Lab 0: Software Configuration

R, RStudio and R Markdown Installation

1 Introduction to Lab

Each lab consists of a set of written instructions (like this!), a short video breaking down the instructions and an associated .pdf lab report deliverable to be completed by the end of the week. This week's report is **ungraded** but still **mandatory**!

1.1 Know Your TA

Danielle Ripsman Email: daripsman@uwaterloo.ca
I am a PhD student working under the supervision of Dr. Mahmoudzadeh.

1.2 Lab Structure

- You reports are due by **11:59pm** each **Sunday**. See course syllabus for lateness policies.
- Submitted work should be independent unless instructed otherwise. **Claiming another student's code as your own work is an academic offence.**
- Labs are worth 20% of your final grade (11 graded reports total, lowest mark dropped).
- My "office" hours are every **Thursday** from **1:30-2:20pm** on LEARN's virtual classroom.
  - They will begin this week (September 10^{th}), and are completely optional.
  - The link to each live session is available through your course calendar.
  - The structure is a *code along*: sign in, work on the lab with mics on mute, unmute yourself to ask questions.
  - Other students can benefit from your questions, but nobody is forced to participate.
  - You can use this as a structured, weekly time to complete the lab work.
  - The format of these office hours can be changed if they are not found to be helpful.
- I have set up a **Lab Feedback** forum on the discussion board on LEARN (*Connect* → *Discussions*). You can post feedback anonymously there (make sure to check the anonymous box!). I will personally read those threads, so if there are general comments or concerns about the lab, that would be an excellent way to let me know!
- For all other enquiries: see the syllabus or review the discussion board. If your question has not already been asked, feel free to make the post yourself.

2 Software Requirements

This unmarked pre-lab that covers the installation of R; a common software for data science and statistical analysis, as well as some tools that make using R more pleasant.

- **R** is a free, open-source software with simple syntax and excellent capabilities for statistical analysis and data visualization.
- **RStudio** is a user-friendly GUI (graphical user interface) that makes programming in R easier and more streamlined.
- **R Markdown** is an authoring package which allows you to generate high-quality reports, dashboards, websites and more, as you code (and update your code).

This may seem like a lot of moving parts, but if you think of these 3 components as a vehicle, R is the engine, RStudio is the controls and steering, and R Markdown is the polished exterior and paint job. When used together, these tools will make the journey to high-quality statistical analysis smooth and professional-looking for your TAs, professors and future employers, alike.

3 Installing Basic R Software

The basic R download includes an R compiler, a very simple GUI with a command prompt, and the standard R packages. To install R:

1. Go to the link https://www.r-project.org/.
2. Select CRAN on the left-hand side of the page and select a geographically nearby mirror. For example, you can select http://cran.utstat.utoronto.ca/.
3. Select the appropriate version of R for your OS and download the latest version.

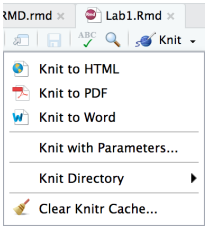
4 Installing RStudio

RStudio is a free Integrated Development Environment (IDE) for R programs. It uses your system's version of R, providing tools and GUI features that will make use of the software easier. This includes autocomplete, graphical displays and point-and-click-enabled features.

The software is available at: https://www.rstudio.com/products/rstudio/download/.

5 Installing R Markdown Packages

This installation can be done within RStudio. Note, R Markdown has dependencies on other authoring packages (e.g., LaTeX). In the next steps, we will attempt to configure all of these dependencies, to make sure R Markdown can run. You will know that it can run when you create or open a .Rmd file, and the dropdown option to "Knit" comes up as follows:
Here are the steps that seemed to work best for last year's cohort:



1. In the console, write: `install.packages('rmarkdown')`.
2. Next you need a version of LaTeX to generate the PDFs: `install.packages('tinytex')`.
3. The following downloads more LaTeX packages: `tinytex::install_tinytex()`.
4. Finally, try the following command for the remaining files: `tinytex:::install_prebuilt()`.

To see if this works for you, either generate your own R Markdown template, through the RStudio File menu, or download the sample file that I have posted online (**Lab0.Rmd**).

6 Computer Difficulties

If these steps do not work for you, you are encouraged to post on the discussion board and ask questions. However, if the issue seems unresolvable, or your computer is unable to handle running RStudio, please message me directly and we will talk about other available options.

7 Weekly Deliverable

Output a PDF from either your template or my template (feel free to edit the template if you'd like!). There are no marks for this week's lab, but do have it uploaded by **Sunday, September 13, 2020 at 11:59 PM**, so I know that you've successfully followed these instructions!