R4DS - Unit 1: Tidyverse

UNIVERSITA' DEGLI STUDI DI MILANO BICOCCA

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Outline and main concepts

- The objective of this course is to introduce a set of effective and modern tools for data science, version-control and R packages' development.

- At the beginning of this class, I will briefly mention a set of (**opinionated**) views that may improve your experience when developing R code.

- The examples are based on the Rstudio IDE (version 2022.7.2.576), but similar considerations hold for other Rstudio versions and different IDEs.

Outline and main concepts (cont)

- Then, we are going to briefly present the `tidyverse` and some of its most important packages via several examples.
- These practical examples we will based on a series of datasets shared by the Department for Transport: https://www.data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data
- We are not going to review the basics of the R language, but if you have any question feel free to ask!

But first, my favourite analogy!

via boredpanda, bbc, reddit

Your taste develops faster than your ability.

Source: https://www.youtube.com/watch?v=7oyiPBjLAWY&t=448s&ab_channel=RConsortium

What They Forgot (WTF!!!)

- Always start R with a blank state!
- Adopt a project-oriented workflow.
- Practice safe “paths”.
- Work and share examples in a reproducible environment, a so-called `reprex` (see Unit 2).

The examples are taken from `https://rstats.wtf/`. Another course on similar topics (not R-based and slightly more advanced): `https://missing.csail.mit.edu/`.

Always start R with a blank state!

- By default, when you terminate an R session, the software asks you if you want to save the current workspace.

- Similarly, the R startup mechanism[1] loads a saved image of the user workspace (i.e. an `.Rdata` file) if there is one.

- Unfortunately, this behaviour might be really dangerous, especially if you don't remember how the saved objects were generated. Citing the Python's style guide PEP20: *Explicit is better than implicit*.

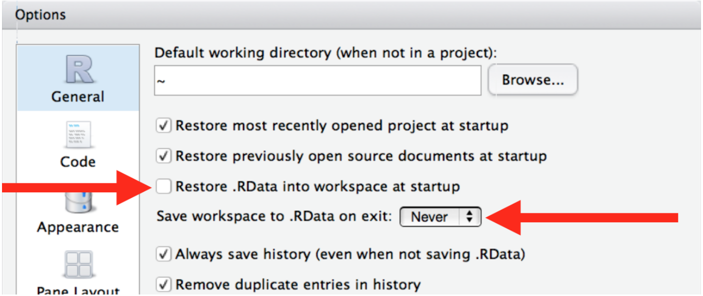
[1] See also `?Startup` and `?quit` for more details.

or, as Beyoncé said ...

Source: `https://rstats.wtf/`

So what can I do?

- If you run R from the shell, use `R --no-save --no-restore-data`.
- In Rstudio, set the following options via Tools -> Global Options.



Options

Default working directory (when not in a project):

~

☑ Restore most recently opened project at startup

☑ Restore previously open source documents at startup

□ Restore .RData into workspace at startup

Save workspace to .RData on exit: Never

☑ Always save history (even when not saving .RData)

☑ Remove duplicate entries in history

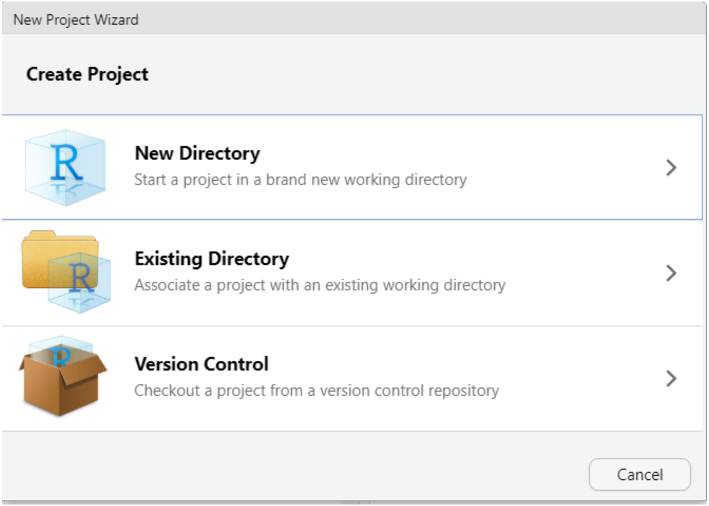
Adopt a project-oriented workflow

- There are many R scripts that begin with the following lines:
  - `rm(list = ls()) # "clean" the environment`
  - `setwd("path/that/I/only/have") # adjust the wd`

- What is the problem with the previous code chunks?
  - `rm(list = ls())` is not enough to properly clean your R session. Let's see an example!
  - The previous `setwd(...)` command is (almost surely) going to fail for everyone who is not the original user 😥

⟹ Organise your analyses as independent (Rstudio) projects, each belonging to a separate folder. Let's try!

Adopt a project-oriented workflow



New Project Wizard

Create Project

New Directory

Start a project in a brand new working directory

Existing Directory

Associate a project with an existing working directory

Version Control

Checkout a project from a version control repository

Practice safe “paths”

- Why do we usually run `setwd(...)`? Because we want to specify the ”relative” path of a file according to a directory.

- Unfortunately, `setwd(...)` may raise several portability issues as seen before.

- The `here` 📦 provides a convenient way to perform the same operation without manual interventions and the aforementioned drawbacks ⟹ Practice safe “paths”!

- Let’s see an example and more details!

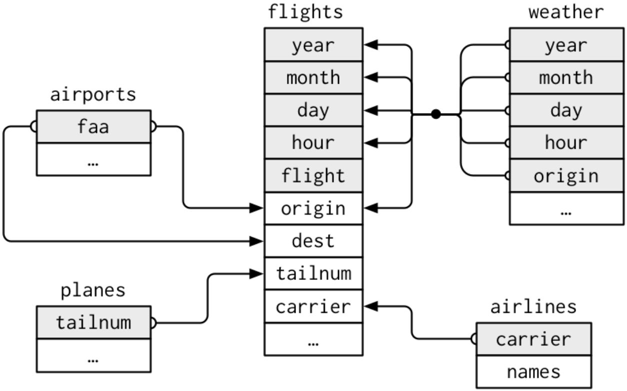
The tidyverse!

The tidyverse is a set of packages that work in harmony because they share common data representations and API design.

https://tidyverse.tidyverse.org/

EDA with the Tidyverse

We are going to briefly showcase the tidyverse toolkit using a series of relational dataset obtained from here.



Source: https://r4ds.had.co.nz/relational-data.html.

Enough theory, let's start coding 🥳