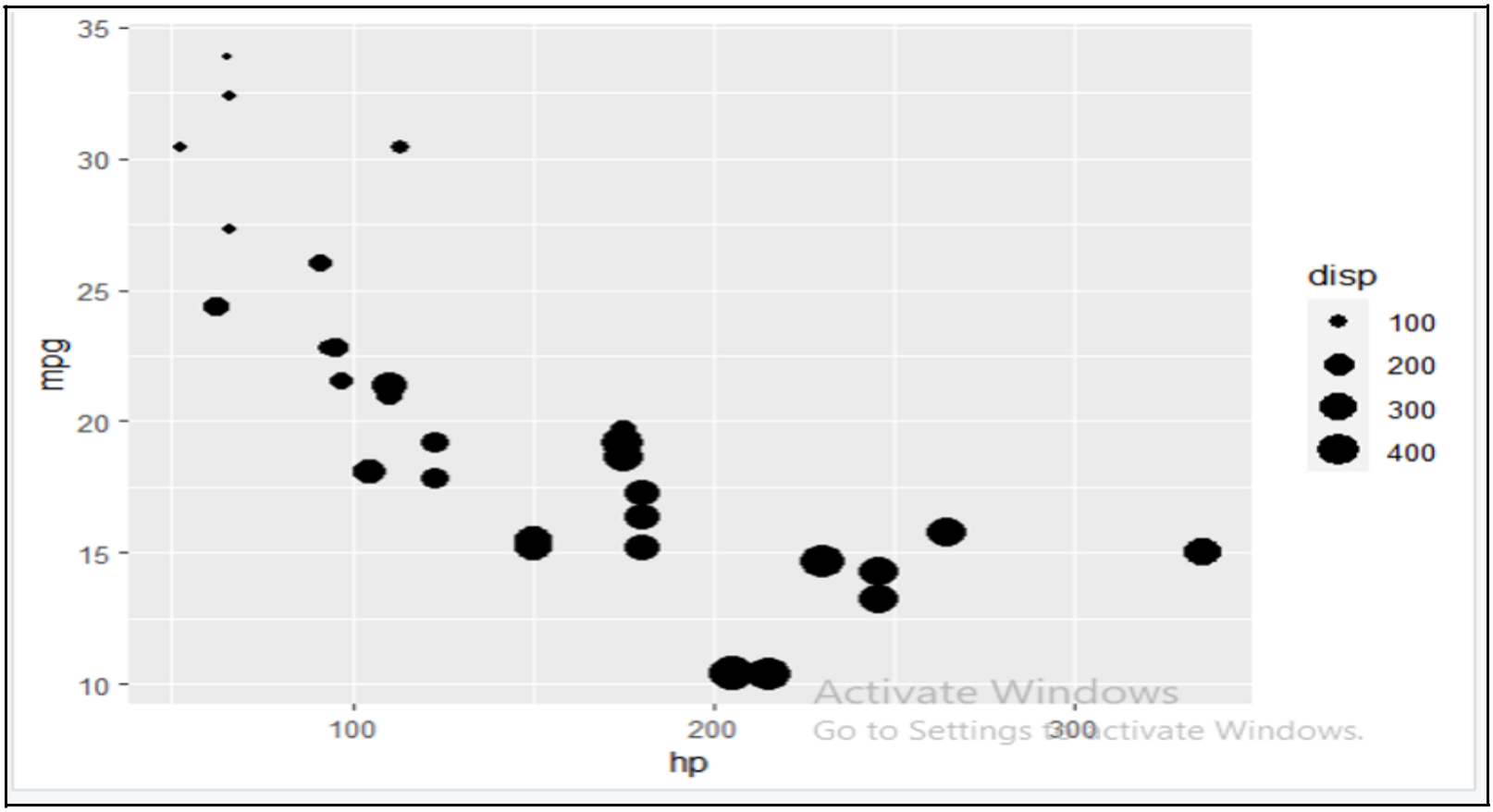
(h) Statistics layer

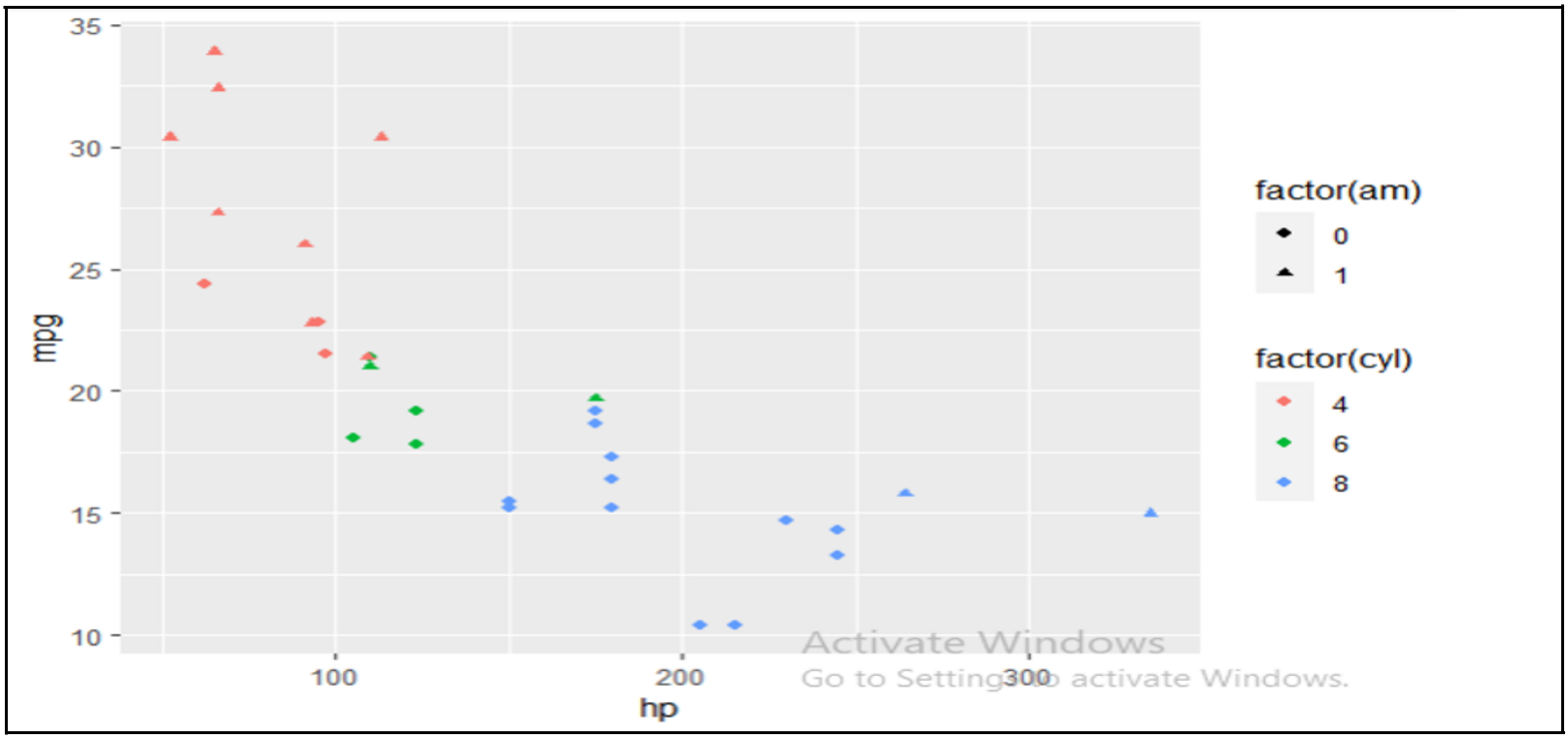
(i) Coordinates layer: Control plot dimensions

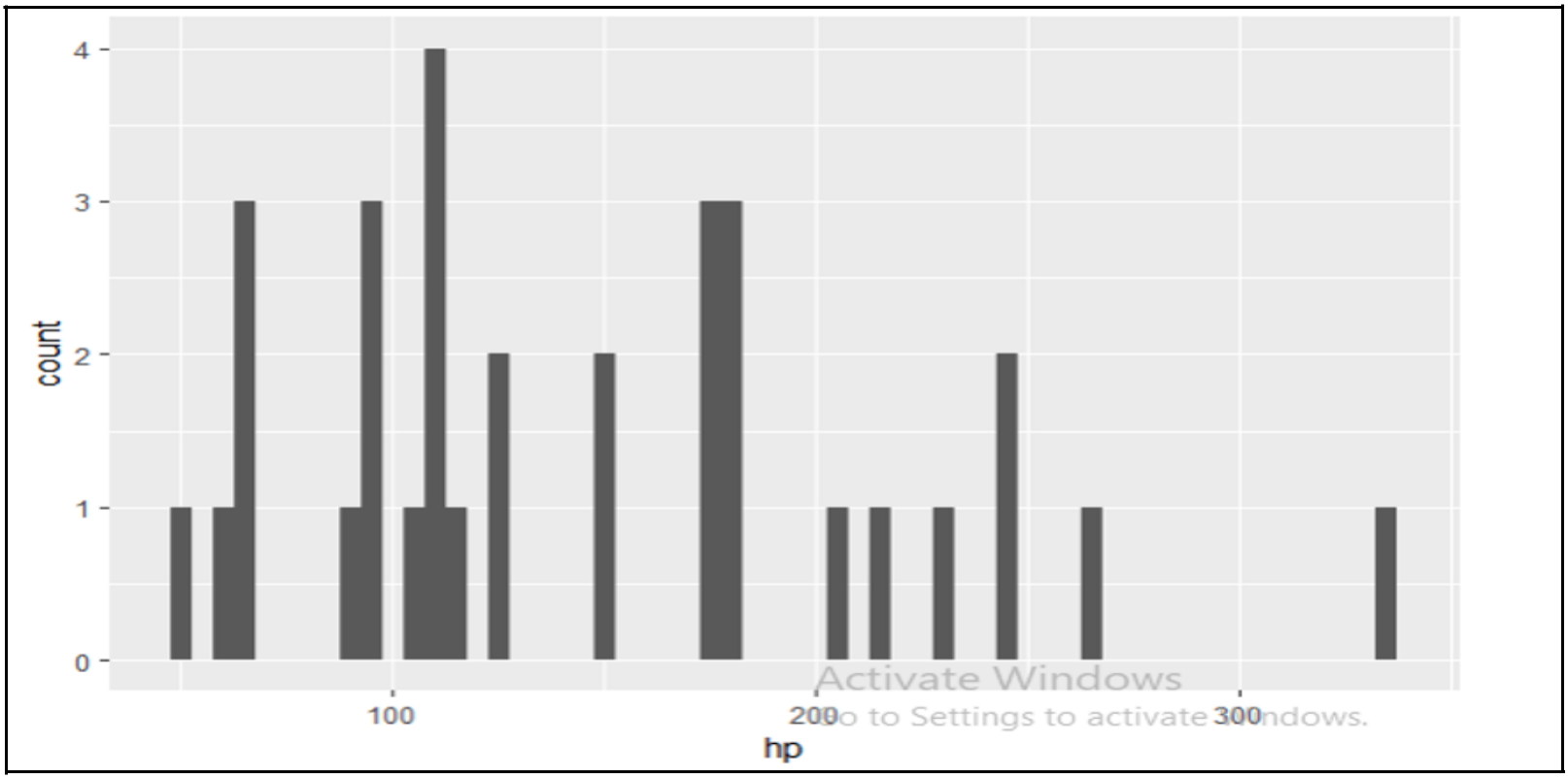
```
install.packages("dplyr")
library(ggplot2)
library(dplyr)
View(mtcars)


ggplot(data = mtcars)
ggplot(data = mtcars, aes(x = hp, y = mpg, col = disp))
ggplot(data = mtcars,
       aes(x = hp, y = mpg, col = disp)) + geom_point()
ggplot(data = mtcars,
       aes(x = hp, y = mpg, size = disp)) + geom_point()

ggplot(data = mtcars,
       aes(x = hp, y = mpg, col = factor(cyl),
           shape = factor(am))) +
  geom_point()

ggplot(data = mtcars, aes(x = hp)) +
  geom_histogram(binwidth = 5)

p <- ggplot(data = mtcars,
            aes(x = hp, y = mpg,
                shape = factor(cyl))) + geom_point()

p + facet_grid(am ~ .)

p + facet_grid(. ~ cyl)

ggplot(data = mtcars, aes(x = hp, y = mpg)) +
  geom_point() +
  stat_smooth(method = lm, col = "red")
```

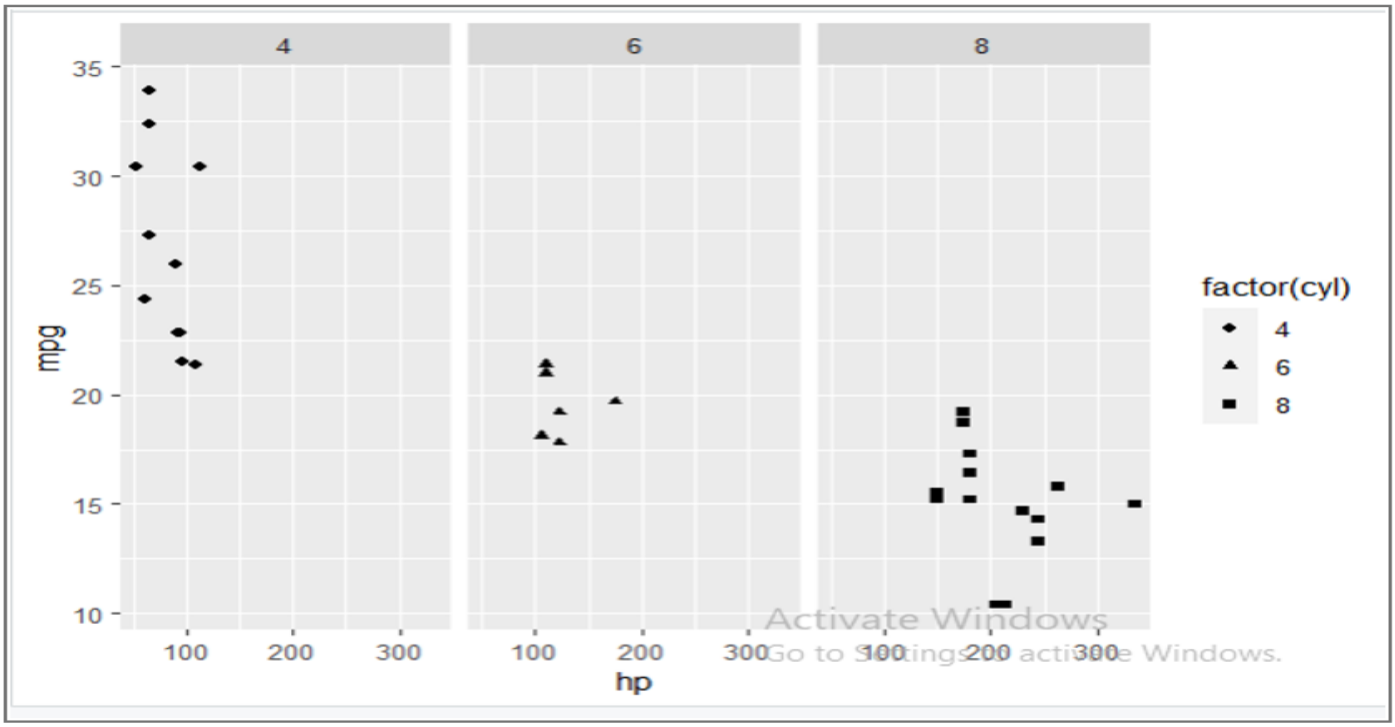

35
30
25
20
15
10
mpg
100
200
300
hp
Activate Windows
Go to Settings to activate Windows.

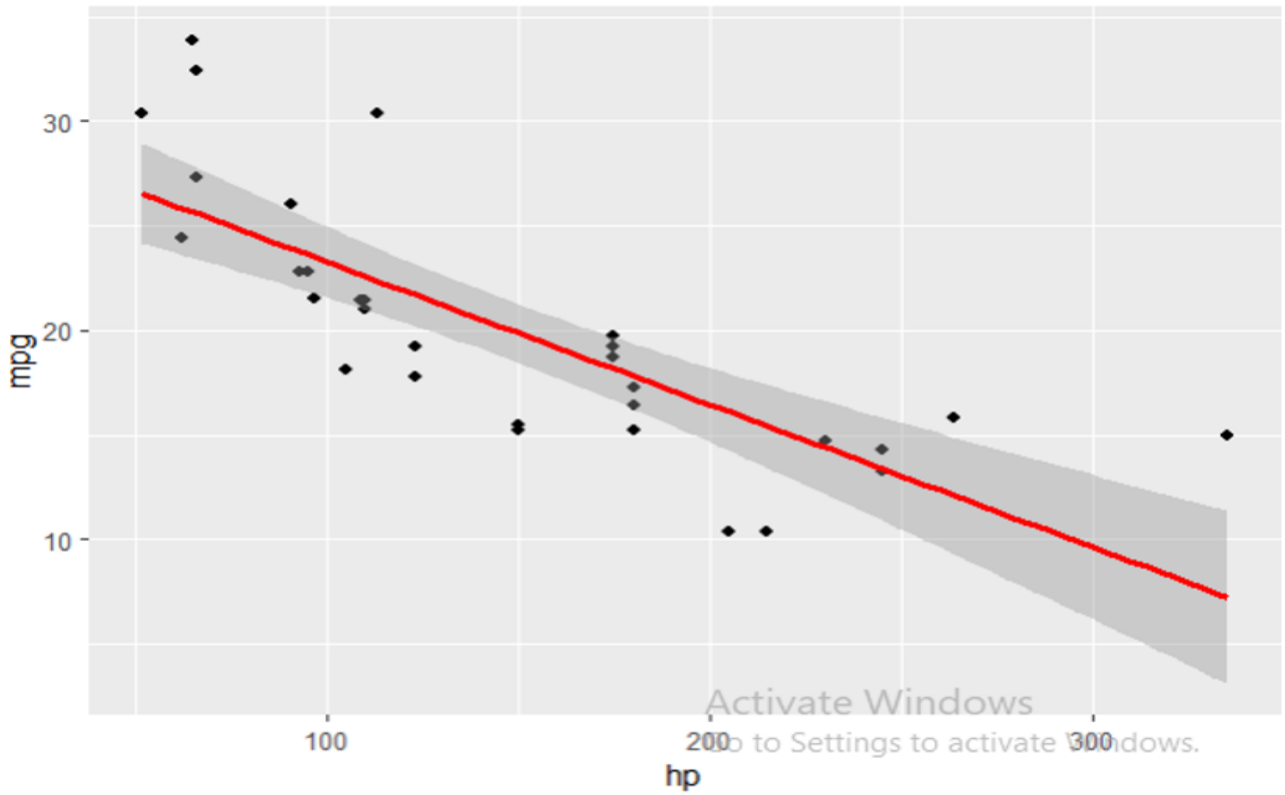

30
25
20
15
10
mpg
100
200
300
hp
disp
400
300
200
100
Activate Windows
Go to Settings to activate Windows.


35
30
25
20
15
10
mpg
100
200
300
hp
disp
100
200
300
400
Activate Windows
Go to Settings to activate Windows.


35
30
25
20
15
10
mpg
100
200
300
hp
factor(am)
0
1
factor(cyl)
4
6
8
Activate Windows
Go to Settings to activate Windows.


count
hp
0
1
2
3
4
100
200
300
Activate Windows
Go to Settings to activate Windows.


4
6
8
mpg
hp
10
15
20
25
30
35
100
200
300
factor(cyl)
4
6
8
Activate Windows
Go to Settings to activate Windows.


30
20
10
mpg
100
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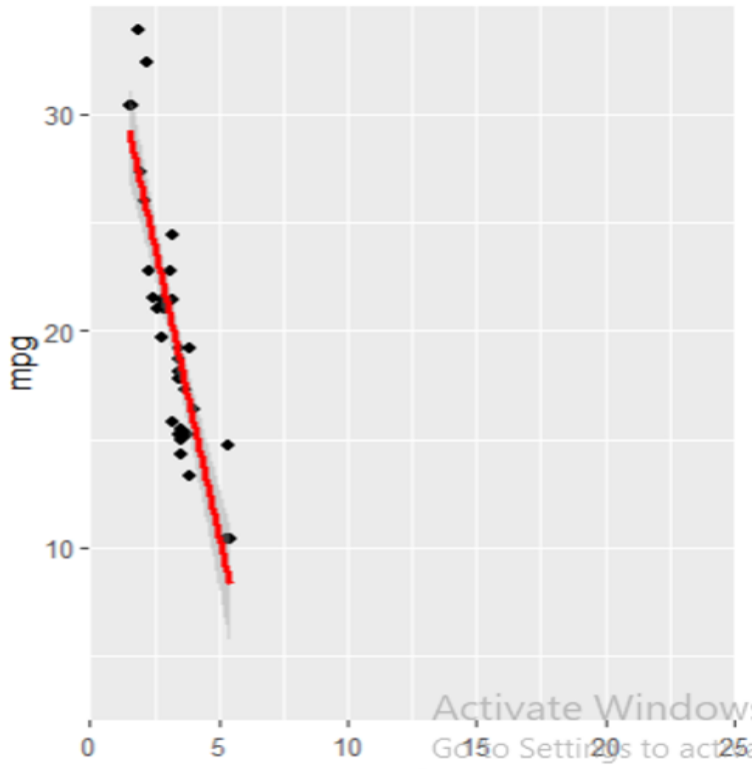
300
hp
Activate Windows
Go to Settings to activate Windows.

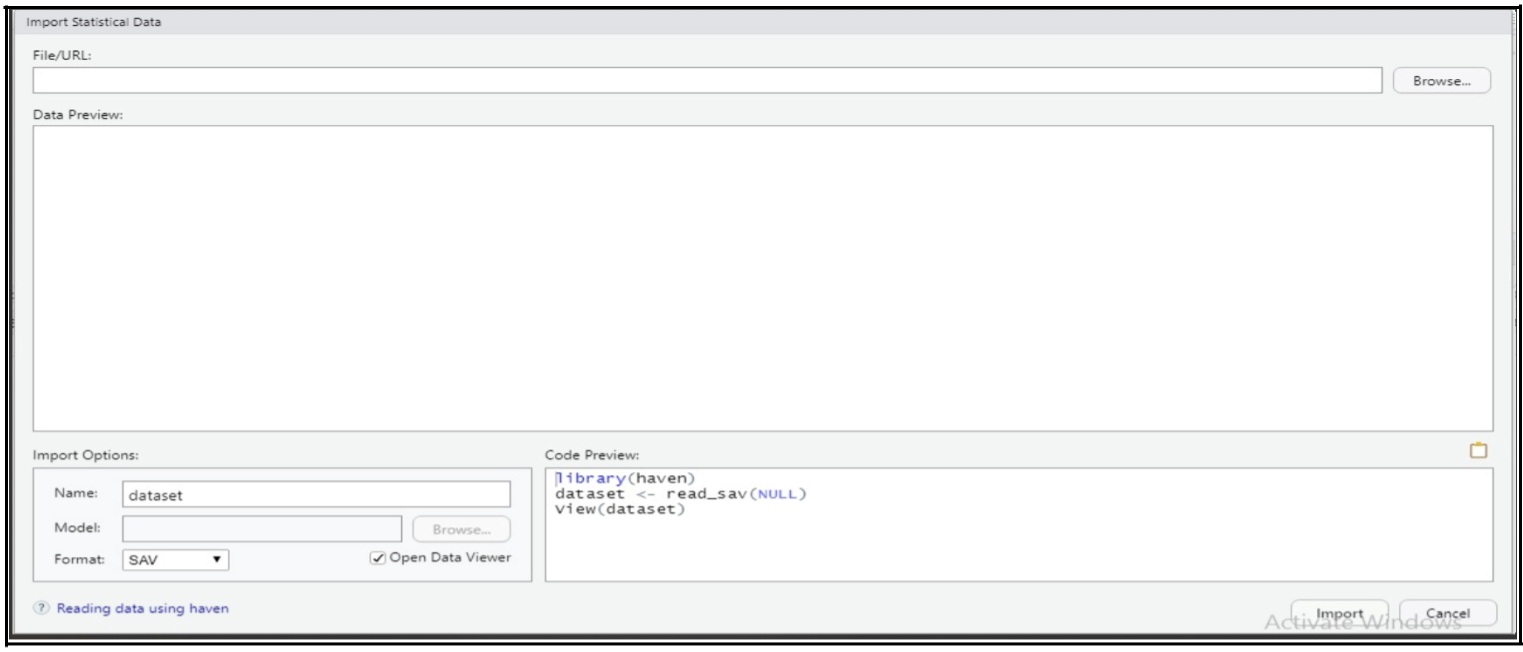

30
20
10
mpg
0
5
10
15
20
25
Activate Windows
Go to Settings to activate Windows.

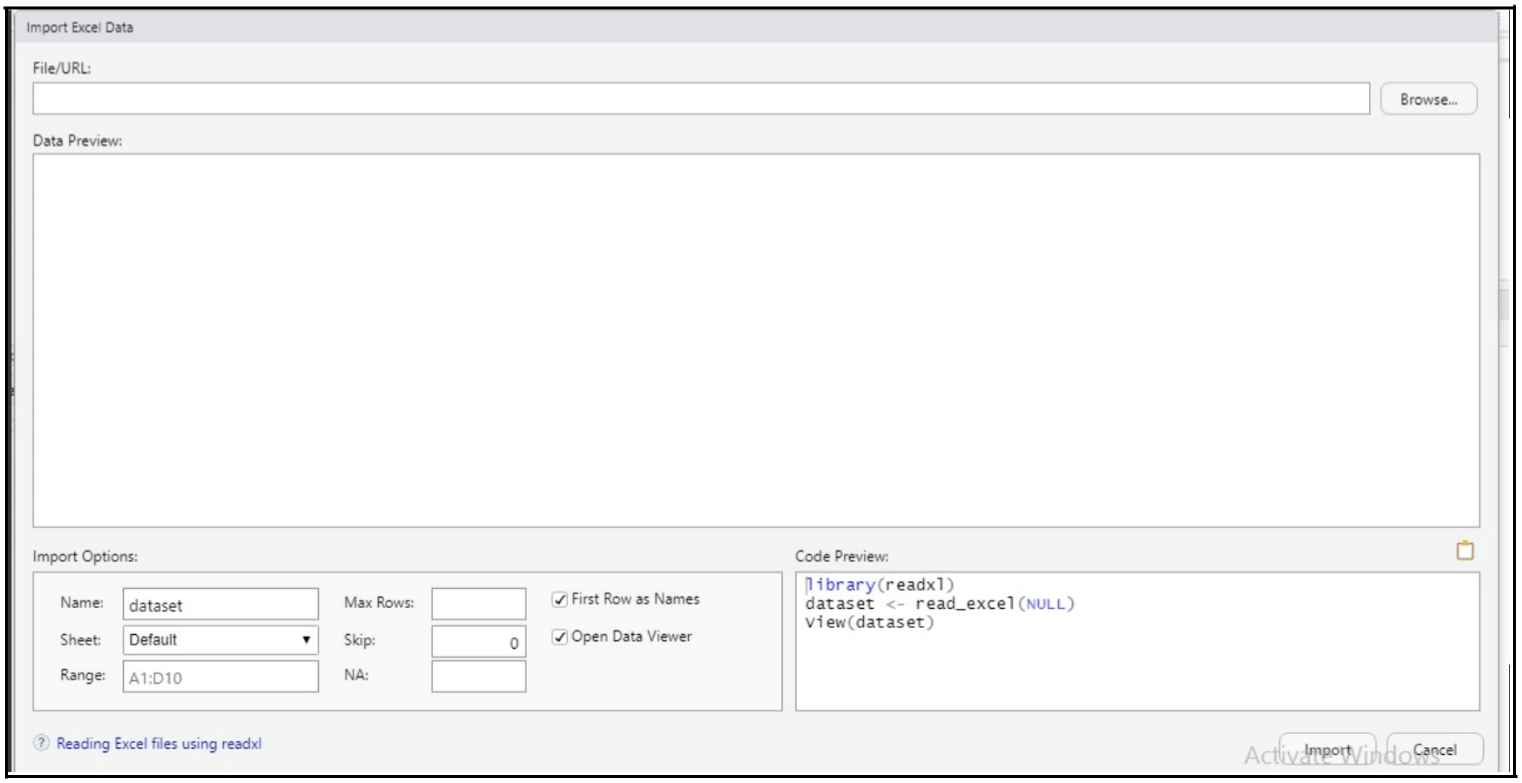
3)) Display Import and load dataset from external sources like:

(a) Excel File

(b) Statistical Analysis System (SAS) File

(c) Text File (base)





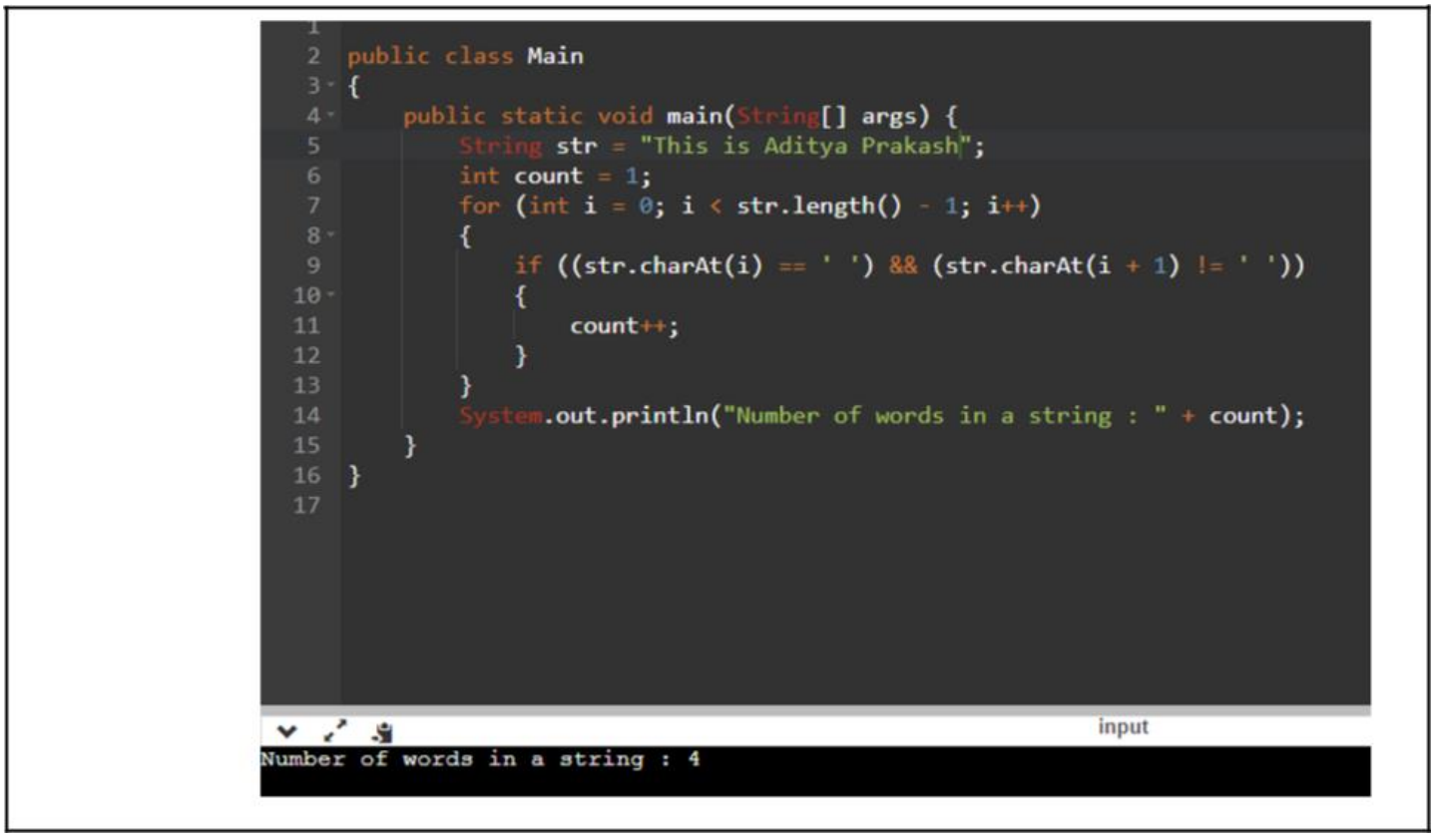
4) Read file using below function commands:

(a) read.delim( ) and read.delim2( )

(b) read.table( )

(c) read.csv( )

5) Write a program in Java for counting the number of words.



ASSIGNMENT-07

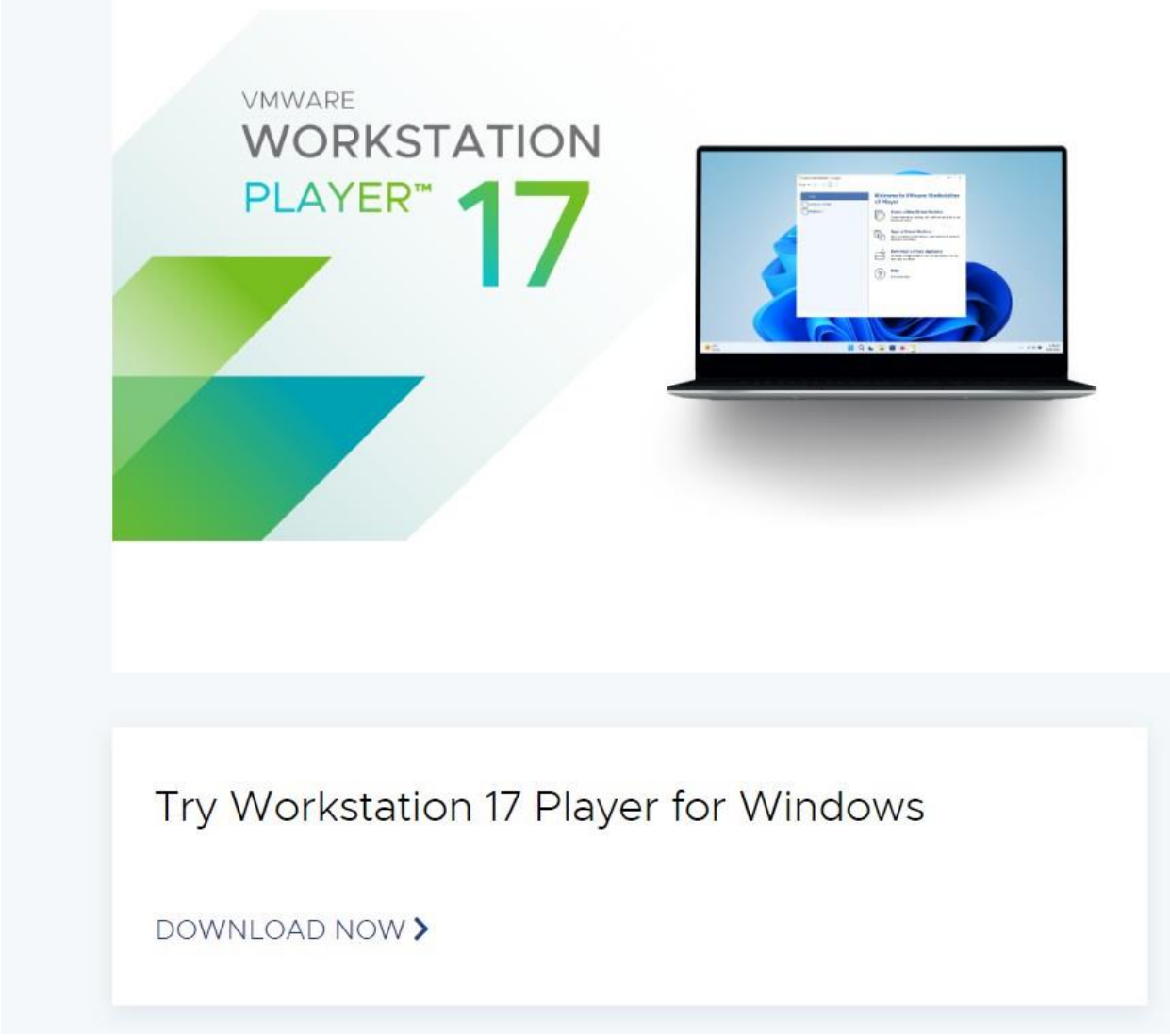
Big data analytics

Name - Aniruddha Bajpai

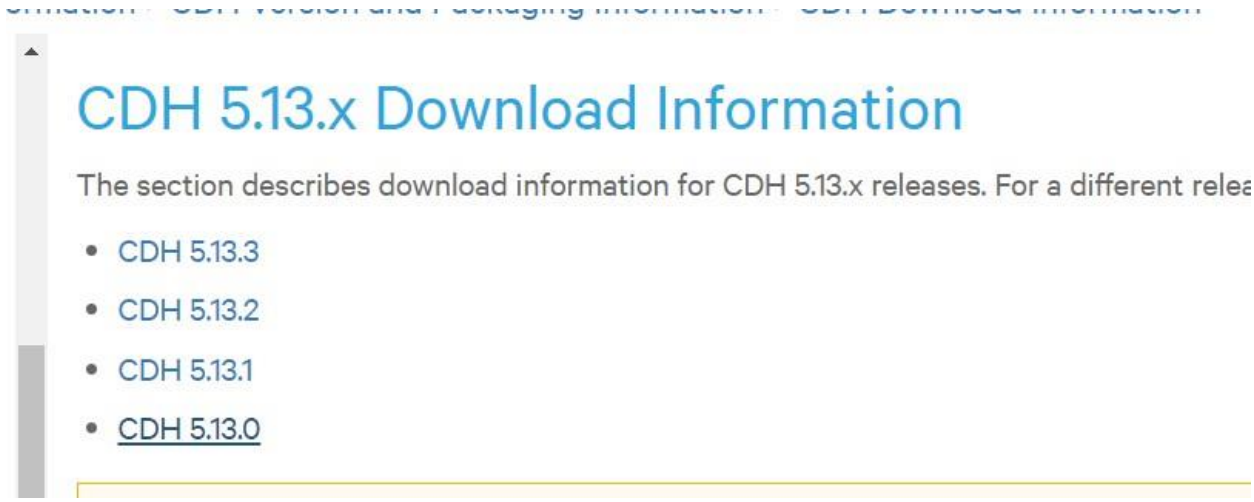
Roll no - 201500092

Section - C(18)

Q1 Download VMware 17 Pro for Window.

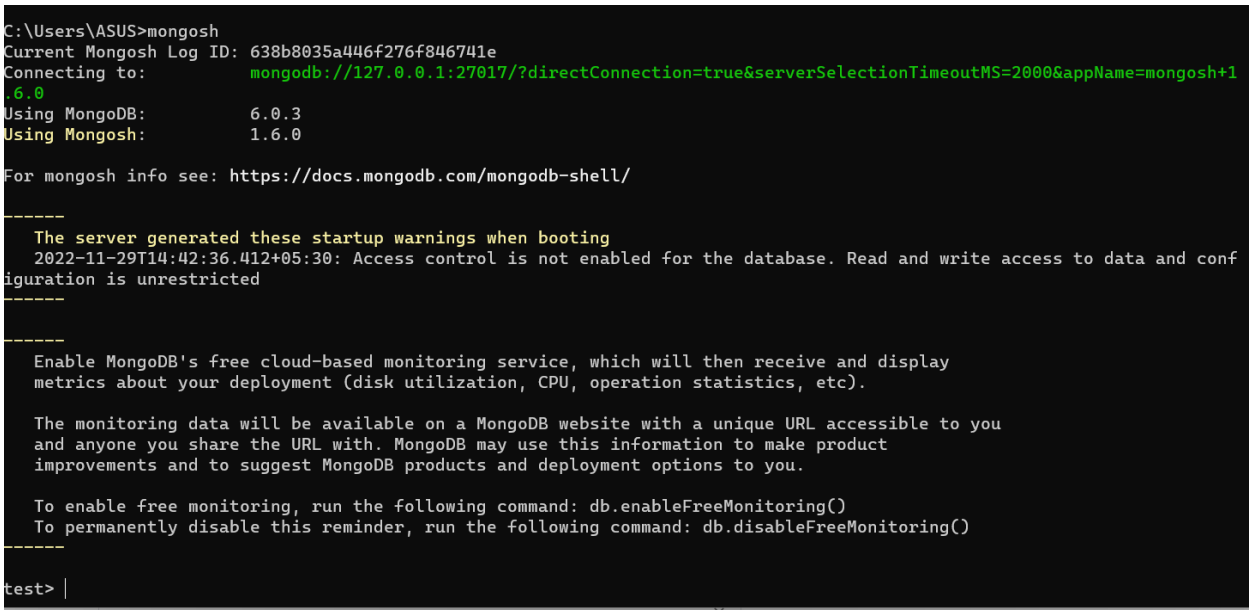


Q 2 Download CloudEra Quick Start



Q3 Download Cassandra cqlsh: Command Line Interfac

Q4 Download MongoDB and CRUD Operations on Mongosh:



Course Name: Big Data and Analytics Lab (Code: BCSE0183)

Semester: 5th Section: 3-C (Batches)

Academic Session: Aug 2022 – Dec 2022

Lab Assignment – 04

Additional Problems on Basics of R Programming Language

Aniruddha bajpai

Section C , Roll-number 201500092 (18)

1) Write R Program to Find Sum, Mean and Product of Vector.

```
R 4.2.1 · ~/Assignment_3/
> # Question 1
> demo <- c(19,29,12,32,1,23,21)
> print(mean(demo))
[1] 19.57143
> print(sum(demo))
[1] 137
> print(prod(demo))
[1] 102195072
>
```

2) Write R Program to Take Input From User

```
R 4.2.1 · ~/Assignment_3/
> # Question 2
> name <- readline(prompt="Enter you name ")
Enter you name Aniruddha bajpai
> print(name)
[1] "Aniruddha bajpai"
>
```

3) Write R Program to sample( ) function on given example

```
R 4.2.1 · ~/Assignment_3/
> # Question 3
> sampledemo <- c(102,12,21,42,54,65,76,12,34,21,43654,01)
> print(sample(sampledemo,5))
[1]    21 43654   102    65    42
>
```

4) Write R Program to minimum, maximum and range of a given Vector

```
R 4.2.1 · ~/Assignment_3/
> # Question 4
> v <- c(10,2,1,21,3,54,21,09)
> print(min(v))
[1] 1
> print(max(v))
[1] 54
> print(range(v))
[1]  1 54
>
```

5) Write R Program to Sort a given Vector

```
R 4.2.1 · ~/Assignment_3/
> # Question 5
> v <- c(19,21,42,1,421,53,12,122)
> v <- sort(v)
> print(v)
[1]   1  12  19  21  42  53 122 421
>
```

6) Write R Program to Find the Factorial of a Number

```
> # Question 6
> print(factorial(5))
[1] 120
>
```

7) Write R Program to Print Table of given Number

```
> x=5
>  a=1
> while(a<11){
+
+   print(x*a)
+   a=a+1
+ }
[1] 5
[1] 10
[1] 15
[1] 20
[1] 25
[1] 30
[1] 35
[1] 40
[1] 45
[1] 50
>
```

8) Write R Program to Check Prime Number

```
> num=5
> flag = 0
> if(num > 1) {
+
+   flag = 1
+   for(i in 2:(num-1)) {
+     if ((num %% i) == 0) {
+       flag = 0
+       break
+     }
+   }
+ }
> if(num == 2)    flag = 1
> if(flag == 1) {
+   print(paste(num,"is a prime number"))
+ } else {
+   print(paste(num,"is not a prime number"))
+ }
[1] "5 is a prime number"
>
```

9) Write R Program to check Armstrong Number

```
> num =12
> sum = 0
> temp = num
> while(temp > 0) {
+   digit = temp %% 10
+   sum = sum + (digit ^ 3)
+   temp = floor(temp / 10)
+ }
> if(num == sum) {
+   print(paste(num, "is an Armstrong number"))
+ } else {
+   print(paste(num, "is not an Armstrong number"))
+ }
[1] "12 is not an Armstrong number"
>
```

10) Write R Program to Print the Fibonacci Sequence

```
> nterms=5
> n1 = 0
> n2 = 1
> count = 2
>   if(nterms == 1) {
+     print(n1)
+   } else {
+     print(n1)
+     print(n2)
+     while(count < nterms) {
+       nth = n1 + n2
+       print(nth)
+       n1 = n2
+       n2 = nth
+       count = count + 1
+     }
+   }
[1] 0
[1] 1
[1] 1
[1] 2
[1] 3
>
```

11) Write R Program to find nth highest value in a given vector.

```
> x = c(10, 20, 30, 20, 20, 25, 9, 26)
> print("n = 1")
[1] "n = 1"
> n = 1
> print(sort(x, TRUE)[n])
[1] 30
> print("n = 2")
[1] "n = 2"
> n = 2
> print(sort(x, TRUE)[n])
[1] 26
```

12) Write R Program to create a vector using **:** operator and seq( ) function.

```
> x = 1:15
> y = seq(1, 3, by=0.3)
> print(y)
[1] 1.0 1.3 1.6 1.9 2.2 2.5 2.8
> z = seq(1, 5, length.out = 6)
> print(z)
[1] 1.0 1.8 2.6 3.4 4.2 5.0
>
```

13) Write R Program to convert a given list to vector.

```
> n1 = list(1,2,3)
> c1 = list(4,5,6)
> v1 = unlist(n1)
> v2 = unlist(c1)
> print(v1)
[1] 1 2 3
> print(v2)
[1] 4 5 6
> v = v1 + v2
> print(v)
[1] 5 7 9
>
```

14) Write R Program for Convert Decimal into Binary using Recursion

```
> binary <- function(num) {
+   if(num > 1) {
+     binary(as.integer(num/2))
+   }
+   cat(num %% 2)
+ }
> binary(5)
101
>
```

15) Write R Program to Find H.C.F. or G.C.D.

```
> hcf <- function(x, y) {
+   if(x > y) {
+     smaller = y
+   } else {
+     smaller = x
+   }
+   for(i in 1:smaller) {
+     if((x %% i == 0) && (y %% i == 0)) {
+       hcf = i
+     }
+   }
+   return(hcf)
+ }
> hcf(15,25)
[1] 5
>
```

16) Write R Program to create an array of two 3x3 matrices each with 3 rows and 3 columns from two given two vectors. Print the second row of the second matrix of the array and the element in the 3rd row and 3rd column of the 1st matrix.

```
> v1 =  c(1,3,4,5)
> v2 =  c(10,11,12,13,14,15)
> result = array(c(v1,v2),dim = c(3,3,2))
> print(result)
, , 1

     [,1] [,2] [,3]
[1,]    1    5   12
[2,]    3   10   13
[3,]    4   11   14

, , 2

     [,1] [,2] [,3]
[1,]   15    4   11
[2,]    1    5   12
[3,]    3   10   13

> print(result[2,,2])
[1]  1  5 12
> print(result[3,3,1])
[1] 14
>
```

17) Write R Program to create two 2x3 matrix and add, subtract, multiply and divide the matrixes.

```
> m1 = matrix(c(1, 2, 3, 4, 5, 6), nrow = 2)
> m2 = matrix(c(0, 1, 2, 3, 0, 2), nrow = 2)
> result = m1 + m2
> print(result)
     [,1] [,2] [,3]
[1,]    1    5    5
[2,]    3    7    8
>
> result = m1 - m2
> print(result)
     [,1] [,2] [,3]
[1,]    1    1    5
[2,]    1    1    4
>
```

18) Write R Program to access the element at 3rd column and 2nd row, only the 3rd row and only the 4th column

of a given matrix.

```
> row_names = c("row1", "row2", "row3", "row4")
> col_names = c("col1", "col2", "col3", "col4")
> M = matrix(c(1:16), nrow = 4, byrow = TRUE, dimnames = list(row_names, col_names))
>
> print(M[2,3])
[1] 7
> print("Access only the  3rd row:")
[1] "Access only the  3rd row:"
> print(M[3,])
col1 col2 col3 col4
   9   10   11   12
> print("Access only the 4th column:")
[1] "Access only the 4th column:"
> print(M[,4])
row1 row2 row3 row4
   4    8   12   16
>
```

19) Write R Program to find row and column index of maximum and minimum value in a given matrix.

```
> m = matrix(c(1:16), nrow = 4, byrow = TRUE)
> result = which(m == max(m), arr.ind=TRUE)
> print("max value")
[1] "max value"
> print(result)
     row col
[1,]   4   4
> result = which(m == min(m), arr.ind=TRUE)
> print("min value")
[1] "min value"
> print(result)
     row col
[1,]   1   1
>
```

20) Write R Program to concatenate two given matrices of same column but different rows.

```
> x = matrix(1:12, ncol=3)
> y = matrix(13:24, ncol=3)
> result = dim(rbind(x,y))
> print(result)
[1] 8 3
>
```

21) Write R Program to extract specific column from a data frame using column name.

```
exam_data = data.frame(
  name = c('Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'),
  score = c(12.5, 9, 16.5, 12, 9, 20, 14.5, 13.5, 8, 19),
  attempts = c(1, 3, 2, 3, 2, 3, 1, 1, 2, 1),
  qualify = c('yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes')
)
print("Original dataframe:")
print(exam_data)
print("Extract Specific columns:")
result <- data.frame(exam_data$name,exam_data$score)
print(result)
```

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ASSIGNMENT-05

BIG DATA ANALYTICS

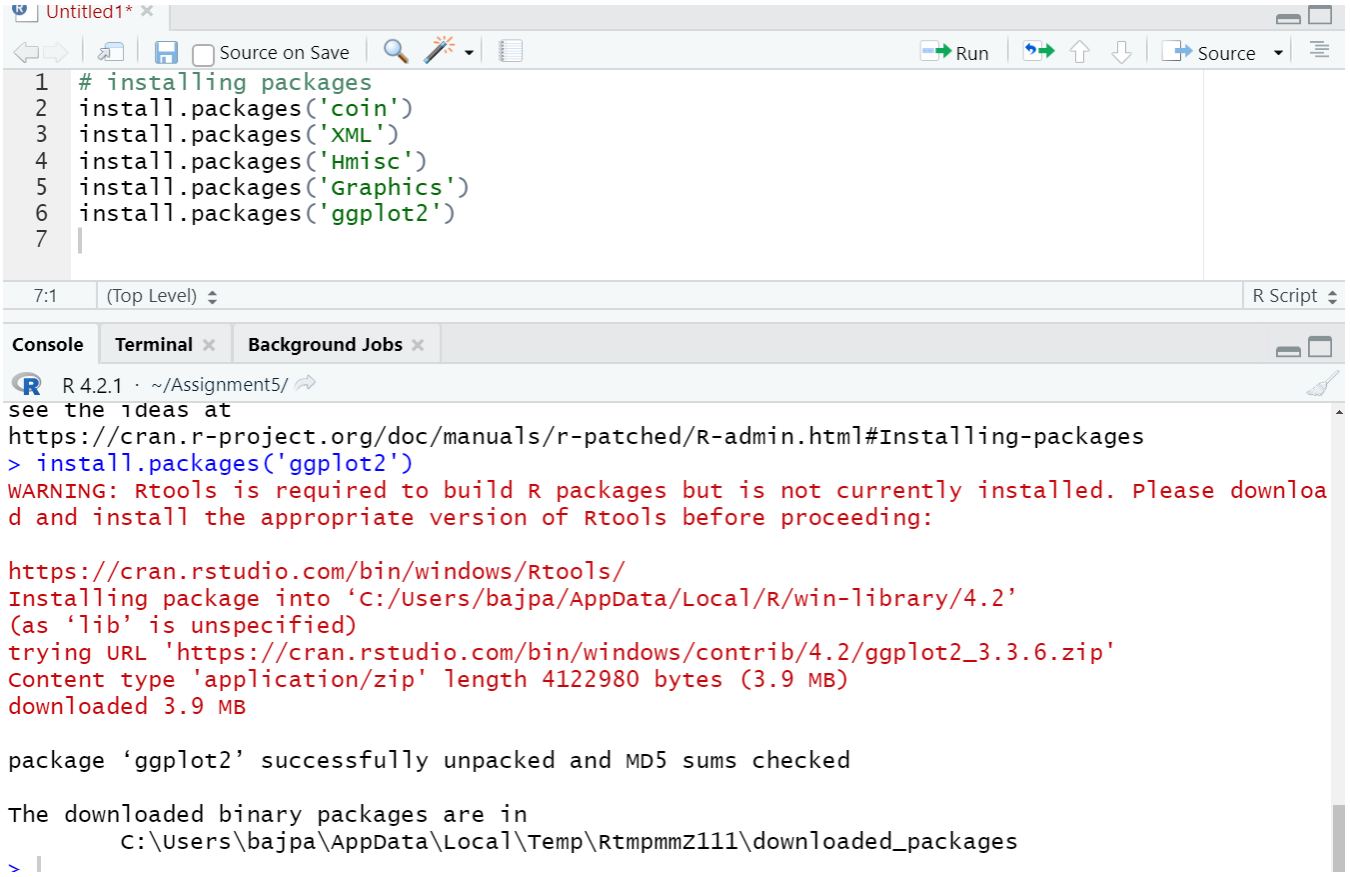
NAME - ANIRUDDHA BAJPAI
SECTION-C(18)
ROLL NO.-201500092

Q1) Install below packages using `install.package( )` function :

- Coin
- XML
- Hmisc
- Graphics
- Ggplot

  and list all available set of Packages under system library & user library.

Hint: For specific help in particular package use `library (help= "graphics").`
Also, use
`edit(), search()` and `detach()` functions for different package utilities.



```
install.packages( ggplot2 )

# available packages
installed.packages()

7:1  (Top Level)
```

Console | Terminal | Background Jobs

R 4.2.1 · ~/Assignment5/

```
package 'ggplot2' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\bajpa\AppData\Local\Temp\RtmpmmZ111\downloaded_packages
> # available packages
> installed.packages()
             Package         LibPath
askpass      "askpass"       "C:/Users/bajpa/AppData/Local/R/win-library/4.2"
backports    "backports"     "C:/Users/bajpa/AppData/Local/R/win-library/4.2"
base64enc    "base64enc"     "C:/Users/bajpa/AppData/Local/R/win-library/4.2"
checkmate    "checkmate"     "C:/Users/bajpa/AppData/Local/R/win-library/4.2"
cli          "cli"           "C:/Users/bajpa/AppData/Local/R/win-library/4.2"
coin         "coin"          "C:/Users/bajpa/AppData/Local/R/win-library/4.2"
colorspace   "colorspace"    "C:/Users/bajpa/AppData/Local/R/win-library/4.2"
crandep      "crandep"       "C:/Users/bajpa/AppData/Local/R/win-library/4.2"
curl         "curl"          "C:/Users/bajpa/AppData/Local/R/win-library/4.2"
```

Q2) Display below datasets available under specific packages: • Graphics • MASS • Datasets • Cluster

Ans)

```
Data sets in package 'datasets':

AirPassengers                Monthly Airline Passenger Numbers 1949-1960
BJsales                      Sales Data with Leading Indicator
BJsales.lead (BJsales)       Sales Data with Leading Indicator
BOD                          Biochemical Oxygen Demand
CO2                          Carbon Dioxide Uptake in Grass Plants
ChickWeight                  Weight versus age of chicks on different diets
DNase                        Elisa assay of DNase
EuStockMarkets               Daily Closing Prices of Major European Stock Indices, 1991-1998
Formaldehyde                 Determination of Formaldehyde

Data sets in package 'cluster':

agriculture                  European Union Agricultural Workforces
animals                      Attributes of Animals
chorSub                      Subset of C-horizon of Kola Data
flower                       Flower Characteristics
plantTraits                  Plant Species Traits Data
pluton                       Isotopic Composition Plutonium Batches
ruspini                      Ruspini Data
votes.repub                  Votes for Republican Candidate in Presidential Elections
xclara                       Bivariate Data Set with 3 Clusters
```

```
> data()
> data(package = .packages(all.available = TRUE))
> data(package = .packages(all.available = TRUE))
>
```

Data sets in package 'MASS':

Aids2	Australian AIDS Survival Data
Animals	Brain and Body Weights for 28 Species
Boston	Housing Values in Suburbs of Boston
Cars93	Data from 93 Cars on Sale in the USA in 1993
Cushings	Diagnostic Tests on Patients with Cushing's Syndrome
DDT	DDT in Kale
GAGurine	Level of GAG in Urine of Children
Insurance	Numbers of Car Insurance claims
Melanoma	Survival from Malignant Melanoma
OME	Tests of Auditory Perception in Children with OME
Pima.te	Diabetes in Pima Indian Women
Pima.tr	Diabetes in Pima Indian Women
Pima.tr2	Diabetes in Pima Indian Women
Rabbit	Blood Pressure in Rabbits
Rubber	Accelerated Testing of Tyre Rubber
SP500	Returns of the Standard and Poors 500
Sitka	Growth Curves for Sitka Spruce Trees in 1988
Sitka89	Growth Curves for Sitka Spruce Trees in 1989
Skye	AFM Compositions of Aphyric Skye Lavas
Traffic	Effect of Swedish Speed Limits on Accidents
UScereal	Nutritional and Marketing Information on US Cereals
UScrime	The Effect of Punishment Regimes on Crime Rates
VA	Veteran's Administration Lung Cancer Trial
abbey	Determinations of Nickel Content
accdeaths	Accidental Deaths in the US 1973-1978
anorexia	Anorexia Data on Weight Change
bacteria	Presence of Bacteria after Drug Treatments

Q3) For given 'mtcars' dataset, use below functions– (a) dim ( ) (b) sort ( ) [for individual parameter with '$' Dollar Sign] (c) names ( ) (d) rownames ( ) (e) Print Variable Values using '$' Dollar Sign (f) summary ( ) (g) max ( ) and which.max ( ) (h) min ( ) and which.min ( ) (i) mean ( ) (j) median ( ) (k) quantile ( )

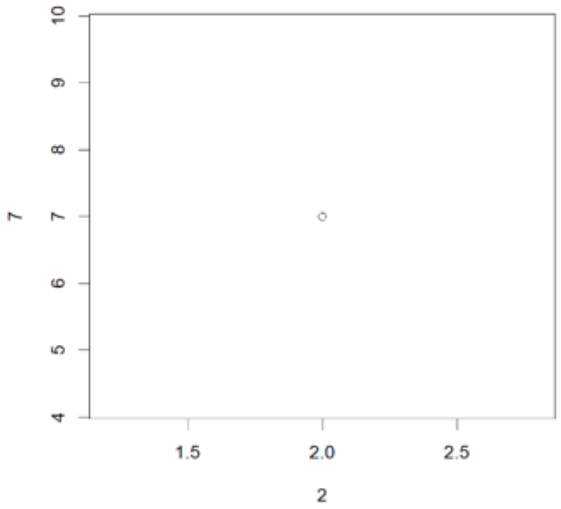
```
R 4.2.1 · ~/Assignment5/
> dim(mtcars)
[1] 32 11
> names(mtcars)
 [1] "mpg"  "cyl"  "disp" "hp"   "drat" "wt"   "qsec" "vs"   "am"   "gear" "carb"
> rownames(mtcars)
 [1] "Mazda RX4"           "Mazda RX4 Wag"       "Datsun 710"          "Hornet 4 Drive"      "Hornet Sportabout"
 [6] "Valiant"             "Duster 360"          "Merc 240D"           "Merc 230"            "Merc 280"
[11] "Merc 280C"           "Merc 450SE"          "Merc 450SL"          "Merc 450SLC"         "Cadillac Fleetwood"
[16] "Lincoln Continental" "Chrysler Imperial"   "Fiat 128"            "Honda Civic"         "Toyota Corolla"
[21] "Toyota Corona"       "Dodge Challenger"    "AMC Javelin"         "Camaro Z28"          "Pontiac Firebird"
[26] "Fiat X1-9"           "Porsche 914-2"       "Lotus Europa"        "Ford Pantera L"      "Ferrari Dino"
[31] "Maserati Bora"       "Volvo 142E"
> summary(mtcars)
      mpg             cyl             disp             hp             drat             wt             qsec      
 Min.   :10.40   Min.   :4.000   Min.   : 71.1   Min.   : 52.0   Min.   :2.760   Min.   :1.513   Min.   :14.50  
 1st Qu.:15.43   1st Qu.:4.000   1st Qu.:120.8   1st Qu.: 96.5   1st Qu.:3.080   1st Qu.:2.581   1st Qu.:16.89  
 Median :19.20   Median :6.000   Median :196.3   Median :123.0   Median :3.695   Median :3.325   Median :17.71  
 Mean   :20.09   Mean   :6.188   Mean   :230.7   Mean   :146.7   Mean   :3.597   Mean   :3.217   Mean   :17.85  
 3rd Qu.:22.80   3rd Qu.:8.000   3rd Qu.:326.0   3rd Qu.:180.0   3rd Qu.:3.920   3rd Qu.:3.610   3rd Qu.:18.90  
 Max.   :33.90   Max.   :8.000   Max.   :472.0   Max.   :335.0   Max.   :4.930   Max.   :5.424   Max.   :22.90  
       vs              am              gear            carb      
 Min.   :0.0000   Min.   :0.0000   Min.   :3.000   Min.   :1.000  
 1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:3.000   1st Qu.:2.000  
 Median :0.0000   Median :0.0000   Median :4.000   Median :2.000  
 Mean   :0.4375   Mean   :0.4062   Mean   :3.688   Mean   :2.812  
 3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:4.000   3rd Qu.:4.000  
 Max.   :1.0000   Max.   :1.0000   Max.   :5.000   Max.   :8.000  
> 
```

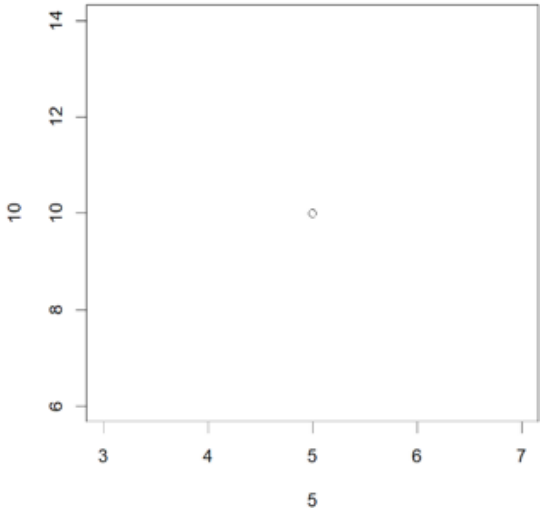
```
> max(mtcars)
[1] 472
> which.max(mtcars$mpg)
[1] 20
> min(mtcars)
[1] 0
> which.min(mtcars$mpg)
[1] 15
> mean(mtcars$mpg)
[1] 20.09062
> median(mtcars$mpg)
[1] 19.2

> quantile(mtcars$mpg)
    0%    25%    50%    75%   100% 
10.400 15.425 19.200 22.800 33.900 
> 
```

```
> mpg <- mtcars$mpg
> sort(mpg)
 [1] 10.4 10.4 13.3 14.3 14.7 15.0 15.2 15.2 15.5 15.8 16.4 17.3 17.8 18.1 18.7 19.2 19.2 19.7 21.0 21.0 21.4 21.4 21.5 22.8
[25] 22.8 24.4 26.0 27.3 30.4 30.4 32.4 33.9
> mtcars$vs
 [1] 0 0 1 1 0 1 0 1 1 1 1 0 0 0 0 0 0 1 1 1 1 0 0 0 0 1 0 1 0 0 0 1
> mtcars$cyl
 [1] 6 6 4 6 8 6 8 4 4 6 6 8 8 8 8 8 8 4 4 4 4 8 8 8 8 4 4 4 8 6 8 4
> mtcars$disp
 [1] 160.0 160.0 108.0 258.0 360.0 225.0 360.0 146.7 140.8 167.6 167.6 275.8 275.8 275.8 472.0 460.0 440.0  78.7  75.7  71.1
[21] 120.1 318.0 304.0 350.0 400.0  79.0 120.3  95.1 351.0 145.0 301.0 121.0
> mtcars$hp
 [1] 110 110  93 110 175 105 245  62  95 123 123 180 180 180 205 215 230  66  52  65  97 150 150 245 175  66  91 113 264 175
[31] 335 109
> mtcars$drat
 [1] 3.90 3.90 3.85 3.08 3.15 2.76 3.21 3.69 3.92 3.92 3.92 3.07 3.07 3.07 2.93 3.00 3.23 4.08 4.93 4.22 3.70 2.76 3.15 3.73
[25] 3.08 4.08 4.43 3.77 4.22 3.62 3.54 4.11
> mtcars$wt
 [1] 2.620 2.875 2.320 3.215 3.440 3.460 3.570 3.190 3.150 3.440 3.440 4.070 3.730 3.780 5.250 5.424 5.345 2.200 1.615 1.835
[21] 2.465 3.520 3.435 3.840 3.845 1.935 2.140 1.513 3.170 2.770 3.570 2.780
> mtcars$qsec
 [1] 16.46 17.02 18.61 19.44 17.02 20.22 15.84 20.00 22.90 18.30 18.90 17.40 17.60 18.00 17.98 17.82 17.42 19.47 18.52 19.90
[21] 20.01 16.87 17.30 15.41 17.05 18.90 16.70 16.90 14.50 15.50 14.60 18.60
> mtcars$vs
 [1] 0 0 1 1 0 1 0 1 1 1 1 0 0 0 0 0 0 1 1 1 1 0 0 0 0 1 0 1 0 0 0 1
> mtcars$am
 [1] 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 1 1 1 1 1 1 1
> mtcars$gear
 [1] 4 4 4 3 3 3 3 4 4 4 4 3 3 3 3 3 3 4 4 4 3 3 3 3 3 4 5 5 5 5 5 4
```

Q4) For given function plot ( ), use below operations: (a) Draw two points with position (2, 7) and (5, 10)

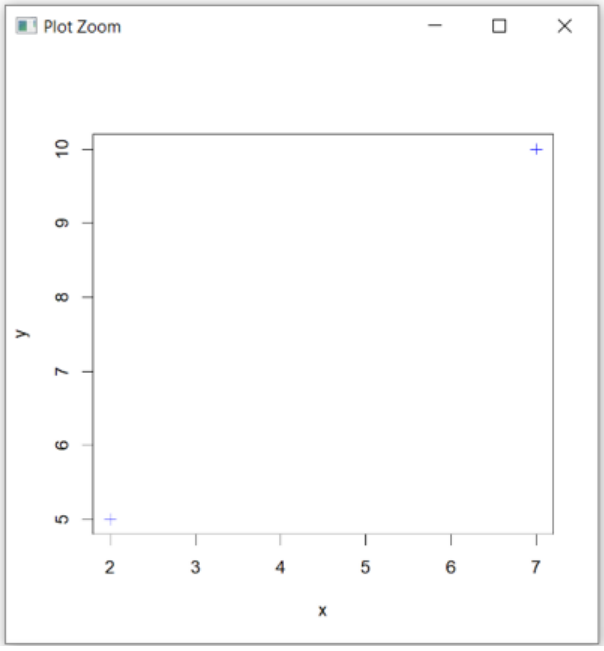
```
R 4.2.1 · ~/Assignment5/
> plot(2,7)
> plot(5,10)
```





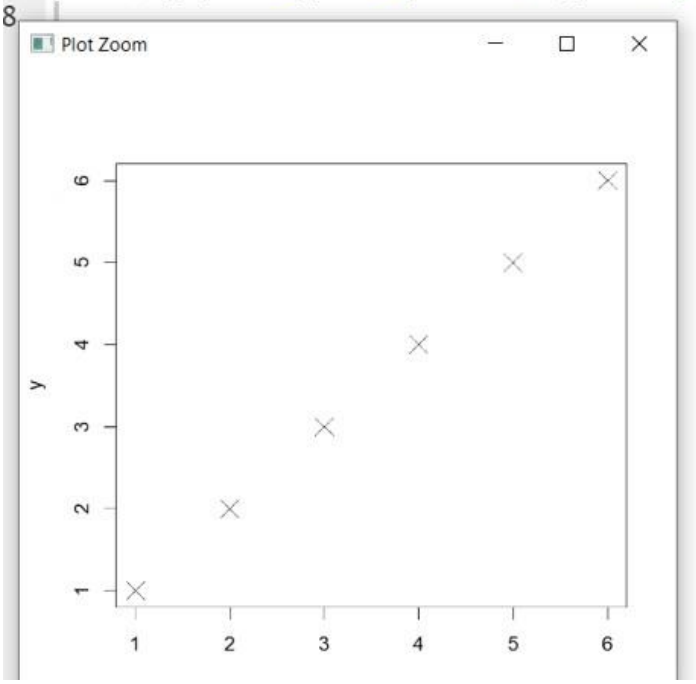
(c) Draw multiple points with variable positions

```
x <- c(2,7)
y <- c(5,10)
plot(x,y,cex=1,pch=3,xlab="x",ylab="y",col="blue")
```



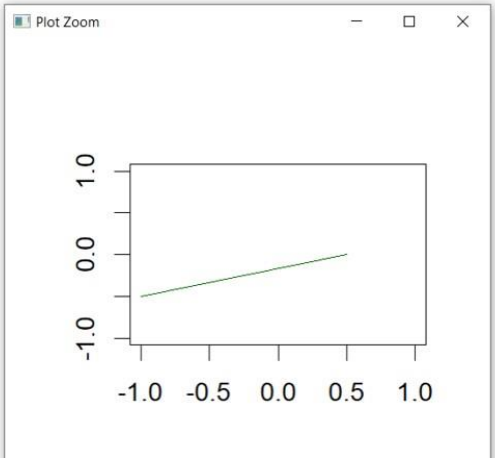
(d) Draw multiple points with vector

```
x <- c(1,2,3,4,5,6)
y <- c(1,2,3,4,5,6)
plot(x,y,cex=2,pch=4,xlab="x",ylab="y",col="BLACK")
```



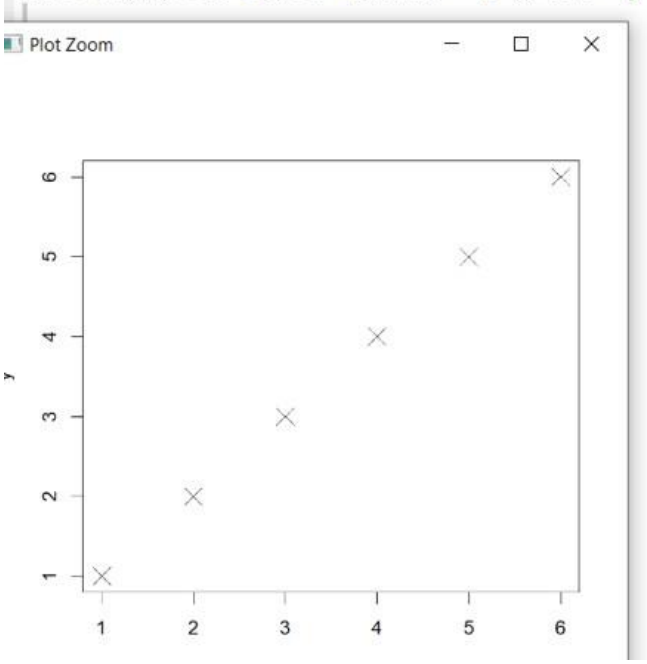
(e) Draw sequences of points

```
# Create empty example plot
plot(0, 0, col = "white", xlab = "", ylab = "")

# Draw one line
segments(x0 = - 1, y0 = - 0.5, x1 = 0.5, y1 = 0, col = "darkgreen")
```



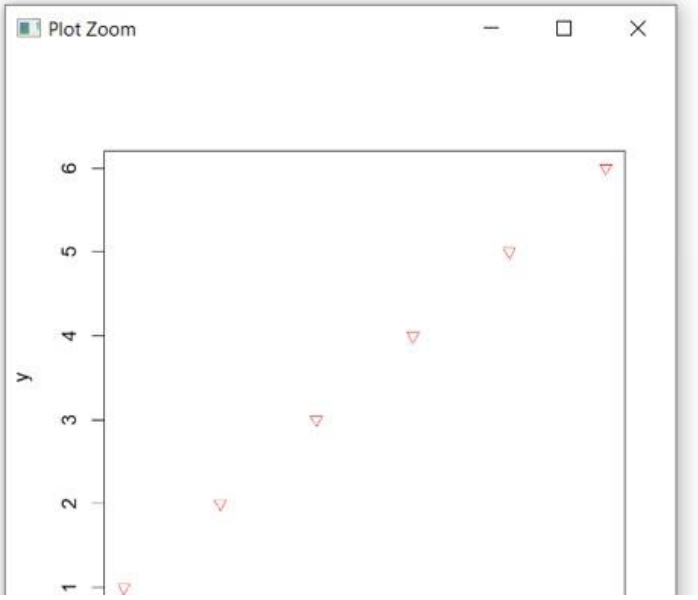
(f) Draw multiple points with parameters like main, xlab and ylab

```
x <- c(1,2,3,4,5,6)
y <- c(1,2,3,4,5,6)
plot(x,y,cex=2,pch=4,xlab="x",ylab="y",col="BLACK")
```



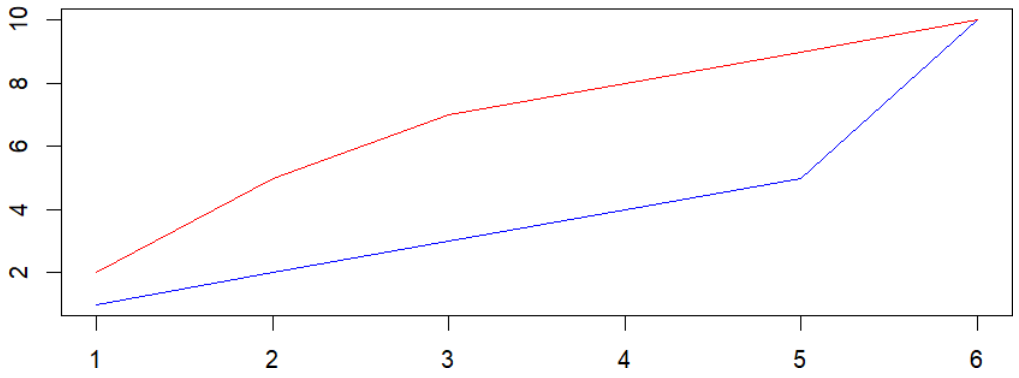
(g) Draw multiple points with point shape, colors and size

```
x <- c(1,3,1,7,5,1)
y <- c(1,2,3,4,7,6)
plot(x,y,cex=1,pch=6,xlab="x",ylab="y",col="red")
```



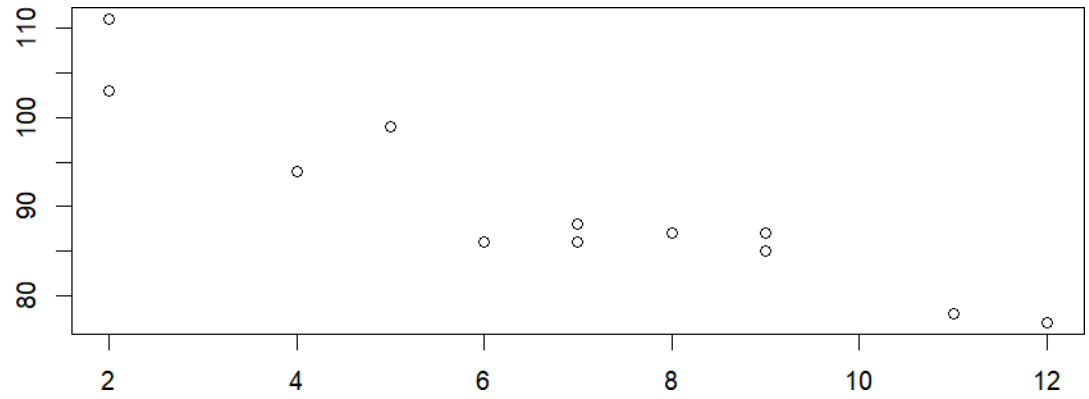
Q5) Compare two plots on following criteria: (a) Draw Multiple Lines with style, width and color (f) Draw observations for bar texture using density, width & color parameters

```
line1 <- c(1,2,3,4,5,10)
line2 <- c(2,5,7,8,9,10)

plot(line1, type = "l", col = "blue")
lines(line2, type="l", col = "red")
```



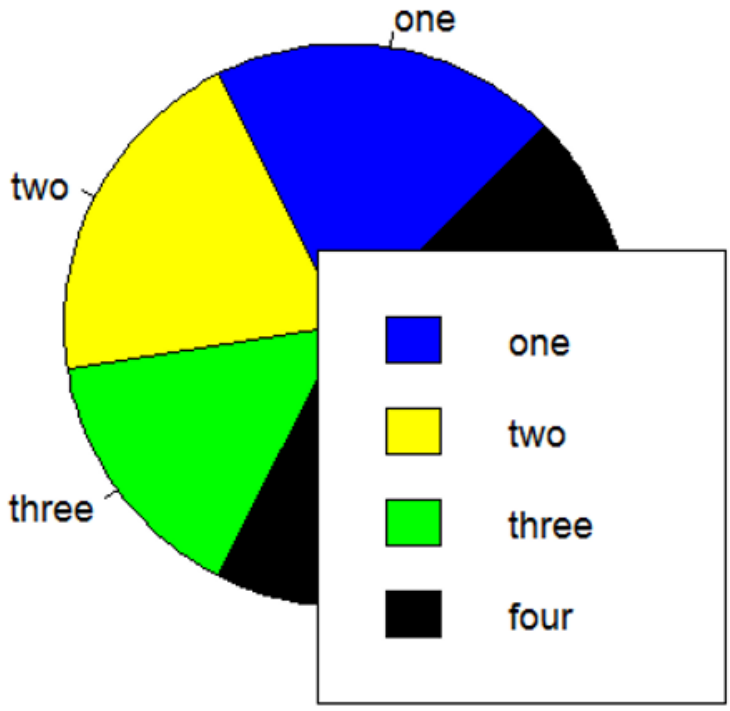
(b) Draw the observations for two different dataset using points( ) function

```
x <- c(5,7,8,7,2,2,9,4,11,12,9,6)
y <- c(99,86,87,88,111,103,87,94,78,77,85,86)

plot(x, y)
```

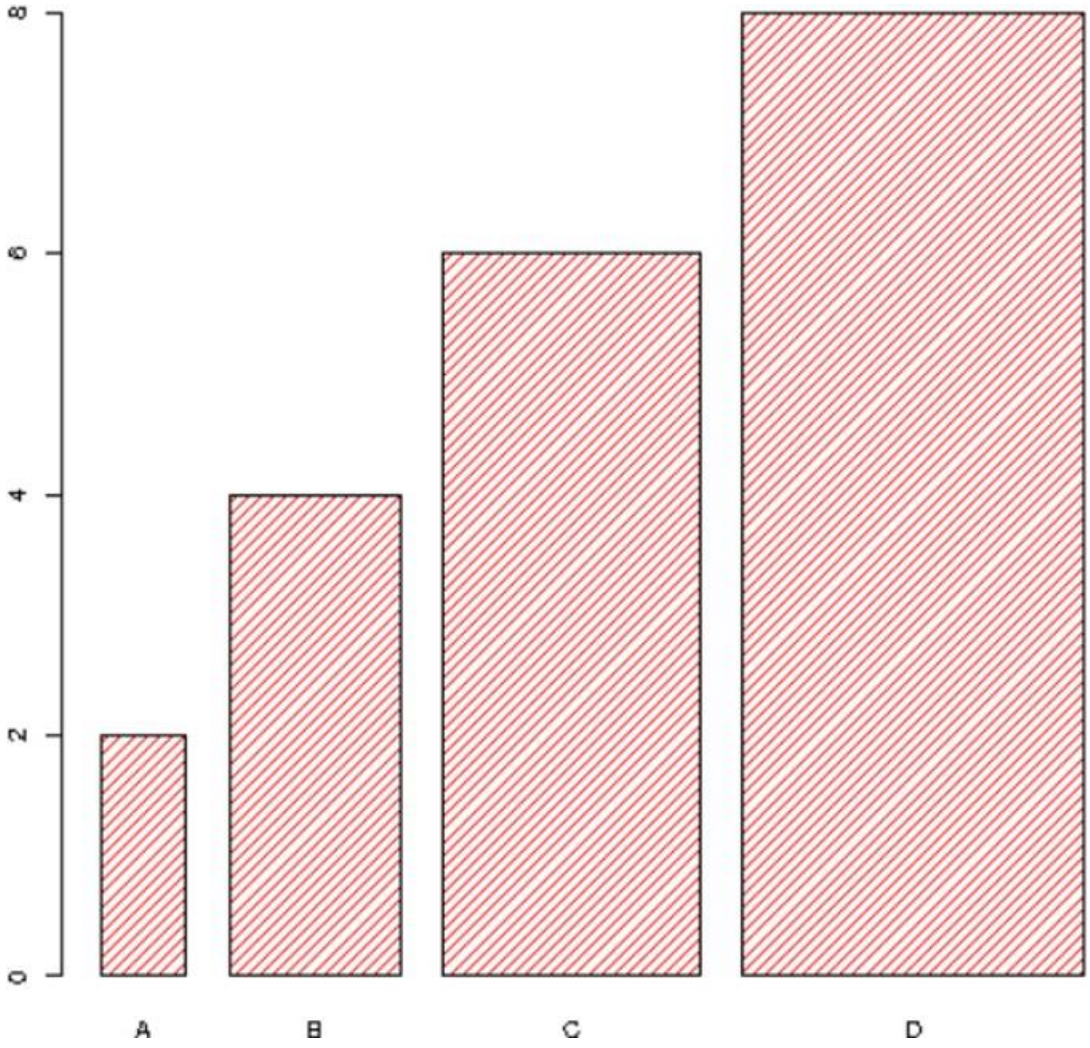


(c) Draw circular data visualization (pie chart) using pie( ) function

```
x<-c(20,20,15,45)
labels<-c("one","two","three","four")
colors <- c("blue", "yellow", "green", "black")
pie(x,label=labels,init.angle = 45,main = "number", col=colors)
legend("bottomright", labels, fill = colors)
```



(e) Draw rectangular data visualization (bar chart) using barplot ( ) function.


0
2
4
6
8
A
B
C
D

Course Name: Big Data and Analytics Lab (Code: BCSE0183)

Semester: 5th **Section: 3-C (All Batches)**

Academic Session: Aug 2022 – Dec 2022

Lab Assignment – 02

Decision Making, Selection & Looping Structures using R Programming Language

Projected submitted by Aniruddha Bajpai(18-C1) (University roll-number : 201500092)

1) Write a R program to perform below operations on Data Structures like **vector** and **list** –

(a) Determining the length of elements
(b) Sorting the elements
(c) Accessing the elements
(d) Changing the element's value
(e) Join the two lists
(f) Repeat elements of vector

```
# Declaring vector and list
my_vector1 <- c(1,4,3,5,6)
my_list1 <- list(my_vector1,"my_list1",5.0,"this is my mylist","aniruddha")

# Determining the length of the elements
print(length(my_vector1)) # this is the length of the vector data structure
print(length(my_list1)) # this is the length of the list data structure

# sorting the elements of the vector
sort.result <- sort(my_vector1)
print(sort.result)

# Accessing the elements of data structure
print(my_vector1[c(2,3,5)])
print(my_list1[c(2,3,5)])

# Changing the element's value
my_vector1[3] <- 2
my_list1[1] <- my_vector1
print(my_vector1)
print(my_list1[1])

# Join the two lists
my_list2 <- list(3,2,4,5)
merged.list <- c(my_list1,my_list2)
print(merged.list)
```

```
> # Declaring vector and list
> my_vector1 <- c(1,4,3,5,6)
> my_list1 <- list(my_vector1,"my_list1",5.0,"this is my mylist","aniruddha")
> # Determining the length of the elements
> print(length(my_vector1)) # this is the length of the vector data structure
[1] 5
> print(length(my_list1)) # this is the length of the list data structure
[1] 5
> # sorting the elements of the vector
> sort.result <- sort(my_vector1)
> print(sort.result)
[1] 1 3 4 5 6
> # Accessing the elements of data structure
> print(my_vector1[c(2,3,5)])
[1] 4 3 6
> print(my_list1[c(2,3,5)])
[[1]]
[1] "my_list1"

[[2]]
[1] 5

[[3]]
[1] "aniruddha"

> # Changing the element's value
> my_vector1[3] <- 2
> my_list1[1] <- my_vector1
```

```
> # Changing the element's value
> my_vector1[3] <- 2
> my_list1[1] <- my_vector1
Warning message:
In my_list1[1] <- my_vector1 :
  number of items to replace is not a multiple of replacement length
> print(my_vector1)
[1] 1 4 2 5 6
> print(my_list1[1])
[[1]]
[1] 1

> # Join the two lists
> my_list2 <- list(3,2,4,5)
> merged.list <- c(my_list1,my_list2)
> print(merged.list)
[[1]]
[1] 1

[[2]]
[1] "my_list1"

[[3]]
[1] 5

[[4]]
[1] "this is my mylist"

[[5]]
```

```
> merged.list <- c(my_list1,my_list2)
> print(merged.list)
[[1]]
[1] 1

[[2]]
[1] "my_list1"

[[3]]
[1] 5

[[4]]
[1] "this is my mylist"

[[5]]
[1] "aniruddha"

[[6]]
[1] 3

[[7]]
[1] 2

[[8]]
[1] 4

[[9]]
[1] 5
```

```
# Repeat the elements of two vectors
v2 <- rep(c(4,11),each=10,times=2)
print(v2)
```

```
[1] 3

[[7]]
[1] 2

[[8]]
[1] 4

[[9]]
[1] 5

> # Repeat the elements of two vectors
> v2 <- rep(c(4,11),each=10,times=2)
> print(v2)
 [1]  4  4  4  4  4  4  4  4  4  4 11 11 11 11 11 11 11 11 11 11  4  4  4  4  4  4  4  4  4  4 11 11 11 11 11 11 11 11 11 11
>
```

2) Write a R program to perform below operations on Data Structures like **matrix** and **array** –

(a) Determining the length
(b) Accessing the elements
(c) Check element exists or not
(d) Add row and column
(e) Remove row and column
(f) Combining the two matrices

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Source on Save

```
# Declaring matrix and array
mtrix <- matrix(c(0:9),nrow=5,byrow=TRUE)
arr <- array(mtrix,dim=c(3,3,2))
arr

# Determining the length
dim(mtrix) # matrix dimension
length(mtrix) # matrix length
length(arr)

# Accessing the elements in a matrix
print(mtrix[1,]) # accessing all elements in row 1
print(mtrix[,1]) # accessing all elements in coloum 1
print(arr[1,2,1]) # accessing elements in array

# check if element exist or not
print(5 %in% mtrix)  # 5 exist in matrix hence true
print(15 %in% mtrix) # 15 does not exist in matrix hence false
print(8 %in% arr) # 8 exist in array
```

Console | Terminal × | Background Jobs ×

R 4.2.1 · ~/Assignment2/

```
> # Declaring matrix and array
> mtrix <- matrix(c(0:9),nrow=5,byrow=TRUE)
> arr <- array(mtrix,dim=c(3,3,2))
> # Determining the length
> dim(mtrix) # matrix dimension
[1] 5 2
> length(mtrix) # matrix length
[1] 10
> length(arr)
[1] 18
> # Accessing the elements in a matrix
> print(mtrix[1,]) # accessing all elements in row 1
[1] 0 1
> print(mtrix[,1]) # accessing all elements in coloum 1
[1] 0 2 4 6 8
> print(arr[1,2,1]) # accessing elements in array
[1] 6
> # check if element exist or not
> print(5 %in% mtrix)  # 5 exist in matrix hence true
[1] TRUE
> print(15 %in% mtrix) # 15 does not exist in matrix hence false
[1] FALSE
> print(8 %in% arr) # 8 exist in array
[1] TRUE
>
```

```r
# adding row or column
cmtrix <- cbind(c(0,1),mtrix)      # adding column in matrix
cmtrix
rmtrix <- rbind(c(10,11),mtrix)    # adding row in matrix
rmtrix


# removing row and column in matrix
cmtrix <- cmtrix[,-c(1)]
cmtrix
rmtrix <- rmtrix[-c(1),]
rmtrix

# combining the two matrix
combinedmtrix <- cbind(cmtrix,rmtrix) # combined the matrix
combinedmtrix
arr2 <- array(c(1:9))
merged.array <- cbind(arr,arr2) # combined the row
merged.array
```

Console Terminal Background Jobs

R 4.2.1 · ~/Assignment2/

```
> # adding row or column
> cmtrix <- cbind(c(1,2,3,4,5),mtrix)      # adding column in matrix
> cmtrix
     [,1] [,2] [,3]
[1,]    1    0    1
[2,]    2    2    3
[3,]    3    4    5
[4,]    4    6    7
[5,]    5    8    9
> rmtrix <- rbind(c(10,11),mtrix)    # adding row in matrix
> rmtrix
     [,1] [,2]
[1,]   10   11
[2,]    0    1
[3,]    2    3
[4,]    4    5
[5,]    6    7
[6,]    8    9
> # removing row and column in matrix
> cmtrix <- cmtrix[,-c(1)]
> cmtrix
     [,1] [,2]
[1,]    0    1
[2,]    2    3
[3,]    4    5
[4,]    6    7
[5,]    8    9
```

Source

Console Terminal Background Jobs

R 4.2.1 · ~/Assignment2/

```
[5,]    8    9
> rmtrix <- rmtrix[-c(1),]
> rmtrix
     [,1] [,2]
[1,]    0    1
[2,]    2    3
[3,]    4    5
[4,]    6    7
[5,]    8    9
> # combining the two matrix
> combinedmtrix <- cbind(cmtrix,rmtrix) # combined the matrix
> combinedmtrix
     [,1] [,2] [,3] [,4]
[1,]    0    1    0    1
[2,]    2    3    2    3
[3,]    4    5    4    5
[4,]    6    7    6    7
[5,]    8    9    8    9
```

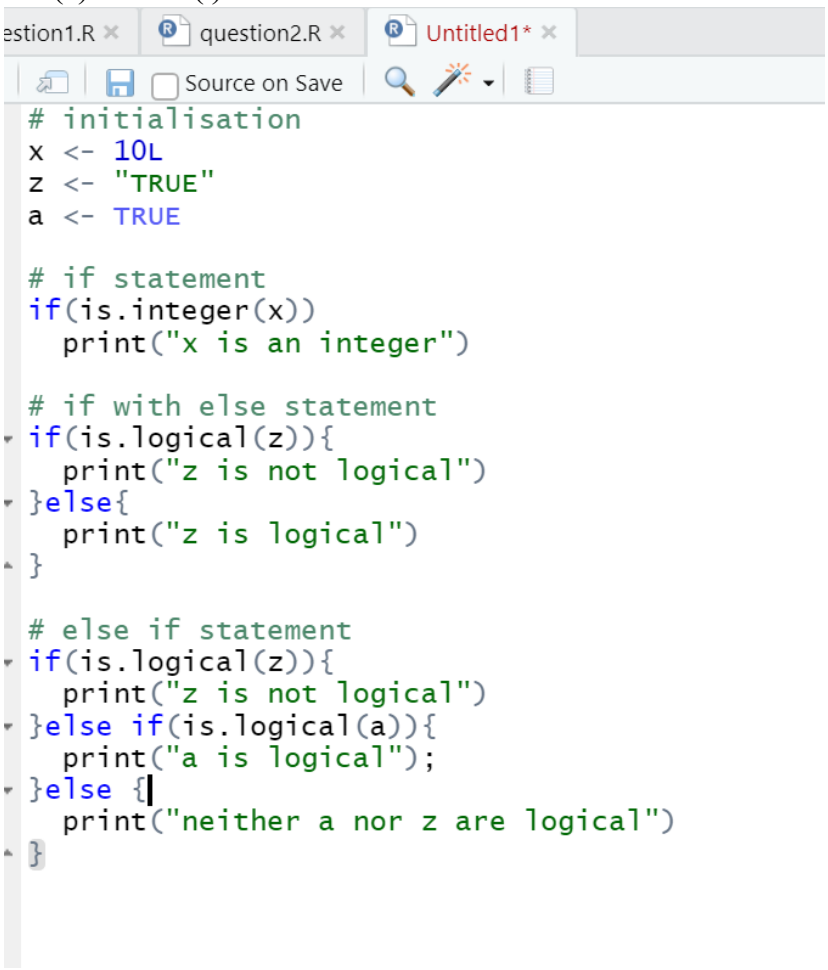
```
> arr2 <- array(c(1:9))
> merged.array <- cbind(arr,arr2) # combined the row
> merged.array
      arr arr2
 [1,]   0    1
 [2,]   2    2
 [3,]   4    3
 [4,]   6    4
 [5,]   8    5
 [6,]   1    6
 [7,]   3    7
 [8,]   5    8
 [9,]   7    9
[10,]   9    1
[11,]   0    2
[12,]   2    3
[13,]   4    4
[14,]   6    5
[15,]   8    6
[16,]   1    7
[17,]   3    8
[18,]   5    9
>
```

3) Create R Code for Condition Statements -

(a) if ( )

(b) if ( ) … else {...}

(c) else if ( )



```
R 4.2.1 · ~/Assignment2/
> # initialisation
> x <- 10L
> z <- "TRUE"
> a <- TRUE
> # if statement
> if(is.integer(x))
+   print("x is an integer")
[1] "x is an integer"
> # if with else statement
> if(is.logical(z)){
+   print("z is not logical")
+ }else{
+   print("z is logical")
+ }
[1] "z is logical"
> # else if statement
> if(is.logical(z)){
+   print("z is not logical")
+ }else if(is.logical(a)){
+   print("a is logical");
+ }else {
+   print("neither a nor z are logical")
+ }
[1] "a is logical"
>
```

4) Create R Code for Selection Control Structures –

(a) switch statement
(b) next statement
(c) break statement

question1.R × | question2.R × | question3.R × | Untitled1* ×

Source on Save

```
1  # switch statement
2  result <- switch(paste("myname",sep = " "),
3                   "friend1" = "harsh",
4                   "friend2" = "aryan",
5                   "friend3" = "shivang",
6                   "myname"  = "aniruddha")
7  print(result)
8
9  # next & break
10 i <- 1
11 repeat
12   {
13   if(i==5){
14     break}
15   if(i==5) {
16     next
17   }
18   print(i)
19   i <- i+1
20 }
```

```
Console   Terminal ×   Background Jobs ×
R 4.2.1 · ~/Assignment2/
> # switch statement
> result <- switch(paste("myname",sep = " "),
+                  "friend1" = "harsh",
+                  "friend2" = "aryan",
+                  "friend3" = "shivang",
+                  "myname"  = "aniruddha")
> print(result)
[1] "aniruddha"
> # next & break
> i <- 1
> repeat
+   {
+   if(i==5){
+     break}
+   if(i==5) {
+     next
+   }
+   print(i)
+   i <- i+1
+ }
[1] 1
[1] 2
[1] 3
[1] 4
>
```

5) Create R Code for Looping Statements –

(a) repeat Loop
(b) while Loop
(c) for Loop

```r
# repeat program in r

v <- c(5,2,12,12,32)
mx <- 0
i <- 1
repeat {
  if(length(v)<i){
    break
  }
  if(v[i]>mx){
    mx <- v[i]
  }
  i<- i+1
}
print(paste("Maximum number= ", mx))
```

Console | Terminal | Background Jobs

R 4.2.1 · ~/Assignment2/

```
> v <- c(5,2,12,12,32)
> mx <- 0
> i <- 1
> repeat {
+   if(length(v)<i){
+     break
+   }
+   if(v[i]>mx){
+     mx <- v[i]
+   }
+   i<- i+1
+ }
> print(paste("Maximum number= ", mx))
[1] "Maximum number=  32"
>
```

Source on Save

```
1
2  v <- c(5,2,12,12,32)
3
4  k <- 32
5  i <- 1
6  while(length(v)>i){
7    if(k==v[i])
8      break
9    i<-i+1
10 }
11 print(paste("Element found at index ",k))
12
```

R 4.2.1 · ~/Assignment2/

```
v <- c(5,2,12,12,32)
k <- 32
i <- 1
while(length(v)>i){
  if(k==v[i])
    break
  i<-i+1
}
print(paste("Element found at index ",i))
1] "Element found at index  5"
```

Source on Save

```
1  fruit <- c('Apple', 'Orange',"Guava", 'Pinapple', 'Banana','Grapes')
2  # creating for statement for displaying the fruits
3  for ( i in fruit){
4    print(i)
5  }
6
```

```
> fruit <- c('Apple', 'Orange',"Guava", 'Pinapple', 'Banana','Grapes')
> # creating for statement for displaying the fruits
> for ( i in fruit){
+   print(i)
+ }
[1] "Apple"
[1] "Orange"
[1] "Guava"
[1] "Pinapple"
[1] "Banana"
[1] "Grapes"
>
```

6) Write a R program to perform below operations using String functions –

(a) String Length
(b) Check a String
(c) Multiline Strings
(d) Combine Two Strings
(e) Escape Characters

```
# string length function
str <- "aniruddha"
nchar(str)

# check a string
grepl("ruddh",str) #--> TRUE : ruddh is present in string "aniruddha"

# creating multine string
ms <- 'One night a father was relaxing with his newspaper,
after a long day at office. His son, who wanted to play,kept,
 on pestering him. Finally, fed up ,the father ripped out a picture of the globe that was in the paper and tore it into a
 tuby pieces." Here,son go ahead and try to put this back together" ,he said,hoping that this would keep the little boy b
 long enough to finish reading the newspaper .To his amazement, his son returned after only one minute with the globe per
 together , when the startled father asked how he achieved this feat, the smiled gently and replied, "Dad, on the other s
 there was a picture of a person and once I got the person together ,the worl was okay"'
cat(ms)

# combine two string
str1 <- " My name is "
str2 <- "Aniruddha"
res <- paste(str1,str2)
print(res)

# escape character
s <- "Ram said,\n\"I am on a voyage to find my true aim in life\""
cat(s)
```

```
> # string length function
> str <- "aniruddha"
> nchar(str)
[1] 9
> # check a string
> grepl("ruddh",str) #--> TRUE : ruddh is present in string "aniruddha"
[1] TRUE
> # creating multine string
> ms <- 'One night a father was relaxing with his newspaper,
+ after a long day at office. His son, who wanted to play,kept,
+  on pestering him. Finally, fed up ,the father ripped out a picture of the globe that was in the paper and tore it into a hundred
 ,
+  tuby pieces." Here,son go ahead and try to put this back together" ,he said,hoping that this would keep the little boy busy,
+  long enough to finish reading the newspaper .To his amazement, his son returned after only one minute with the globe perfectly b
ack,
+  together , when the startled father asked how he achieved this feat, the smiled gently and replied, "Dad, on the other side of t
he",
+  there was a picture of a person and once I got the person together ,the worl was okay"'
> cat(ms)
he",
+  there was a picture of a person and once I got the person together ,the worl was okay"'
> cat(ms)
One night a father was relaxing with his newspaper,
after a long day at office. His son, who wanted to play,kept,
 on pestering him. Finally, fed up ,the father ripped out a picture of the globe that was in the paper and tore it into a hundred ,
 tuby pieces." Here,son go ahead and try to put this back together" ,he said,hoping that this would keep the little boy busy,
 long enough to finish reading the newspaper .To his amazement, his son returned after only one minute with the globe perfectly bac
k,
 together , when the startled father asked how he achieved this feat, the smiled gently and replied, "Dad, on the other side of th
e",
 there was a picture of a person and once I got the person together ,the worl was okay"
> # combine two string
> str1 <- " My name is "
> str2 <- "Aniruddha"
> res <- paste(str1,str2)
> print(res)
[1] " My name is  Aniruddha"
> # escape character
> s <- "Ram said,\n\"I am on a voyage to find my true aim in life\""
> cat(s)
Ram said,
"I am on a voyage to find my true aim in life"
>
```