Class 1

R - Overview and its importance

R – Programming Language

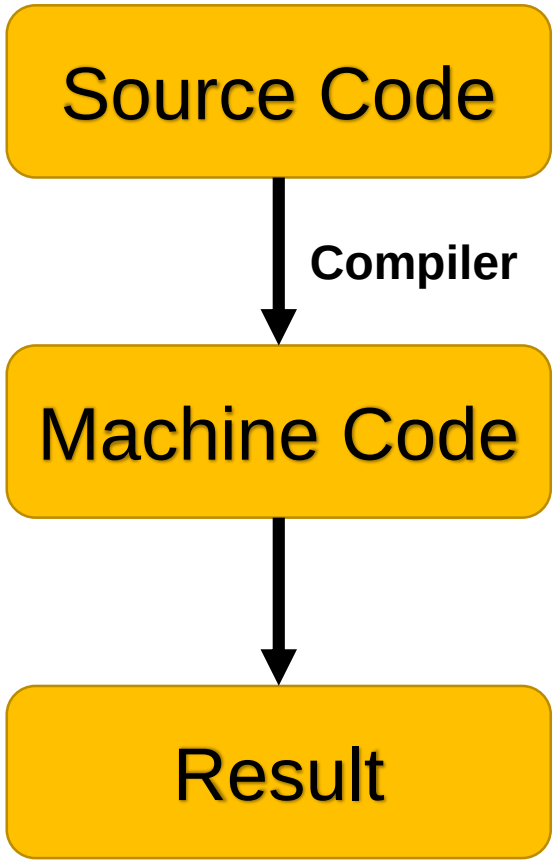
- Created by
  - Ross Ihaka and Robert Gentleman

    -University of Auckland, New Zealand
- Currently it's maintained by "R Development core Team".
- Freely available under GNU General Public licence
- Available for multiple operating systems i.e. Windows, Unix and Mac
- R → Implementation of S program with static scoping.

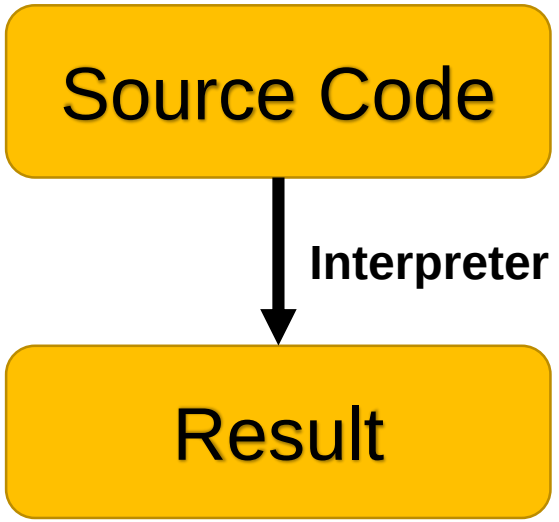
R – Programming Language

- It provides a software environment to analyse statistical data, data modelling, report and graphical representation.
- Support mixture of programming paradigms.
- Interpreted programming language.
- For improving the efficiency, R allows integration with the procedures written in C, C++, .Net, Python, FORTRAN languages.
- Object oriented programming

Interpreted Programming Language

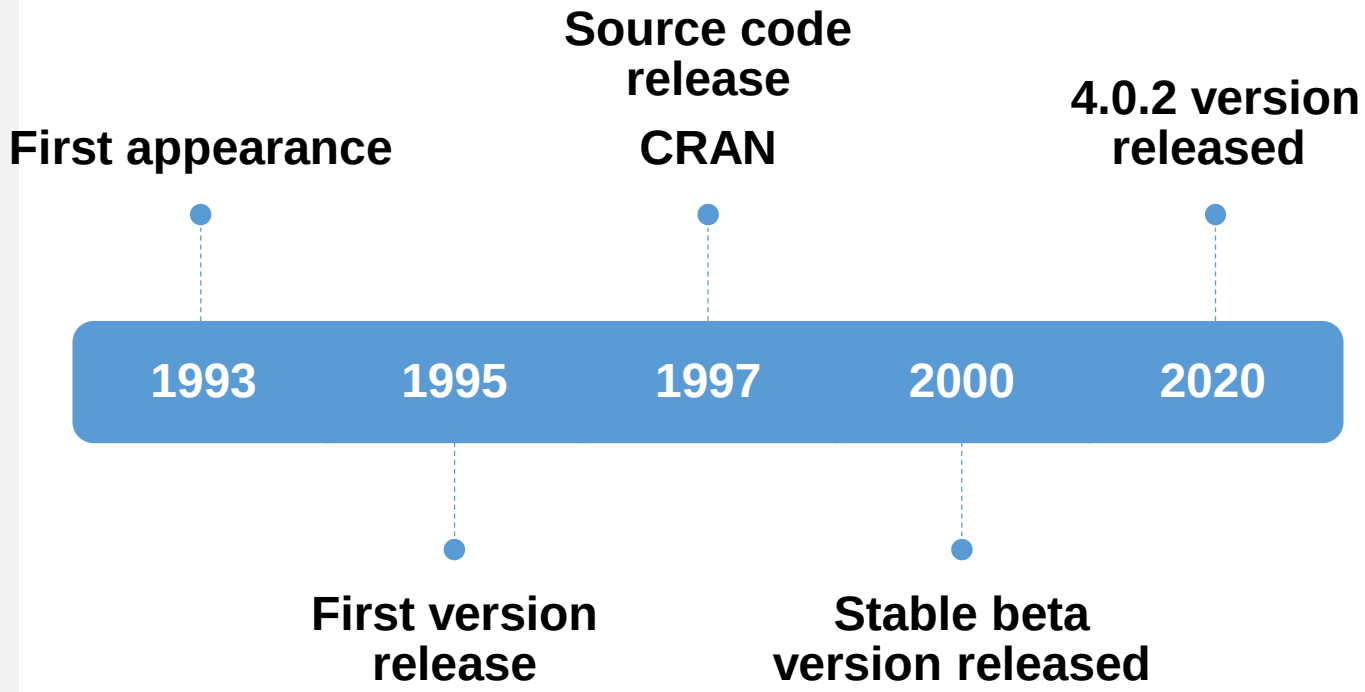


Example. C



Example. Python

History


First appearance
Source code release
CRAN
4.0.2 version released
1993
1995
1997
2000
2020
First version release
Stable beta version released

R Project Home page

https://www.r-project.org/

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Help With R

The R Project for Statistical Computing

Getting Started

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To **download R**, please choose your preferred CRAN mirror.

If you have questions about R like how to download and install the software, or what the license terms are, please read our answers to frequently asked questions before you send an email.

News

- **R version 4.0.2 (Taking Off Again)** has been released on 2020-06-22.
- useR! 2020 in Saint Louis has been cancelled. The European hub planned in Munich will not be an in-person conference. Both organizing committees are working on the best course of action.
- **R version 3.6.3 (Holding the Windsock)** has been released on 2020-02-29.
- You can support the R Foundation with a renewable subscription as a supporting member

News via Twitter

The R Foundation Retweeted

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Check out our plans for virtual #useR2020 📽️
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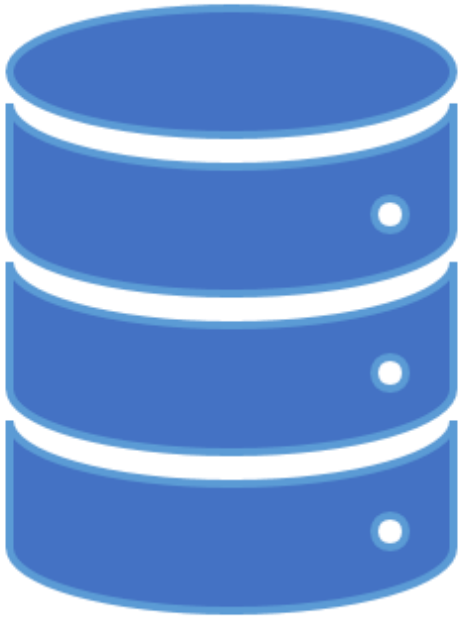
https://twitter.com/useR2020stl/status/1273682555485782019



Features

- Interpreted programming language
- Open-source
- Graphic techniques
- Different operators
- Simple
- Easy for data analysis
- Well designed
- Complex operation by using vectors
- Data handling

Why R?

- While running a task, user can link C, C++, and Fortran code for better operations.
- Big data handling
- More useful for statistical data analysis
- Lot of Packages
- Data representation

Advantages of R

Platform Independent

- Code will run on all operating systems.
- Write once execute any OS
- Ex. Windows, Linux, Mac

Free Software / Open Source

- Completely free under GNU licence.
- No need to pay any money.
- Anyone can contribute to develop new packages, resolving issues and modifying existing packages in R.

Data Wrangling

- Transforming unorganized data into organized data
- Example packages for this operation: *tidyverse, dplyr, readr*

Statistics

- Pre-dominant than other programming languages.
- *Lingua franca* of statistical analysis.
- Statistical packages

ML (Machine Learning) Operations

- Provides machine learning operations such as classification and regression.
- Used for developing neural networks.

Array of packages

- More than 10000 packages available in the CRAN site.
- Variety of packages

Quality plotting and Graphing

- Facilitates better plotting and high quality graphics
- Lots of packages (Ex. gplots, ggplot2)

Continuous development

- Constantly evolving
- Updates

Disadvantages of R

Weak Origin

- Origin from ‘S’ Programming Language
- It doesn’t support dynamic and 3D graphics
- Possible to create dynamics and 3D graphics through ggplot2 and other packages

Security

- Less security
- Not able to embed with web-application
- Other programming like python having more security features

Complicated language

- Not that much easy compare than other programming language
- Learner needed prior knowledge on programming concepts

Speed

- Execution speed less than other programming language

Data Handling

- Physical memory stores the objects
- R utilizes more memory
- Entire data should be in one single place (memory).

  This is not suitable for handling big data

Applications of R

Banking

Finance

Healthcare

Social Media

Manufacturing