



<b>Subject:</b>	<b>R Programming Lab. (ITL804)</b>		
<b>Class:</b>	<b>BE IT / Semester – VIII (Rev-2016) / Academic year: 2019-20</b>		
<b>Name of Student:</b>	<b>Kazi Jawwad A Rahim</b>		
<b>Roll No:</b>	<b>28</b>	<b>Date of performance (DOP) :</b>	
<b>Assignment/Experiment No:</b>	<b>01</b>	<b>Date of checking (DOC) :</b>	
<b>Title:</b> Program to demonstrate basic functionality of R such as- data types, characters, strings, factors, helps, accessing packages.			
<b>Marks:</b>		<b>Teacher's Signature:</b>	

**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	4)	x=TRUE mode(x) >> logical
2)	x=5.5 mode(x) >> numeric	5)	x=6+4i mode(x) >> complex
3)	x="Jawwad" mode(x) >> character	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)
```




The screenshot shows the R Documentation page for the `sqrt` function. The page title is "Miscellaneous Mathematical Functions". The description states: "sqrt(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." The usage section shows: "sqrt(x)" and "sqrt(x)". The arguments section states: "x a numeric or complex vector or array." The details section explains that these are S4 generic functions, with methods defined individually or via the `sqrt` group generic. It also notes that `abs(x)` returns an integer vector when x is integer or logical, and that there are 54 methods in total, all members of the `sqrt` group generic.

### Packages:

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

Select mirror



The screenshot shows the R console output for the command `install.packages("rmeta")`. It displays the selection of a CRAN mirror (OzCloud), the URL for the package, the content type, the length (112314 bytes), and the download status (109 KB). It then shows the package being successfully unpacked and MD5 sums checked. Finally, it displays the path where the downloaded binary packages are stored: `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 <u>or</u> 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?