# R-Introduction:

## *Definition:*

- R is an interpreted programming language used to analyze statistical information**,** graphical representation**,** reporting**,** and data modeling**.**
- R is the implementation of the S programming language, which is combined with lexical scoping semantics**.**
- Its most common use is to analyze and visualize data. R generally comes with the Command-line interface.

## *Evolution of R:*

- R programming language was designed by Ross Ihaka and Robert Gentleman at the University of Auckland, New Zealand.
- The *R Development Core Team* currently develops R.

## *Why R programming Language:*

- R programming is an open-source free language which is currently one of the most requested programming languages in the Data Science job market.
- R is a platform-independent language and it is used as a leading tool for machine learning, statistics, and data analysis.
- R programming language allows us to integrate with other languages (C, C++) and it has a vast community of users and it's growing day by day.

## *Advantages of R:*

- R programming is platform independent which runs on any operating systems.
- In R, everyone is welcome to provide new packages, bug fixes, and code enhancements.

## *Disadvantages of R:*

- In the R programming language, the standard of some packages is less than perfect.
- Although, R commands give little pressure to memory management. So R programming language may consume all available memory.

### ***Applications of R:***

- We use R for Data Science.
- R is used by many quantitative analysts as its programming tool.
- Tech giants like Google, Facebook, bing, Accenture, Wipro and many more using R nowadays.

## R installation:

R programming is a very popular language and to work on that we have to install two things, i.e., R and RStudio. R and RStudio work together to create a project on R.

### ***Installation of R:***

1. First, we have to download the R setup from https://cloud.r-project.org/bin/windows/base/.
2. When we click on Download R for windows, our downloading will be started of R setup. Once the downloading is finished, we have to run the setup of R in the following way:
   - Select the path where we want to download the R and proceed to Next.
   - Select all components which we want to install, and then we will proceed to Next**.**
   - In the next step, we have to select either customized start-up or accept the default, and then we proceed to Next.
   - When we proceed to next, our installation of R in our system will get started.
   - In the end, we will click on finish to successfully install R in our system.

### ***Installation of RStudio:***

1. First, we have to visit the RStudio official site. (https://rstudio.com/products/rstudio/download/)
2. Select the RStudio desktop for open-source license and click on download.
3. Select the appropriate installer and download it. Once the downloading is finished, we have to run the setup of R in the following way:
   - Click on Next on the welcome page.
   - Click on Install.

- Click on Finish.

4. Now, RStudio is ready to work.

# some basic commands and output:

## *Mathematical Functions:*

| FUNCTION | | INPUT | OUTPUT |
|---|---|---|---|
| abs(x) | | abs(-10) | 10 |
| log(x, base=y) | | log(100, base=10) | 2 |
| exp(x) | | exp(5) | 148.4132 |
| sqrt(x) | | sqrt(25) | 5 |
| factorial(x) | | factorial(3) | 6 |
| pi | | pi | 3.141593 |

## *Logical Functions:*

| FUNCTION | | INPUT | OUTPUT |
|---|---|---|---|
| Greater than | | 5>6 | FALSE |
| Less than | | 4<5 | TRUE |
| Less than and Equal to | | 12<=10 | FALSE |
| Greater than and Equal to | | 19>=15 | TRUE |
| Equal to | | 7==8 | FALSE |
| Not equal to | | 13!=14 | TRUE |
| AND | | 3 & 4 | TRUE |
| OR | | 3 \| 4 | TRUE |
| NOT | | !3 | FALSE |

## *Other Functions:*

| FUNCTION | | INPUT | OUTPUT |
|---|---|---|---|
| Colon (:) | | 1:6 | 1 2 3 4 5 6 |
| %in% | | 5 %in% 6<br>5 %in% 5 | FALSE<br>TRUE |