UNIVERSITY OF PORTSMOUTH

R for Data Analysis

Introduction to R

(TB2 - Week 6)

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What we will learn this week?

- Introduction to R
  - What is R?
  - Installing R
  - Basic of R

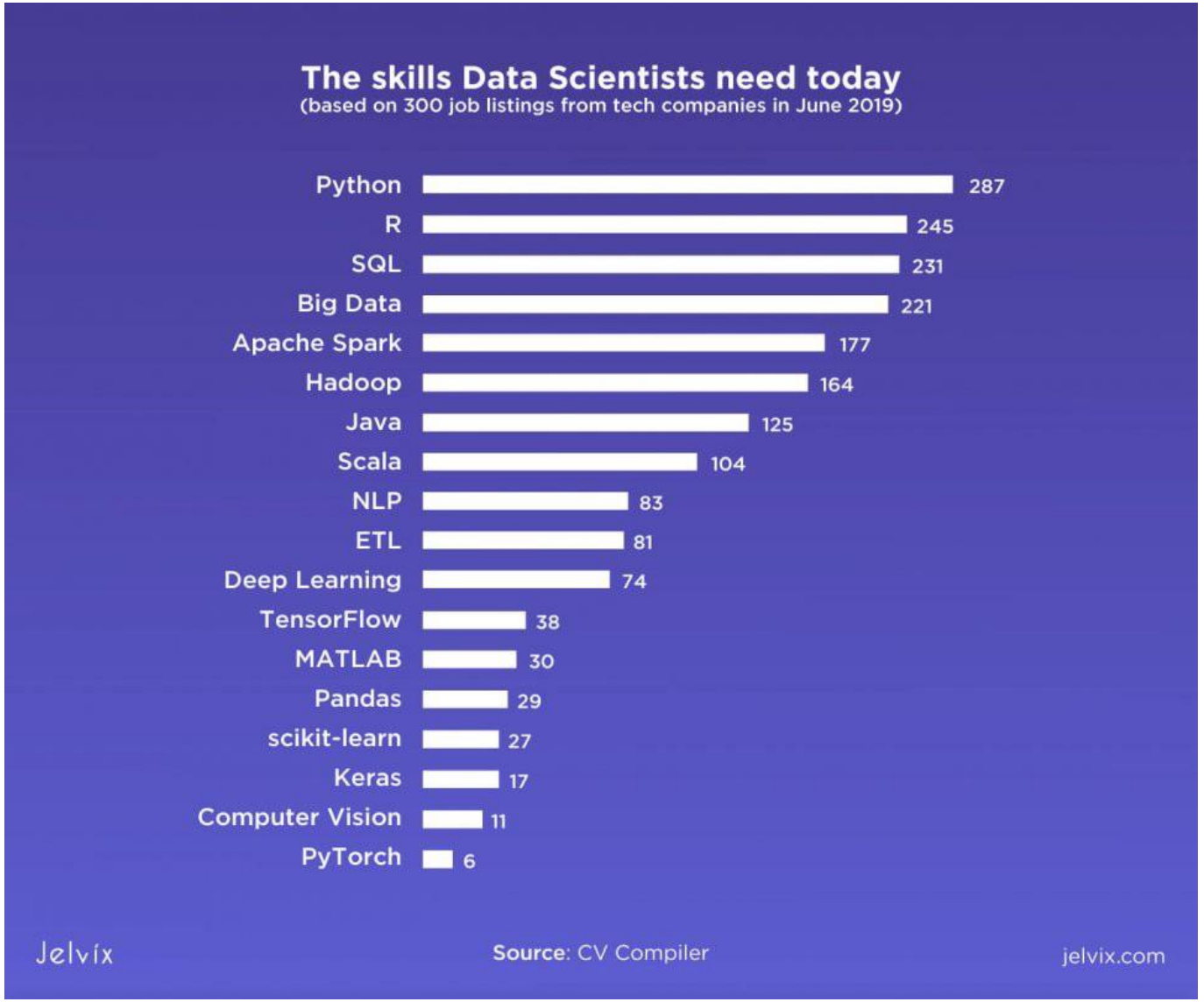
What is R?

- R is a language and environment for statistical computing and graphics.
  - R is open source and free, also the packages are free
- R provides a wide variety of statistical (linear and nonlinear modelling, classical statistical tests, time-series analysis, classification, clustering, …) and graphical techniques, and is highly extensible.
- One of R's strengths is the ease with which well-designed publication-quality plots can be produced, including mathematical symbols and formulae where needed.

What is R? (cont.)

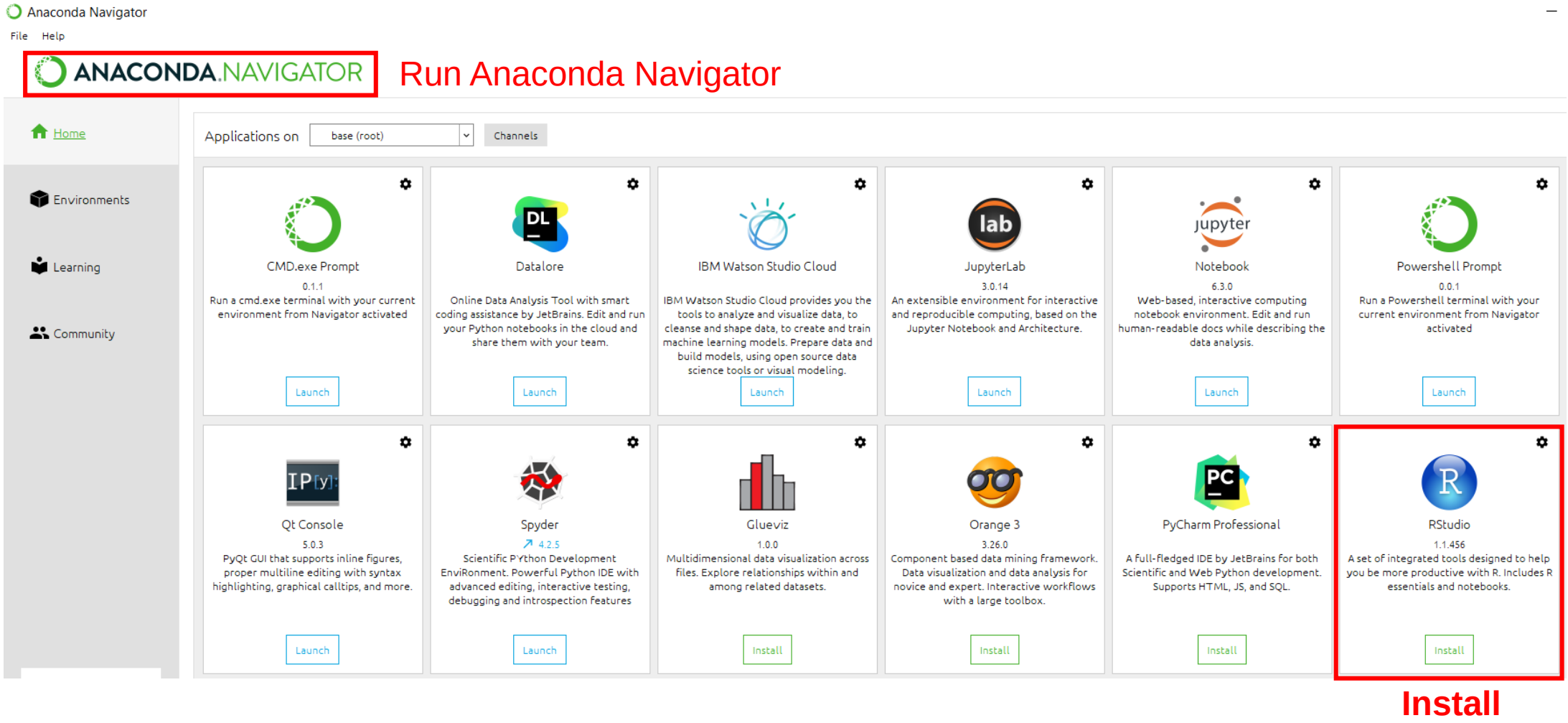
- R is an integrated suite of software facilities for data manipulation, calculation and graphical display. It includes:
  - an effective data handling and storage facility,
  - a suite of operators for calculations on arrays, in particular matrices,
  - a large, coherent, integrated collection of intermediate tools for data analysis,
  - graphical facilities for data analysis and display either on-screen or on hardcopy,
  - a well-developed, simple and effective programming language which includes conditionals, loops, user-defined recursive functions and input and output facilities.

What is R? (cont.)



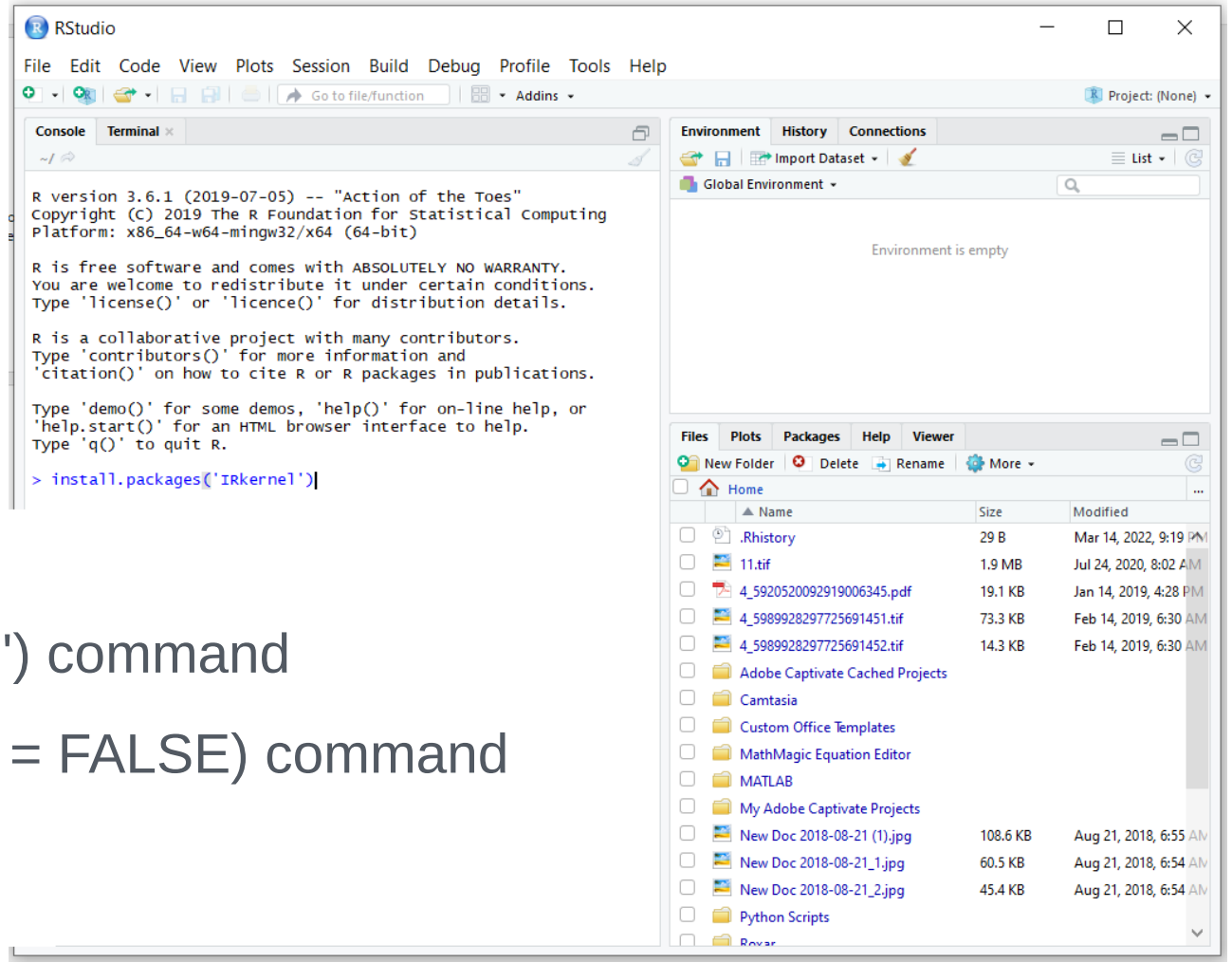
- Ref: https://medium.com/javarevisited/best-11-data-science-programming-languages-in-2020

Installing R



- Alternatively you can download Rstudio from: https://www.rstudio.com/products/rstudio/download/

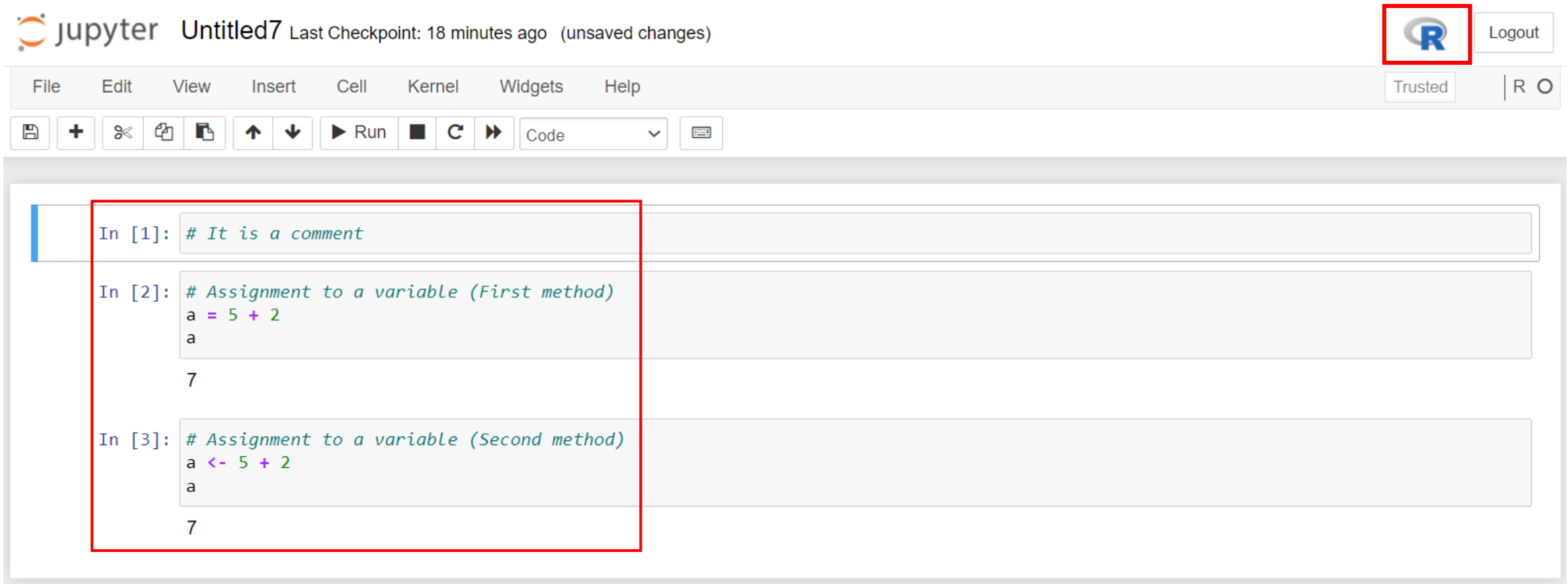
Installing R (cont.)



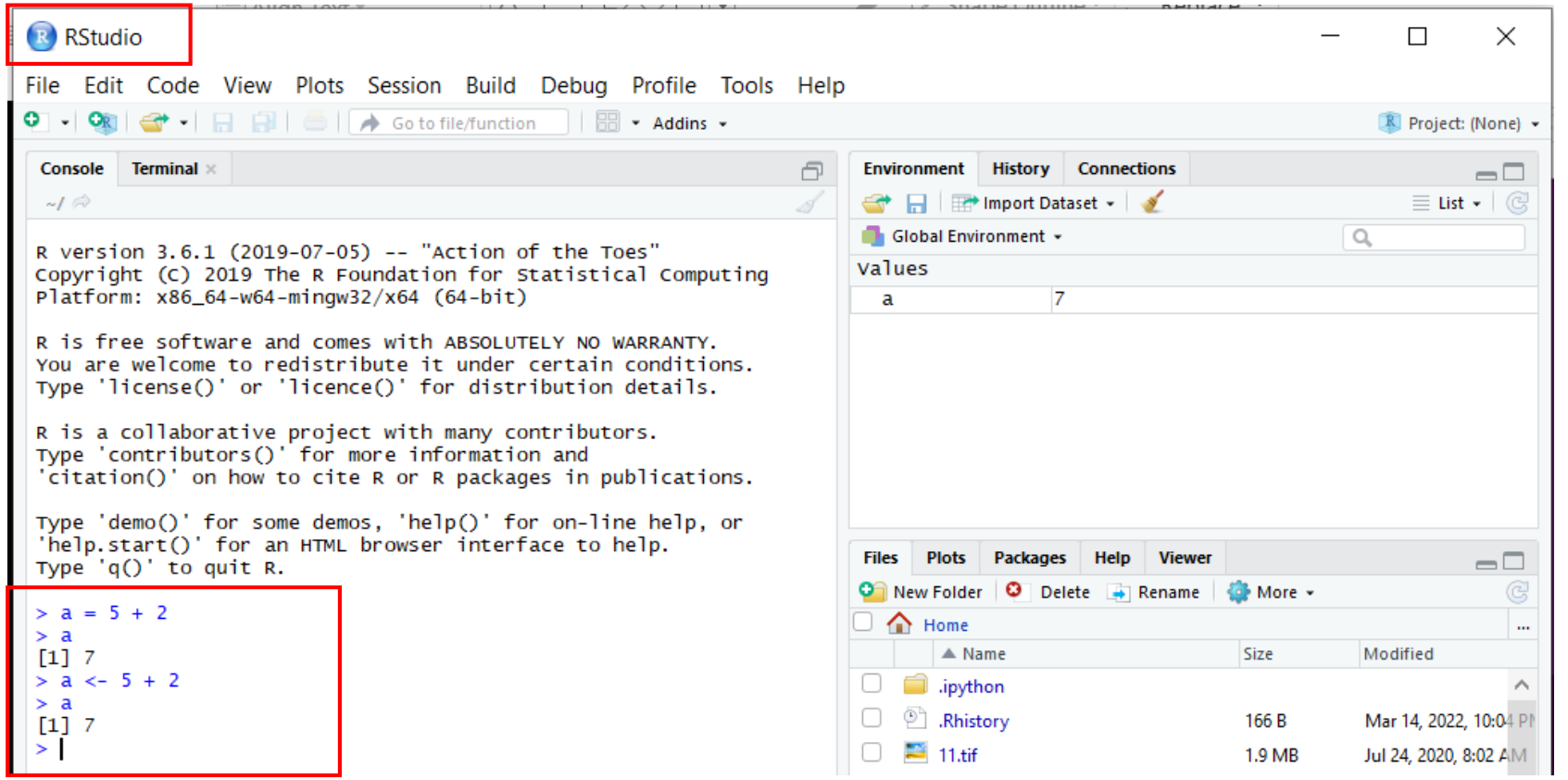
- Run RStudio
- Execute install.packages('IRkernel') command
- Execute IRkernel::installspec(user = FALSE) command

Installing R (cont.)
Running Jupyter Notebook with R

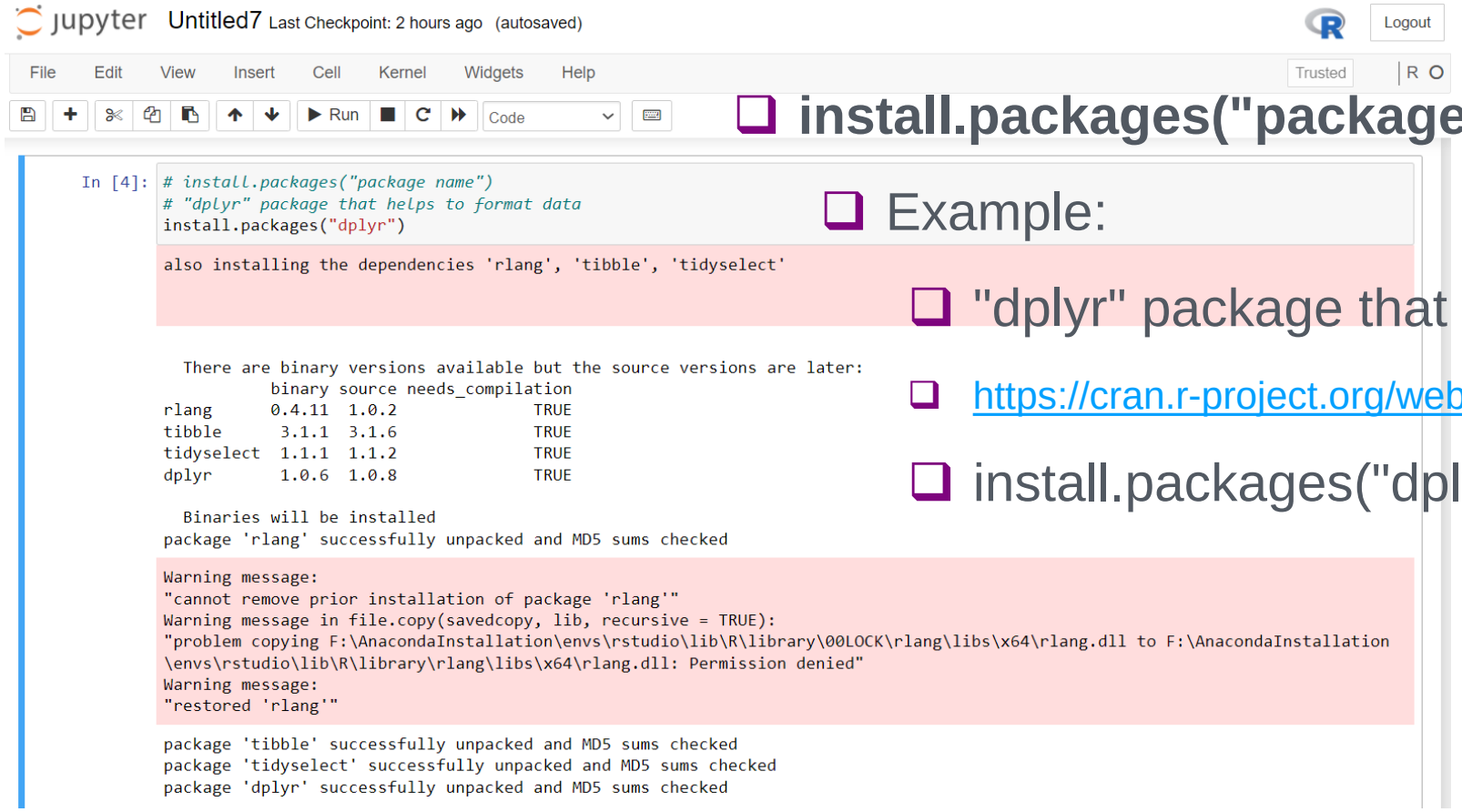
Basic of R
Jupyter



Basic of R (cont.)
RStudio

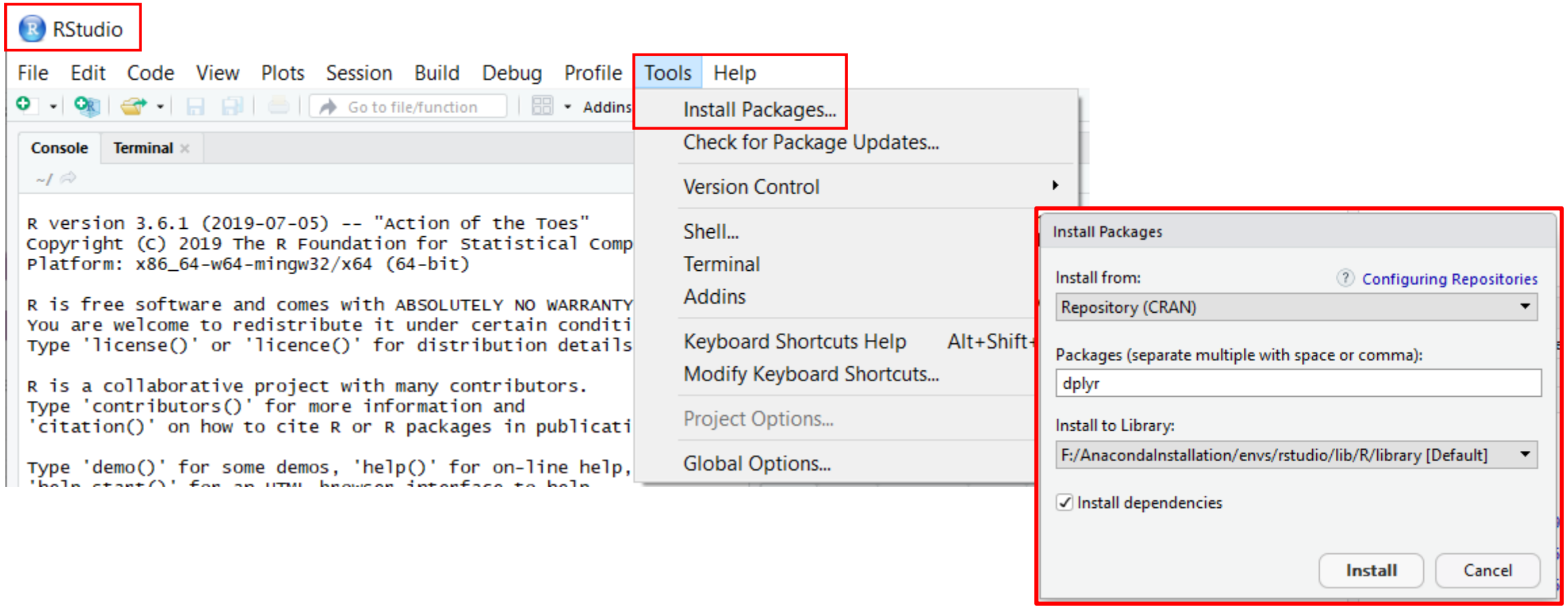


Basic of R (cont.)
Installing Packages / Jupyter



- install.packages("package name")
- Example:
  - "dplyr" package that helps to format data
  - https://cran.r-project.org/web/packages/dplyr/vignettes/dplyr.html
  - install.packages("dplyr")

Basic of R (cont.)
Installing Packages / RStudio



Basic of R (cont.)
Arithmetic with R

- Following arithmetic operators are the basic forms of Math calculation with R:
  - Addition: +
  - Subtraction: -
  - Multiplication: *
  - Division: /
  - Exponentiation: ^
  - Modulo: %%
  - sqrt(a) # *'a is a variable or a number'*
- **Try some examples with these operators.**

Basic of R (cont.)
Practical Sheet

- There are some examples on practical sheet:
  - Basic commands
  - Assigning values (= -> <-)
  - Sequences
  - Math operators
  - Data Types (Numeric, Character, Logical, typeof() function)

References & More Resources

- References:
  - Learning R:

    https://www.linkedin.com/learning/learning-r-2/

  - R Programming in Data Science: Setup and Start

    https://www.linkedin.com/learning/r-programming-in-data-science-setup-and-start/

  - To use LinkedinLearning, you can log in with your university account:

    https://myport.port.ac.uk/study-skills/linkedin-learning

Practical Session

- Install R.
- Try installing packages (Jupyter and Rstudio).
- Try different examples with arithmetic operators (Slide 13).
- Open the practical file, run the commands in Jupyter and Rstudio.