Introduction

Course Info

Components

- Lectures
- Exercises
- Lab Exercises

Syllabus

- Introduction to R
- Univariate data
- Bivariate data
- Multivariate data
- Discrete random data
- Continuous random data
- Law of large numbers (LLM) and central limit theorem (CLT)
- Confidence interval estimation
- Hypothesis testing
- Two-sample tests
- Chi square tests
- Regression analysis
- Multiple linear regression
- Analysis of variance

Materials

- **Book: Verzani,** John Simple R
- **Course Web Site:** moodle
- **Software:** R
- **IDE:** R Studio

Why we learn statistics with R?

R:
- is free and open-source programming language
- runs on UNIX, Windows and Macintosh
- is widely used in academia
- is interactive /results can be seen one command at a time/
- has an excellent built-in help system
- is powerful and easy to learn
- has many built in statistical functions

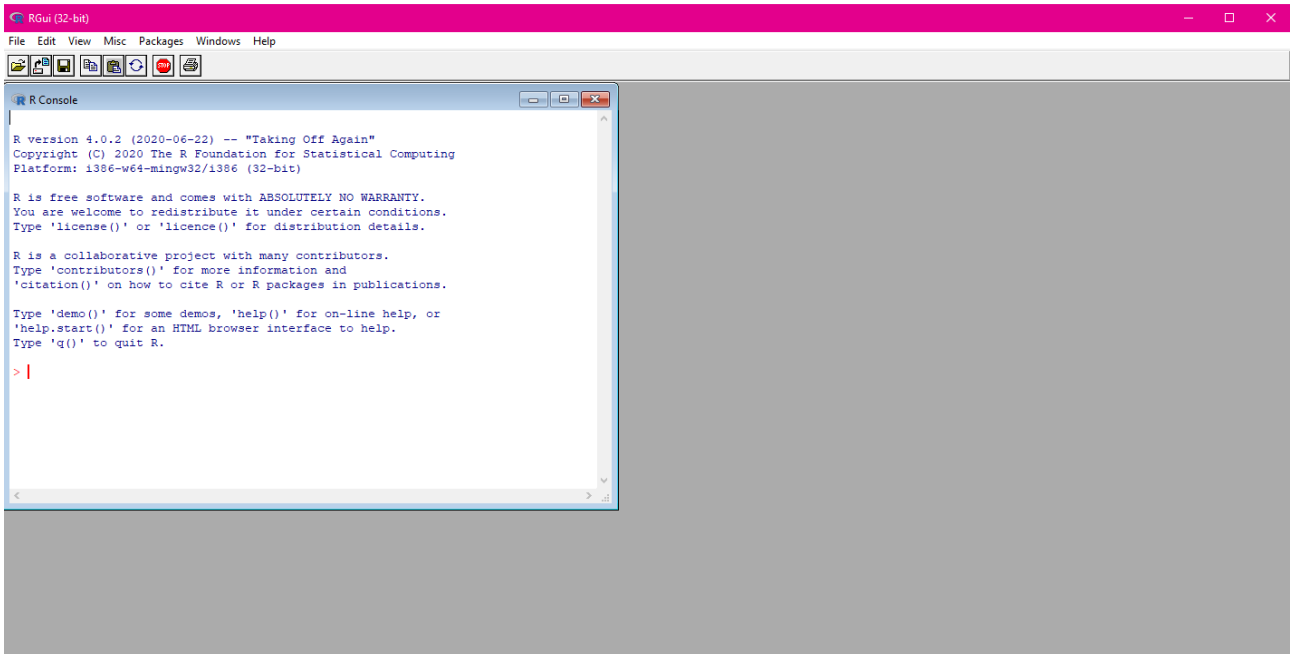
Why is it called R?

- Created in Aug 1993 by Ross Ihaka and Robert Gentleman at the University of Auckland, New Zealand
- There was a language called S created by John Chambers in 1976, at Bell Labs

- So the name R came from the first letters of the names of the creators of the language and as a play with the name of S

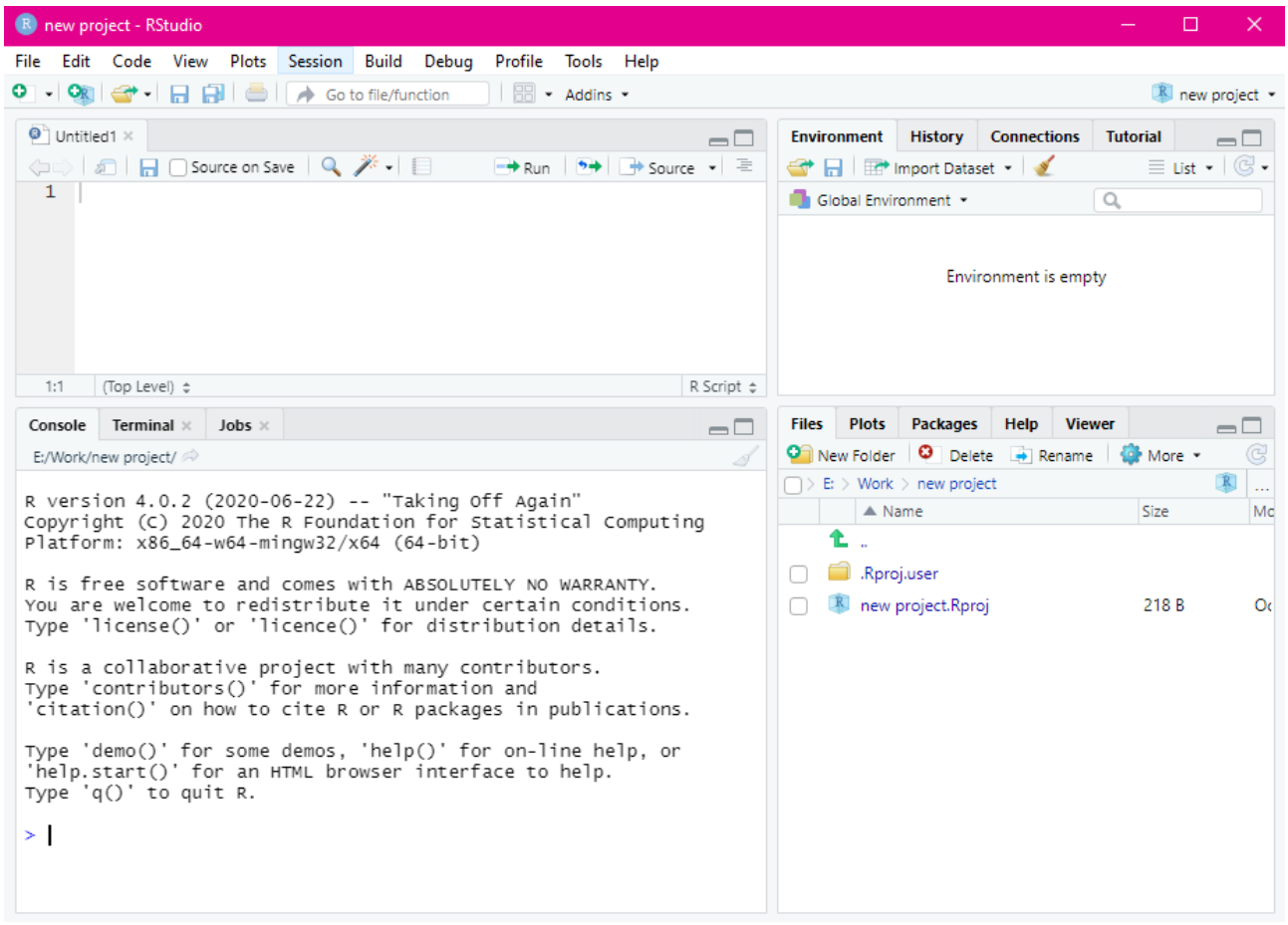
R Console

You can download and install R from here.
If you have any problem with the installation you can refer to: for the Windows users, for the Ubuntu users, for the Mac users.
After the installation you must see something similar to this:



Commands are written after the prompt “>”.
Shortcuts:
- Enter – run a command
- Up Arrow – give the previous written command
- Esc – interrupt a command

R Studio
After installing R, you can install the free version of R Studio IDE from here.
If you have any problems with the installation you can refer to: for the Windows users, for the Ubuntu users, for the Mac users.
After the installation you must see something similar to this:



R Studio is customizable, but in the begging the interface is separated in 4 panels in which we have:

- Upper Left panel
  - **Text editor** – here you write your code
- Lower Left panel
  - **Console** – the commands are executed here and the output is printed
- Upper Right panel
  - **Environment** – contains interactive list of loaded R objects
  - **History** – containing the executed commands
- Lower Right panel
  - **Files** – shows the files in your working directory
  - **Plots** – output location for plots
  - **Packages** – list of installed packages
  - **Help** – output location for help commands and help search window

Shortcuts

- Ctrl + Enter – Run current line
- Ctrl + Shift + S – Run an entire file of code
- Ctrl + Z – Undo
- Ctrl + Shift + Z – Redo
- Ctrl + D – Delete Line
- Ctrl + 1 – Moves the cursor to the text editor area
- Ctrl + 2 – Moves the cursor to the console area
- Alt + Shift + K – Shows keyboard shortcut reference

Sources

[1] Monika Petkova's notes on R programming language @ FMI, Sofia University