**R LAB – 04**

**Task – 01 :**

**Aim :** Apply Different operations On Matrices in R.

1. Write a R program to create a matrix taking a given vector of numbers as input. Display the matrix

**Program :**

num = c(1,2,3,4,5,6,7,8,9,10)

ans = matrix(num, nrow = 5)

ans

**Output :**

> num = c(1,2,3,4,5,6,7,8,9,10)

> ans = matrix(num, nrow = 5)

> ans

[,1] [,2]

[1,] 1 6

[2,] 2 7

[3,] 3 8

[4,] 4 9

[5,] 5 10

1. Write a R program to create a matrix taking a given vector of numbers as input and define the column and row names. Display the matrix

**Program :**

vect = c(1,2,3,4,5,6,7,8,9)

ans2 = matrix(vect, nrow = 3)

ans2

rownames(ans2)

colnames(ans2)

rownames(ans2) = c("First","Second","Third")

colnames(ans2) = c("col1","col2","col3")

rownames(ans2)

colnames(ans2)

ans2

**Output :**

> vect = c(1,2,3,4,5,6,7,8,9)

> ans2 = matrix(vect, nrow = 3)

> ans2

[,1] [,2] [,3]

[1,] 1 4 7

[2,] 2 5 8

[3,] 3 6 9

> rownames(ans2)

NULL

> colnames(ans2)

NULL

> rownames(ans2) = c("First","Second","Third")

> colnames(ans2) = c("col1","col2","col3")

> rownames(ans2)

[1] "First" "Second" "Third"

> colnames(ans2)

[1] "col1" "col2" "col3"

> ans2

col1 col2 col3

First 1 4 7

Second 2 5 8

Third 3 6 9

1. Write a 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

**Program :**

vect3 = c(9,8,7,6,5,4,3,2,1)

ans3 = matrix(vect3, nrow = 3)

ans3

res = ans3[c(2),c(3)]

res

**Output :**

> vect3 = c(9,8,7,6,5,4,3,2,1)

> ans3 = matrix(vect3, nrow = 3)

> ans3

[,1] [,2] [,3]

[1,] 9 6 3

[2,] 8 5 2

[3,] 7 4 1

> res = ans3[c(2),c(3)]

> res

[1] 2

1. Write a R program to create two 2x3 matrix and add, subtract, multiply and divide the matrixes.

**Program :**

arth = matrix(c(1,2,3,4,5,6), nrow = 2, ncol = 3)

arth

arth2 = matrix(c(7,8,9,10,11,12), nrow = 2, ncol = 3)

arth2

arth3 = t(arth2)

arth3

add = arth + arth2

add

sub = arth - arth2

sub

mul = arth \* arth2

mul

div = arth / arth2

div

**Output :**

> arth = matrix(c(1,2,3,4,5,6), nrow = 2, ncol = 3)

> arth

[,1] [,2] [,3]

[1,] 1 3 5

[2,] 2 4 6

> arth2 = matrix(c(7,8,9,10,11,12), nrow = 2, ncol = 3)

> arth2

[,1] [,2] [,3]

[1,] 7 9 11

[2,] 8 10 12

> arth3 = t(arth2)

> arth3

[,1] [,2]

[1,] 7 8

[2,] 9 10

[3,] 11 12

> add = arth + arth2

> add

[,1] [,2] [,3]

[1,] 8 12 16

[2,] 10 14 18

> sub = arth - arth2

> sub

[,1] [,2] [,3]

[1,] -6 -6 -6

[2,] -6 -6 -6

> mul = arth \* arth2

> mul

[,1] [,2] [,3]

[1,] 7 27 55

[2,] 16 40 72

> div = arth / arth2

> div

[,1] [,2] [,3]

[1,] 0.1428571 0.3333333 0.4545455

[2,] 0.2500000 0.4000000 0.5000000

1. Write a R program to extract the submatrix whose rows have column value > 7 from a given matrix

**Program :**

rname = c("r1","r2","r3","r4")

cname = c("c1","c2","c3","c4")

vect5 = matrix(1:16, nrow = 4, byrow = TRUE, dimnames = list(rname,cname))

vect5

vect5[vect5[,3] > 7,]

**Output :**

> rname = c("r1","r2","r3","r4")

> cname = c("c1","c2","c3","c4")

> vect5 = matrix(1:16, nrow = 4, byrow = TRUE, dimnames = list(rname,cname))

> vect5

c1 c2 c3 c4

r1 1 2 3 4

r2 5 6 7 8

r3 9 10 11 12

r4 13 14 15 16

>

> vect5[vect5[,3] > 7,]

c1 c2 c3 c4

r3 9 10 11 12

r4 13 14 15 16

1. Write a R program to convert a given matrix to a list of column-vectors

**Program :**

x = matrix(1:12, ncol=3)

x

l = split(x, rep(1:ncol(x), each = nrow(x)))

l

**Output :**

> x = matrix(1:12, ncol=3)

> x

[,1] [,2] [,3]

[1,] 1 5 9

[2,] 2 6 10

[3,] 3 7 11

[4,] 4 8 12

> l = split(x, rep(1:ncol(x), each = nrow(x)))

> l

$`1`

[1] 1 2 3 4

$`2`

[1] 5 6 7 8

$`3`

[1] 9 10 11 12

1. Write a R program to find row and column index of maximum and minimum value in a given matrix

**Program :**

mat7 = matrix(1:20, nrow = 4)

mat7

a = max(mat7)

b = min(mat7)

which(mat7 == a,arr.ind = TRUE)

which(mat7 == b, arr.ind = TRUE)

**Output :**

> mat7 = matrix(1:20, nrow = 4)

> mat7

[,1] [,2] [,3] [,4] [,5]

[1,] 1 5 9 13 17

[2,] 2 6 10 14 18

[3,] 3 7 11 15 19

[4,] 4 8 12 16 20

> a = max(mat7)

> b = min(mat7)

> which(mat7 == a,arr.ind = TRUE)

row col

[1,] 4 5

> which(mat7 == b, arr.ind = TRUE)

row col

[1,] 1 1

**Task – 02 :**

**Aim :** Access the Databases and Tables from mysql to R

**Program :**

install.packages("RMySQL")

library(RMySQL)

mydb = dbConnect(MySQL(), user='root', password='', dbname='student', host='localhost')

mydb

dbListTables(mydb)

dbListFields(mydb, 'ddl\_student')

rs = dbSendQuery(mydb, "select \* from ddl\_student")

rs

data = fetch(rs, n=-1)

data

**Output :**

> mydb = dbConnect(MySQL(), user='root', password='', dbname='student', host='localhost')

> mydb

<MySQLConnection:0,0>

> dbListTables(mydb)

[1] "ddl\_student" "dml\_student" "sample" "student\_data\_type" "student\_info"

> dbListFields(mydb, 'ddl\_student')

[1] "S\_no" "section" "Roll\_no" "maths" "python" "college" "dept"

> rs = dbSendQuery(mydb, "select \* from ddl\_student")

> rs

<MySQLResult:2,0,2>

> data = fetch(rs, n=-1)

> data

S\_no section Roll\_no maths python college dept

1 NA <NA> 208w1a12a0 98.50 99.0 vrsec <NA>

2 NA <NA> 208w1a1299 92.40 96.0 vrsec <NA>

3 NA <NA> 208w1a1291 100.98 99.9 vrsec <NA>

**Task – 03 :**

**Aim :** Load the CSV file into R and manipulate data inside csv.

**Program :**

getwd()

setwd("E:/venkat sai/rstudio\_language") # it will set the new directory location

getwd() # it will return the present location of working directory.

cdata <- read.csv("company.csv")

cdata

# Analyzing the CSV file

is.data.frame(cdata)

ncol(cdata)

nrow(cdata)

# getting the maximum salary from the csv file

sal <- max(cdata$salary)

sal

# getting the person details from the max salary

psal <- subset(cdata, salary == max(salary))

psal

temp = subset(cdata, dept == "IT")

temp

# Employess less than 600 in IT department

lesit = subset(cdata, salary < 600 & dept == "IT")

lesit

# Employess joined After 2014 Year

afyear = subset(cdata, as.Date(start\_date) > as.Date("2014-01-01"))

afyear

# Writing into CSV file

write.csv(afyear,"output.csv")

read.csv("output.csv")

**Output :**

> getwd()

[1] "C:/Users/SHREEE/OneDrive/Documents"

> setwd("E:/venkat sai/rstudio\_language") # it will set the new directory location

>

> getwd() # it will return the present location of working directory.

[1] "E:/venkat sai/rstudio\_language"

> cdata <- read.csv("company.csv")

> cdata

id name salary start\_date dept

1 1 Rick 623.30 2012-01-01 IT

2 2 Dan 515.20 2013-09-23 Operations

3 3 Michelle 611.00 2014-11-15 IT

4 4 Ryan 729.00 2014-05-11 HR

5 5 Gary 843.25 2015-03-27 Finance

6 6 Nina 578.00 2013-05-21 IT

7 7 Simon 632.80 2013-07-30 Operations

8 8 Guru 722.50 2014-06-17 Finance

> # Analyzing the CSV file

> is.data.frame(cdata)

[1] TRUE

> ncol(cdata)

[1] 5

> nrow(cdata)

[1] 8

> # getting the maximum salary from the csv file

> sal <- max(cdata$salary)

> sal

[1] 843.25

> # getting the person details from the max salary

> psal <- subset(cdata, salary == max(salary))

> psal

id name salary start\_date dept

5 5 Gary 843.25 2015-03-27 Finance

> temp = subset(cdata, dept == "IT")

> temp

id name salary start\_date dept

1 1 Rick 623.3 2012-01-01 IT

3 3 Michelle 611.0 2014-11-15 IT

6 6 Nina 578.0 2013-05-21 IT

> # Employess less than 600 in IT department

> lesit = subset(cdata, salary < 600 & dept == "IT")

> lesit

id name salary start\_date dept

6 6 Nina 578 2013-05-21 IT

> # Employess joined After 2014 Year

> afyear = subset(cdata, as.Date(start\_date) > as.Date("2014-01-01"))

> afyear

id name salary start\_date dept

3 3 Michelle 611.00 2014-11-15 IT

4 4 Ryan 729.00 2014-05-11 HR

5 5 Gary 843.25 2015-03-27 Finance

8 8 Guru 722.50 2014-06-17 Finance

> # Writing into CSV file

> write.csv(afyear,"output.csv")

> read.csv("output.csv")

X id name salary start\_date dept

1 3 3 Michelle 611.00 2014-11-15 IT

2 4 4 Ryan 729.00 2014-05-11 HR

3 5 5 Gary 843.25 2015-03-27 Finance

4 8 8 Guru 722.50 2014-06-17 Finance

**Task – 04 :**

**Aim :** load Excel file into R and do changes in data

**Program :**

install.packages("readxl")

library("readxl")

getwd()

setwd("E:/venkat sai/rstudio\_language")

getwd()

read\_excel("product\_list.xlsx")

# writing into an excel file

install.packages("writexl")

library("writexl")

x = 10:1

y = -4:5

q = c("Hockey","Football","Baseball","Curling","Rugby","Lacrosse","Basketball","Tennis","Cricket","Soccer")

theDF = data.frame(x,y,q)

theDF

write\_xlsx(theDF,"sports.xlsx")

**Output :**

> getwd()

[1] "E:/venkat sai/rstudio\_language"

> setwd("E:/venkat sai/rstudio\_language")

> getwd()

[1] "E:/venkat sai/rstudio\_language"

> read\_excel("product\_list.xlsx")

# A tibble: 4 x 2

Product Price

<chr> <dbl>

1 Refrigerator 1200

2 Oven 750

3 Dishwasher 900

4 Coffee Maker 300

> x = 10:1

> y = -4:5

> q = c("Hockey","Football","Baseball","Curling","Rugby","Lacrosse","Basketball","Tennis","Cricket","Soccer")

> theDF = data.frame(x,y,q)

> theDF

x y q

1 10 -4 Hockey

2 9 -3 Football

3 8 -2 Baseball

4 7 -1 Curling

5 6 0 Rugby

6 5 1 Lacrosse

7 4 2 Basketball

8 3 3 Tennis

9 2 4 Cricket

10 1 5 Soccer

> write\_xlsx(theDF,"sports.xlsx")

**Result** : Successfully completed the 4 tasks