# SNS COLLEGE OF TECHNOLOGY

*(An Autonomous Institution)*
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*Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &*
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## UNIT II

R is a flexible and powerful open-source implementation of the language S (for statistics) developed by John Chambers and others at Bell Labs.

### Why R?

Five reasons to learn and use R:

- ✓ R is open source and completely free. R community members regularly contribute packages to increase R's functionality.
- ✓ R is as good as commercially available statistical packages like SPSS, SAS, and Minitab.
- ✓ R has extensive statistical and graphing capabilities. R provides hundreds of built-in statistical functions as well as its own built-in programming language.
- ✓ R is used in teaching and performing computational statistics. It is the language of choice for many academics who teach computational statistics.
- ✓ Getting help from the R user community is easy. There are readily available online tutorials, data sets, and discussion forums about R.

### R uses:

- ✓ R combines aspects of functional and object-oriented programming.
- ✓ R can use in interactive mode
- ✓ It is an interpreted language rather than a compiled one.
- ✓ Finding and fixing mistakes is typically much easier in R than in many other languages.

### R Features:-

- ✓ Programming language for graphics and statistical computations
- ✓ Available freely under the GNU public license

### First R program: Using R as calculator:

R commands can run in two ways:

1) Type at console and press enter to see the output. Output will get at console only in R studio.

2) Open new R Script file and write the command, keep the curser on the same line and press Ctrl+enter or click on Run. Then see the output at console along with command.

### At console:

R as a calculator, typing commands directly into the R Console. Launch R and type the following code, pressing

< Enter > after

each command.

Type an

expression on

console. **R -**

**Assignment**

**Operators:**

<- or = for assignment and == to test equality.

At the outer sider <- and = can be used similar. But we should be careful while using them in combined. In precise '<-' is prioritized than '=' . The operators <- and = assign into the environment in which they are evaluated. The operator <- can be used anywhere, whereas the operator = is only allowed at the top level (e.g., in the complete expression typed at the command prompt) or as one of the subexpressions in a braced list of expressions.

```
x <- y <- 5
x = y = 5
x = y <- 5
x <- y = 5
# Error in (x <- y) = 5 : could not find function "<-<-"
```

Example Exercise1:

> **> 2 * 2  ## Multiplication**
[1] 4
> **> 2 / 2     ## Division**
[1] 1
> **> 2 + 2  ## addition**
> **[1] 4**
> **> 2 – 2  ## subtraction**
> **[1] 0**
> **> 2 ^ 2  ## exponentiation**

> Certain variable names are reserved for particular purposes. Some reserved symbols are: **c q t C D F I T**
> ### meaning of c q t C D F I T
> ?     ## to see help document
> ?c   ## c means Combine Values into a Vector or List
> ?q   ## q means Terminate an R Session
> ?t   ## t means Matrix Transpose
> ?C   ## C means sets contrast for a factor
> ?D   ##  D means Symbolic and Algorithmic Derivatives of Simple Expressions
> ?F   ## F means logical vector Character strings
> c("T", "TRUE", "True", "true") are regarded as true, c("F", "FALSE", "False", "false") as false, and all others as NA.
> >F    ##[1] FALSE
> ?I    ##Inhibit Interpretation/Conversion of Objects

> Working on
  variables:
  Operators in R:

>

| Table - Arithmetic operators | | Table. Logical operators | |
| --- | --- | --- | --- |
| **Operator** | **Description** | **Operator** | **Description** |
| **+** | Addition | **<** | less than |
| **-** | Subtraction | **<=** | less than or equal to |
| ***** | Multiplication | **>** | greater than |
| **/** | Division | **>=** | greater than or equal to |
| **^ or \*\*** | Exponentiation | **==** | exactly equal to |
| **x %% y** | modulus (x mod y) 5%%2 is 1 | **!=** | not equal to |
| **x %/% y** | integer division 5%/%2 is 2 | **!x** | Not x |
| | | **x \| y** | x OR y |
| | | **x & y** | x AND y |
| | | **isTRUE(x)** | test if X is TRUE |