SM-2302 Software for Mathematicians

R0: Getting started

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Instructions

IMPORTANT

Check Canvas for detailed instructions regarding software installation and sign up procedures.

Important points:

- Use UBD e-mail in most cases to obtain Education Benefits
- Pick a suitable username (one that you won't be embarassed to use in a few years time!)
- Practice safe and secure passwords
- When using Lab PCs, best to create a personal folder and keep all your work files in there.
- Using your own laptops is fine. Mind your cables! Avoid tripping hazards.
- Recommended to use USB drives (make sure they're clean!) or some cloud service (Dropbox, Sharepoint, Google Drive, etc.)

Software overview

1. RStudio Desktop
   - RStudio is installed on campus computers.
   - It is free to install on your personal computers.
     computers–`https://www.rstudio.com/products/rstudio/download/`
   - You may also need to install the `R` language too, depending on your system. Do a Google search for 'R Windows download' or similar.
2. Git, github.com and GitHub Desktop
   - Please sign up for an account at github.com/signup using your UBD e-mail.
   - You will be invited to join the course organization (`sm2302-aug24`) in due course.
   - Assignments will be distributed and collected via GitHub.
3. Overleaf.com
   - Please sign up for an account at `https://www.overleaf.com/register`
4. Quarto
   - This is bundled together with RStudio, so no additional software to install.

R

- Learning objectives
- Why learn R?
- Get started

Learning objectives

- Introduction to R, RStudio and learn the difference between the two
- Familiarisation with RStudio layout and customising appearance
- Using the help (?) function
- `base` package and installing other packages
- Setting up working directory and project area
- Using R script files vs working through the console
- Importing data

Highly recommended book:
`https://rstudio-education.github.io/hopr/index.html`

Why learn R?

https://towardsdatascience.com/a-complete-guide-to-learn-r-29e691c61d1

Before we start

Preamble

Before proceeding, some best practices on how to properly conduct data analysis:

1. Keep all files in one folder (working directory), including data file, R scripts, etc.
2. When working with large amounts of files, perhaps better to organise into sub-folders (e.g. folders for code, figures, data, etc.)
3. Use simple naming conventions for files and variables (no spaces, no caps, no special characters, etc.)
4. Create an RStudio project file so that the working directory, environment, code history, etc. is preserved
5. Collect all your R code into R scripts. Don't rely on the console.

Hello, World!

```
my_string <- "Hello, World!"
print(my_string)
```

```
## [1] "Hello, World!"
```

Titanic data analysis

Create an R Project containing the the files in the `R Demo` folder from Canvas. You may run the code line by line.

Observe the way the code is written and formatted, as well as where comments are placed.

`https://style.tidyverse.org/`