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:	**01**	**Date of checking (DOC) :**	
Title: Program to demonstrate basic functionality of R such as- data types, characters, strings, factors, helps, accessing packages.			
Marks:		**Teacher's Signature:**	

1. Aim: To understand basics functionality of R software.

2. Prerequisites:

1. Basics of programming disciplines.

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 R software as a software development platform.
2. To understand elementary building blocks of R software such as- data types, character, string, factors, helps, packages.

6. Learning Objectives Applicable: LO 1

7. Program Outcomes Applicable: PO 1

8. Program Education Objectives Applicable: PEO 1

OUTPUT:

Data Types:

1)
```
x=5
mode(x)
>> numeric
```

2)
```
x=5.5
mode(x)
>> numeric
```

3)
```
x="Jawwad"
mode(x)
>> character
```

4)
```
x=TRUE
mode(x)
>> logical
```

5)
```
x=6+4i
mode(x)
>> complex
```

6)
```
x='Jawwad'
mode(x)
>> character
```

Relational Operators:

```
A=6     B=8
> A>B
[1] FALSE
> A>=B
[1] FALSE
> A<B
[1] TRUE
> A<=B
[1] TRUE
> A==B
[1] FALSE
> A!=B
[1] TRUE
```

Arithmetic Operators:

```
A=6     B=8
> A+B
[1] 14
> A-B
[1] -2
> A*B
[1] 48
> A/B
[1] 0.75
> A%%B
[1] 6
> A%/%B
[1] 0
```

Logical Operators:

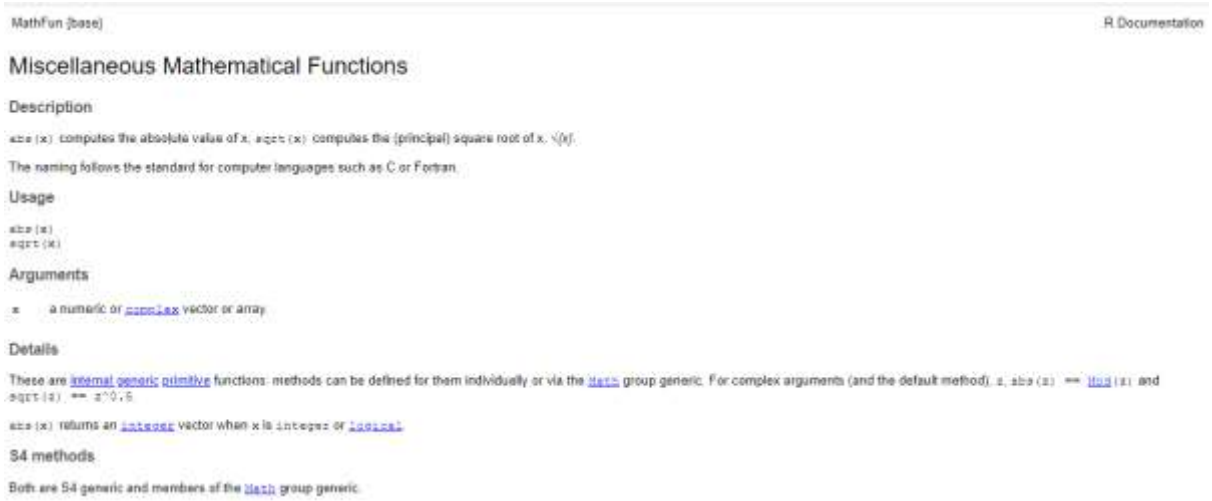
```
> A&B
[1] TRUE
> A&&B
[1] TRUE
> A||B
[1] TRUE
> A|B
[1] TRUE
```

Factors:

```
> d=c(4,1,6)
>
f=factor(d,levels=1:7,labels=c("Monday","Tuesday","Wednesday","Thursday","Friday","Saturday","Sunday
"))
> f[1]
[1] Thursday
Levels: Monday Tuesday Wednesday Thursday Friday Saturday Sunday
```

Help:

help(sqrt)



MathFun {base} R Documentation

Miscellaneous Mathematical Functions

Description

abs(x) computes the absolute value of x, sqrt(x) computes the (principal) square root of x, $\sqrt{x}$.

The naming follows the standard for computer languages such as C or Fortran.

Usage

```
abs(x)
sqrt(x)
```

Arguments

x a numeric or complex vector or array

Details

These are internal generic primitive functions: methods can be defined for them individually or via the Math group generic. For complex arguments (and the default method), z, abs(z) == Mod(z) and sqrt(z) == z^0.5.

abs(x) returns an integer vector when x is integer or logical.

S4 methods

Both are S4 generic and members of the Math group generic.

Packages:

```
> install.packages("rmeta")
```

Select mirror


```
> install.packages("rmeta")
--- Please select a CRAN mirror for use in this session ---
trying URL 'https://cran.asia/bin/windows/contrib/3.6/rmeta_3.0.zip'
Content type 'application/zip' length 112314 bytes (109 KB)
downloaded 109 KB

package 'rmeta' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\student\AppData\Local\Temp\RtmpSaFkbJ\downloaded_packages
```

Learning Outcomes:

1. We understood R software as a software development platform.
2. We understood elementary building blocks of R software such as- data types, character, string, factors, helps, packages.

Conclusion:

We have successfully demonstrated installation of R along with introduction to R and basic building blocks of 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 R?
2. How is R different than Python?
3. What are different data-types in R?
4. How to define a string in R?
5. What is factor data class in R?
6. How to take help in R?
7. How to load packages and libraries in R?