

Lecture I-I: Introduction to R

BTBI3008I

統計應用方法

2025/2/19

R programming language

- <https://cran.r-project.org/>
- Technically a programming language, developed specifically for analyzing data

Getting started with R

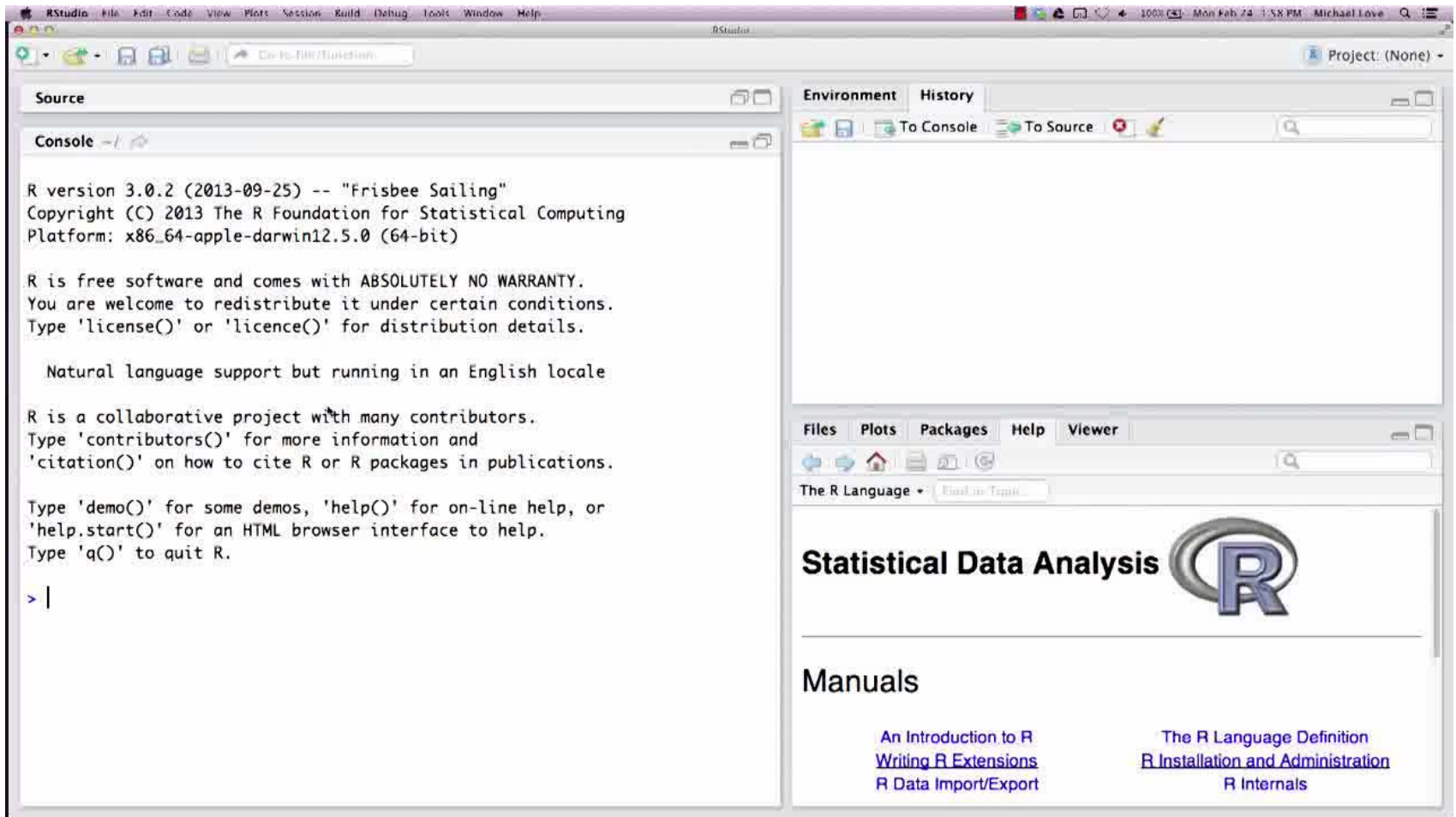
- Installing R
 - Installing R on Windows:
<https://github.com/genomicsclass/windows/>
 - Installing R on Mac: <http://youtu.be/lcawuhf0Yqo>
- Installing RStudio
 - A program for viewing and running R scripts.
 - Technically you can run all the codes without installing RStudio
 - But we highly recommend this integrated development environment (IDE)
 - Instruction:
<https://www.rstudio.com/products/rstudio/download/>

- Learn R basics
 - Package `swirl` (<http://swirlstats.com/>) tutorial:
 - `RMD_example 01-1.1`
 - 「Taiwan R User Group」的「R軟體教學影片」：
<https://taiwanrusergroup.github.io/DSC2014Tutorial/>
 - Quick-R: <http://www.statmethods.net/>
 - DataCamp: R courses
<https://www.datacamp.com/courses/free-introduction-to-r>
 - edX: Introduction to R Programming
<https://www.edx.org/course/introduction-r-programming-microsoft-dat204x-0>

RStudio

- RStudio has four panels
 - the source
 - the console
 - the environment or history panel, and
 - the fourth panel for help and plots and others, depending on which tab you click.
- In order to run a command from the Source panel, you can either click the button Run or you can use the keyboard shortcut Control-Enter.
- Can create and compile R Markdown, R Sweave format files.

RStudio- intro video



R Markdown

- Provide an authoring framework to both
 - save and execute code
 - generate high quality reports to be shared with an audience
- Introduction: <https://vimeo.com/178485416>
- Installation (in R)
 - `install.packages("rmarkdown")`
- Get started: <http://rmarkdown.rstudio.com/lesson-1.html>

The R ecosystem

- When downloading R from CRAN you get what “base” R
 - Include several functions considered fundamental for data analysis
 - Include several example datasets
 - Examples to use these functions and datasets:
RMD_example 01-1.2
 - Collect functions for specific purposes as “packages”, also called “libraries”

Installing R packages

- Besides base functions, CRAN has over 4,000 packages that are not included in the base installation
- Use `install.packages` function to install these packages
- Example to install R packages: `RMD_example 01-1.3`

Help / Comments

- In R, to get help for a function using `help` or `?`
 - `?install.packages`
 - `help("install.packages")`
- The hash character represents comments, so text following these characters is not interpreted
 - `# This is just a comment`

Importing data into R

- Working directory
 - the directory or folder in which R will save or look for files by default
- Know your working directory
 - `getwd()`
- Change your working directory
 - `setwd("C:/Users/USER/Documents")`
 - through RStudio by clicking on “Session”
- You can read and write to the working directory. However, you can also type the **full path**.

- Start a project in RStudio
 - In RStudio, click on “File” and “New Project”. When creating the project, you will select a folder to be associated with it.
 - You can then download all your data and save all your created R script, R Markdown, ... files into this folder.
 - Your working directory will be this folder.

Mathematics in R Markdown

- In side a text chunk of R markdown, you can use mathematical notation if you surround it by dollar signs $\$$ for “inline mathematics” and $\$ \$$ for “displayed equations”.
- The mathematical typesetting is based on LaTeX, so if you need to search for the way to make a particular symbol, include latex in your search. But note: Not all LaTeX macros are available without using additional packages.
- Example to include math in R Markdown:
[RMD_example 01-1.4](#)