Introduction to R for Data Management and Analysis

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Welcome!

Introductions

- Name
- Program/Concentration
- Familiarity with R
- Expectations
- Fun fact?

Class structure

- Lecture and short exercises: 90 minutes
- Break: 10 minutes
- Exercise: 40 minutes
- Discussion: 10 minutes

Grading

- Attendance: 15%
- Quizzes: 20%
- Exercises: 65%

Course Outline

Date	Topics	Assessment
Tues. June 2	Introductions About this class Features of the R language Getting help and troubleshooting	-
Thurs. June 4	Classes and data types data.frame Import/Export subsets	Exercise

Announcements

- Slack available at https://cunysphcode.slack.com
- Syllabus available on Blackboard
- Zoom link in syllabus

Today's class

- Installation
- R and the RStudio interface
- Basic features of the R language
- Getting started
- Tips
- Getting help and troubleshooting
- External resources
- R as a calculator

What is R?

- R is a programming language and environment for statistical computing and data visualization
- "Base R" refers to the standalone suite of pre-packaged functions that allow R to function as a language
- Extensions of the R language are what are called "packages"
- A **package** is a container of functions that give R additional flexibility

What is RStudio?

- IDE Interactive Development Environment
- Console + Help + Figures + Project Management
- Let's have a look at it!

What is Git / GitHub?

- GitHub is a public repository of user generated code / analyses
- Provides a foundation for reproducible reports
- Versioning is done using software called `git`
- `git` takes care of versioning of all files in a repository (project)

How do I get started?

- First download the latest R version from r-project.org
- Install R with all the default settings
- Download RStudio from RStudio.com
- RStudio allow you to select the R version installed in your system.

Recommendations for RStudio setup

- Tools > Global Options
- Don't restore .RData into workspace
- Never save workspace to .RData on exit

Features of the R Language

- case sensitive!!
- Spaces are ignored (except in names)
- works with functions
- vectorized operations
- objects
- help pages
- `?reserved`

Recognizing a function

- a name followed by parentheses `help()`
- arguments (e.g., `functionname(argument1 = "default")`)
- input / output

Useful tips for learning R

Pseudo code	Example code
install.packages(packagename)	install.packages(“dplyr”)
?functionname	?select
?package::functionname	?dplyr::select
? ‘Reserved keyword or symbol’ (or backticks)	? ‘%>%’
??searchforpossiblyexistingfunctionandortopic	??simulate
help(package = “loadedpackage”)	help(“dplyr”)
browseVignettes(“packagename”)	browseVignettes(“dplyr”)

General tips for learning R

- Learning R will be frustrating
- Learning a language
- Practice promotes familiarity

R Housekeeping tips

- Maintain a clean R "global" environment
- Save your scripts rather than outputs
- Use object names that are descriptive
- Improve readability with clean formatting

Getting help and troubleshooting

- Critically important
- "Debugging" your script
- Step by step, line by line process

First contact with R

- R as a calculator exercise

Motivating examples

- http://shiny.rstudio.com/gallery/google-charts.html
- https://mramos.shinyapps.io/PowerCalc/

External Resources

- Coursera
- edX
- RStudio
- Quick-R - Mostly for basic and base functions
- RStudio Cheatcheets

VIM / Emacs (Extra)

- Tools for 'efficient' typing
- (Optional) Vim game
- Emacs download