Getting started: Installation & Signups

SM-2302 Software for Mathematicians

2022-08-02

In this course, we will be making use of four main software:

1. MATLAB
2. RStudio Desktop
3. Git & GitHub (Desktop & online)
4. Overleaf

MATLAB

Instructions explained in class.

RStudio

You may use RStudio in one of three ways listed below.

UBD Computers

If you are using any of UBD's computers, then RStudio should already be installed. Locate the RStudio app by scrolling through the start menu. Alternatively, type `RStudio` in the Windows Run prompt.

Local RStudio

By local, we mean that you are using your own laptop or computer. You need to ensure that you have done the following:

- Install the latest version of R (4.2.1 as of 2022-06-23)
- Install the latest version of RStudio Desktop (2022.07.0+548 as of 2022-07-17)
- Install the list of recommended R packages from CRAN

Note that you do need to install two things here: R and RStudio Desktop. The difference is that R is the actual programming language, so downloading and installing the base distribution and packages allows R to be run on your computer. This can be downloaded from these links: Windows and macOS. To verify that R has been installed, launch the Command Prompt (Windows) or Terminal (macOS) and type `R --version`.

The RStudio Desktop is an Integrated Development Environment (IDE) that all around just makes life a little bit easier for R users. Indeed, you do not have to use RStudio–you can either run R from the command line or its dedicated R application, but I do not recommend it. There are several types of RStudio IDEs, and the one we will be working with is RStudio Desktop (free version). Obtain the installer from here. Once this has been installed, locate the app and launch it to verify correct installation.

Once you have R up and running, go ahead and copy and paste the following command in the R Console to install the recommended packages for this course.

```
install.packages(c("tidyverse", "palmerpenguins", "lubridate", "rmarkdown", "tinytex"))
```

Sometimes, installing a package requires you to have what is known as a working "development environment". For Windows, this means you should install Rtools. For macOS, simply install Xcode from the Mac App Store. This should give you the prerequisites to install some packages from source (rather than from binaries).

RStudio Cloud

This is another option, if you prefer working in the cloud. Sign up for an account at https://rstudio.cloud/plans/free and you can basically use RStudio from a web browser on pretty much any device.

The downside to this is the limitations of the free tier, and mainly that is the 25 project hours per month quota. Roughly speaking, this means you can only open or run projects in your workspace for a little over 6 hours per week. Maybe that's enough, maybe it isn't.

TIP: You can log in with your GitHub credentials, so you don't actually have to sign up for an account if you prefer not to.

Git & GitHub

R is to Git what RStudio is to GitHub. Meaning, there are two things needed here: a working git installation, and a GitHub account (and subsequently the Desktop app). Luckily, if you are using macOS, git comes preinstalled, so you need not do anything. Especially if you tried installing Xcode from the above step, then you should be good to go. For Windows, you need to download and install from here. Apparently, the 64-bit version is recommended when possible.

Next, sign up for a GitHub account from GitHub.com. You should use your UBD e-mail to sign up for GitHub, so that you can be eligible for student benefits. To apply, click on 'Get student benefits' from this link: https://education.github.com/benefits/offers. This step is not really necessary for this course, but moving forward you might want these benefits–in particular it will allow you to host static websites for free (GitHub pages).

IMPORTANT Some advice about selecting your account names (particularly for GitHub)[1]:

- Incorporate your actual name! People like to know who they're dealing with. Also makes your usename easier for people to guess or remember.
- Reuse your username from other contexts (e.g. social media platforms).
- Pick a username you will be comfortable revealing to your future boss.
- Shorter is better than longer, but be unique as possible.
- Make it timeless. Avoid highlighting your current university, employer, or place of residence.

At some point, you will be invited to the `sm2302` GitHub organisation. This is where all our code repositories will live. You can browse through some that we have created and you can explore GitHub features such as commits, issues, and GitHub Pages. Assignments will also be distributed using GitHub (Classroom)–although there will still be a Canvas crossover so as to keep your academic activities within the Learning Management System (LMS).

Overleaf

We have decided that the path of least resistance to get up and running and typesetting LaTeX documents is by using the online editor called Overleaf. You will have to sign up for an account on Overleaf.com, and to use Overleaf it obviously requires an internet connection.

[1] Taken from sta323 course at Duke

For more advanced users, LaTeX can be installed on your local computers. This requires installing (and maintaining!) a TeX distribution, and selecting an IDE to work with. Now, going down this route is a little bit messy and things might not always work. On the other hand, Overleaf has so many benefits for the new user that it allows us instructors to focus on actually teaching you to typeset rather than spending time debugging. A favourite of ours is the very forgiving way that it handles errors, which can literally drive you crazy otherwise.

General advice

- If you are using campus computers, then dedicate a folder where you will store all your work files. Note that these files are retained on the PC you are currently using (since it does not have individual logins). Perhaps a USB drive or some cloud storage would be useful as well.
- Using your own device? It is recommended to work with either a laptop or desktop computer, and not a tablet. Generally speaking, tablets do not provide sufficient compute power and you may find the file system a bit clunkier to manage.
- Practice safe and secure logins. Keep your passwords secure and do not recycle them, especially given the multiple logins you need to create. I would recommend using a password manager, not just for this course, but beyond this. Also, two-factor authentications are a good idea too, so enabling that is highly recommended.