Intro to R

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What is R?

R is a language and environment for data manipulation, calculation and graphical display

Includes:

* Data handling and storage
* Suite of operators
* Tools for data analysis
* Conditionals, loops, user-defined functions, input and output facilities

R vs Python

	R	Python
Purpose	Focuses on user friendly data analysis, statistics and graphical models	Emphasizes productivity and code readability
User base	R has been used primarily in academics in research. * Data scientists * Statisticians	Python is used by programmers that turn to data science. * Developers *Programmers
Specialty	* Statistical tests and models are easy in R	* Flexible for creating new tools

Citation for this slide and more info

R vs RStudio

R: The programming language

* Open source programming language
* You do not need to use Rstudio to run R

www.r-project.org

Rstudio: The graphical user interface

* Integrated development environment (IDE)
* Privately run company
* You do need R to use Rstudio

www.rstudio.com

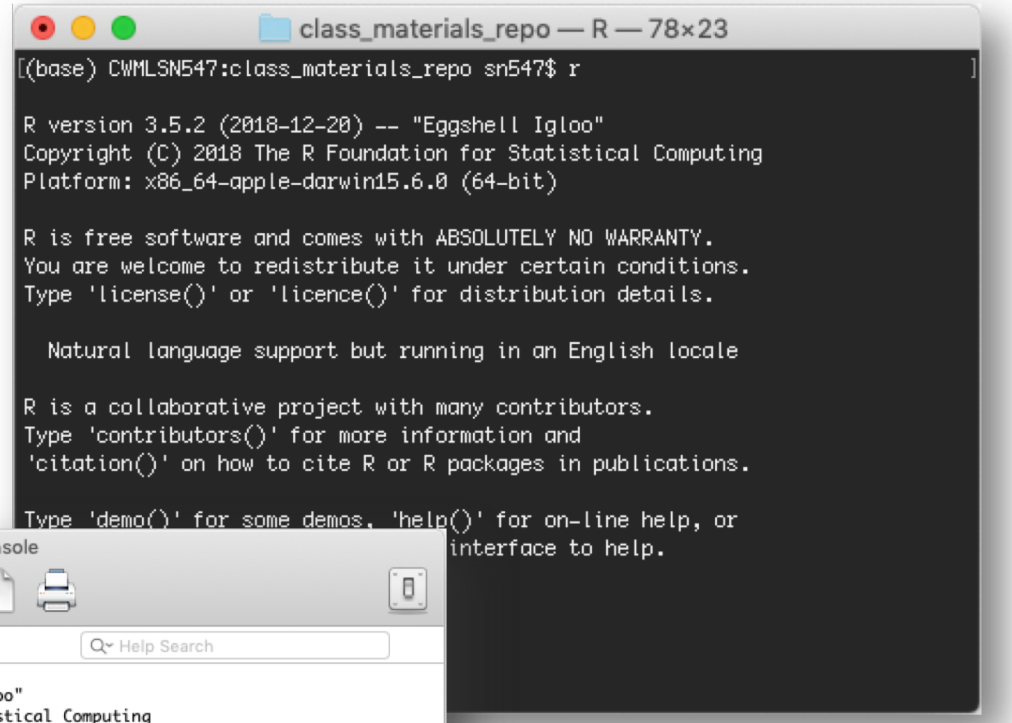
Where can you run R?

GUI

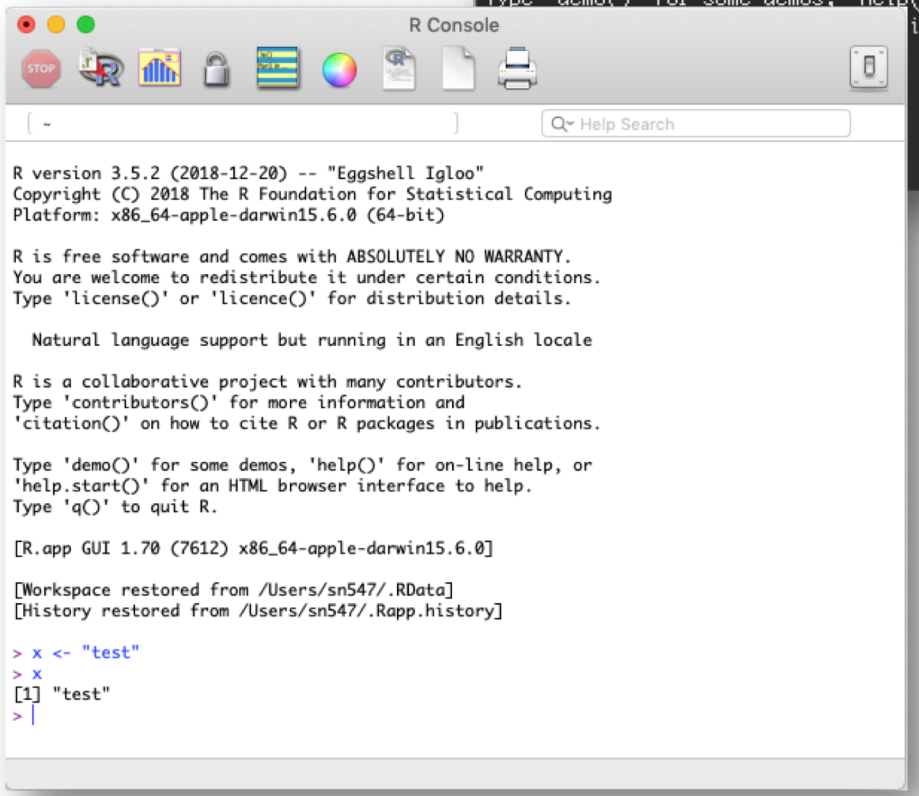
* Rstudio

CUI

* Command prompt (Windows)
* Terminal (Mac & Linux)
* R Console



^Terminal window



^R console

R Packages

Search through all R packages

* https://www.r-pkg.org/

Packages of note

* bioconductor (and biomaRt)
* Seurat for scRNA analysis (https://satijalab.org/seurat/v3.1/pbmc3k_tutorial.html)
* tidyverse (dplyr, tidyr, stringr, lubridate, ggplot2)
* readxl
* haven

R Syntax

```
> myString <- “Hello, World!”
> print(myString)
[1] “Hello, World!”


> install.packages(”package_name”)
> library(package_name)
```

Note: R is case sensitive

Finding help with R

Cushing/Whitney Medical Library

* StatLab consultations
* Data Librarian consultations

Within R

* ?function_name
* help(function_name)

On the web

* R Project Manuals and FAQs
* Stack Overflow | Use the R tag
* Rseek | R search engine
* R-bloggers | R news and tutorials
* Rstudio cheat sheet printouts

Continue learning after this class

Recommended tutorials, texts, and sources for further Information

* https://library.medicine.yale.edu/research-data/data-tools-software/about-r

LinkedIn Learning through Yale

* https://your.yale.edu/work-yale/learn-and-grow/online-learning

Demo topics

1. Mathematic operators (larger list: http://www.sr.bham.ac.uk/~ajrs/R/r-function_list.html)
2. Comparison operators
3. Vectors
4. Reading in files
5. Dataframes

All content (and then some) is available on github. A link will go out after class.