Reproducible data treatment with R

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Objectives of the class

The goal of this class is that at the end, the students are able to:

- Treat their data with the free and open source language **R**, *i.e.*:
  - Read, browse, manipulate and plot their data
  - Model or simulate their data
- Make automatic reporting through **Rmarkdown** and/or **Jupyter notebooks**
- Build a graphical interface with **Shiny** to interact with their data and output something (a value, a pdf report, a graph...)

Prerequisites

- Coding skills: none expected
- The students should come with a laptop with admin rights (should be able to install stuff)

Format

- 6 slots of interactive course
- Final project : 4 slots

Details

1. Introduction to R (*4 slots*)
    1. Installing R and R Studio
    2. Learning the basics
        1. Installing packages
        2. Variables, vectors, matrices, data frames, lists...
        3. `If then else`, `for`, `while`, and how to avoid it (`apply` & co.)
        4. Functions
    3. Plotting using base graphics
    4. Plotting using `ggplot2`
    5. Fitting and modeling data
2. Introduction to `Rmarkdown` (*1 slot*)
    2. Basics of `Rmarkdown`
    3. Example of full data treatment and automatic reporting
3. Building a graphical interface with `Shiny` (*1 slot*)
4. Projects (*4 slots*)