Subject:	**R Programming Lab. (ITL804)**		
Class:	**BE IT / Semester – VIII (Rev-2016) / Academic year: 2019-20**		
Name of Student:	**Kazi Jawwad A Rahim**		
Roll No:	**28**	**Date of performance (DOP) :**	
Assignment/Experiment No:	**02**	**Date of checking (DOC) :**	
Title: Program to demonstrate data structures such as- vectors, matrix, list and data frames.			
Marks:		**Teacher's Signature:**	

1. Aim: To understand the use of vectors, matrix, list and data frames in R.

2. Prerequisites:

1. Basics of R programming.

3. Hardware Requirements:

1. PC with minimum 2GB RAM

4. Software Requirements:

1. Windows / Linux OS.
2. R version 3.6 or higher

5. Learning Objectives:

1. To understand vectors, matrix and lists.
2. To understand *data frames* which are mainly required for data analysis in R.

6. Learning Objectives Applicable: LO 1, LO 2

7. Program Outcomes Applicable: PO 1

8. Program Education Objectives Applicable: PEO 1, PEO 2

Vectors:

```
> x=c(1,2,3,4,5,6)
> x
[1] 1 2 3 4 5 6
> x=1:7
> x
[1] 1 2 3 4 5 6 7
```

Matrix:

```
A=matrix(nrow=2,ncol=3,data=c(9,2,1,7,5,4))
print(A)
B=t(A)
print(B)
print(A%*%B)
```

OUTPUT:

```
> source('G:/Practicals/R/EXP2/Second.R')
     [,1] [,2] [,3]
[1,]    9    1    5
[2,]    2    7    4
     [,1] [,2]
[1,]    9    2
[2,]    1    7
[3,]    5    4
     [,1] [,2]
[1,]  107   45
[2,]   45   69
```

List:

```
a=list(3,1,"Hello",4.1,TRUE,c(3,1,5),-3+4i)
print(a[[1]])
```

OUTPUT:

```
> source('G:/Practicals/R/EXP2/Second.R')
[1] 3
```

Data Frames:

```
fr=data.frame(1:3,c("Mahesh","Ganesh","Mangesh"),c(21,22,23))
colnames(fr)=c("Roll No.","Name","Age")
print(fr)
print(rownames(fr))
```

OUTPUT:

```
> source('G:/Practicals/R/EXP2/Second.R')
  Roll No.    Name Age
1        1  Mahesh  21
2        2  Ganesh  22
3        3 Mangesh  23
[1] "1" "2" "3"
```

Learning Outcomes Achieved:

1. We understood vectors, matrix and lists.
2. We understood *data frames* which are mainly required for data analysis in R.

Conclusion:

We have successfully demonstrated vectors, matrix, list and data frames in R.

13. Experiment/Assignment Evaluation

Experiment/Assignment Evaluation:				
Sr. No.	**Parameters**		**Marks obtained**	**Out of**
1	Technical Understanding (Assessment may be done based on Q & A **or** any other relevant method.) Teacher should mention the other method used -			6
2	Neatness/presentation			2
3	Punctuality			2
Date of performance (DOP)		**Total marks obtained**		**10**
Date of checking (DOC)		**Signature of teacher**		

References:

1. URL: https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf (Online Resources)
2. R Cookbook Paperback – 2011 by Teetor Paul O Reilly Publications
3. Beginning R: The Statistical Programming Language by Dr. Mark Gardener, Wiley Publications
4. R Programming For Dummies by Joris Meys Andrie de Vries, Wiley Publications

Viva Questions

1. What is vector in R ?
2. How to create matrix in R ?
3. What is difference between vector and list?
4. How is the data-frame different than matrix?
5. What is importance of data-frames in R?