Notes on Software Installation for Econ 671
Fall 2015, version 1.5
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This handout has brief instructions for installing some software that we need for Econ 671. It also has instructions for an in-class project to verify that some of the most important software was installed correctly. There are several ways to install many of these programs and you should choose the approach you're most comfortable with.

1 Required software

1.1 R and RStudio

Option 1. Download and install from project homepage.

- Get R at https://cran.r-project.org
- Get RStudio at https://www.rstudio.com/products/rstudio/download/. You want RStudio Desktop Open Source Edition.

Option 2. Use your OS package manager.

- For Linux, use yum (Fedora), apt-get (Ubuntu), etc to get R. (RStudio does not seem to be available through package managers.)
- For Mac, use Homebrew (http://brew.sh):

  ```
  brew tap homebrew/science
  brew install r
  brew install Caskroom/cask/rstudio
  ```

- I'm not familiar with Windows' package managers, but I assume they exist.

Packages. After installing RStudio, you'll want to install some important R packages. To install them, open RStudio and choose 'Install Packages' from the Tools menu. Then type the package name in the right text box. For now, just install 'rmarkdown'.

1.2 Git

A more comprehensive discussion of Git installation is available at http://git-scm.com/book/en/v2/Getting-Started-Installing-Git

Option 0. You may already have git installed. Type 'git' at the command line to find out.

Option 1. Download and install from project homepage.

- Git is available at http://git-scm.com/downloads
- Sourcetree (a git gui) is available at https://www.sourcetreeapp.com

Option 2. Install Git and Sourcetree through your OS package manager. (Similar options to before.)

Configuration. Read and follow the instructions at http://git-scm.com/book/en/v2/Getting-Started-First-Time-Git-Setup

1.3 LaTeX

This could take a while, so expect the download to last longer than our class meeting.

Option 1. Download and install from project homepage. TeXLive is a good option and is available at https://www.tug.org/texlive/

Option 2. Install TeXLive through your OS package manager. (Similar options to before.)

2 Make sure it works: make a histogram of the unemployment rate and save as html file.

- The unemployment rate can be downloaded from the St. Louis Federal Reserve: https://research.stlouisfed.org/fred2/series/UNRATE/. Save it as a csv file.
- Create a new project in RStudio (under the File menu) and move the unemployment data to that folder.
- Use 'read.csv' to load the data into R, then plot a histogram of the values.
- Create a new RMarkdown file in this project and edit the file so that it contains the command to load the dataset and plot the histogram. You can do this by replacing the R code in the default document.
- Export the file to html through 'Knit HTML'. You should also export it to pdf as well if LaTeX has finished installing.
- There is a cheatsheet and reference guide for RMarkdown available at http://rstudio.com/resources/cheatsheets (Some of the other cheatsheets are good too.)

3 Create gitlab account (on your own for homework)

Not necessary for today's lecture, but it will be necessary soon.

1. Sign in at https://git.ece.iastate.edu
2. Set up SSH keys for your laptop (optional). Directions are at https://git.ece.iastate.edu/help/ssh/README.md
3. Email me or the TA to be added to your team's GitLab group.

4 Install optional software

I like this software, but it can be a bit tricky to install and use. You might want to try it on your own, but we're not going to use it in class.

4.1 Emacs

- Installation instructions are available at http://wikemacs.org/wiki/Installing_Emacs
- After installing Emacs, you'll want to install the following packages:
  1. AucTeX, available through Emacs's package manager (under the Options menu)
  2. MELPA, an additional package manager. There are installation instructions at http://melpa.org/#/getting-started
  3. Emacs Speaks Statistics, which can be installed through MELPA or downloaded from the project homepage, http://ess.r-project.org See the documentation for installation here: http://ess.r-project.org/Manual/ess.html#Installation

4.2 Julia

Julia installation instructions are available at http://julialang.org. Julia is an open-source scientific computing language that has some similarities to Matlab and is becoming popular in economics. The language is still being developed, so you should only use it if you are comfortable debugging programs and writing libraries yourself. Obviously, we will not use Julia in this class. (But we might in the future.)

4.3 Python

Python is a general purpose computing language that has a lot of library support for data analysis, machine learning in particular. If you want to use Python, you'll want to install the "SciPy stack," which is a set of libraries for scientific computing. The installation instructions are available at http://www.scipy.org/install.html.

4.4 Jupyter/IPython[1]

Jupyter is a shell and notebook for interactive scientific computing. You can think of it as an interactive version of RMarkdown that can be used with many different programming languages (Python, Julia, and R are probably most relevant for this class.) You can try Jupyter in your browser at https://try.jupyter.org and there are installation instructions online at https://jupyter.readthedocs.org.

- Jupyter should work with Python immediately. (You need to install Python to be able to install Jupyter.)
- To use Jupyter with R, install the "IRkernel" using the instructions at http://irkernel.github.io.
- To use Jupyter with Julia, install "IJulia" using the instructions at https://github.com/JuliaLang/IJulia.jl.

[1] This project is now called "Jupyter" (sic) but was called "IPython" until very recently. Both names are still in use. We'll call the project "Jupyter" in these notes.