Outline

M1	M2	M3	M4
R workspace	Data and Variables	Descriptives and Graphing	Statistical Tests
Basics of syntax	Importing/Exporting	Descriptive Statistics	Continuous and non-continuous outcomes
Understanding R as a whole	Working with variables	Base R Plots	Linear Regression

Module 1: R-Workspace

Understand the different R windows

Understand the basic syntax symbols and their uses

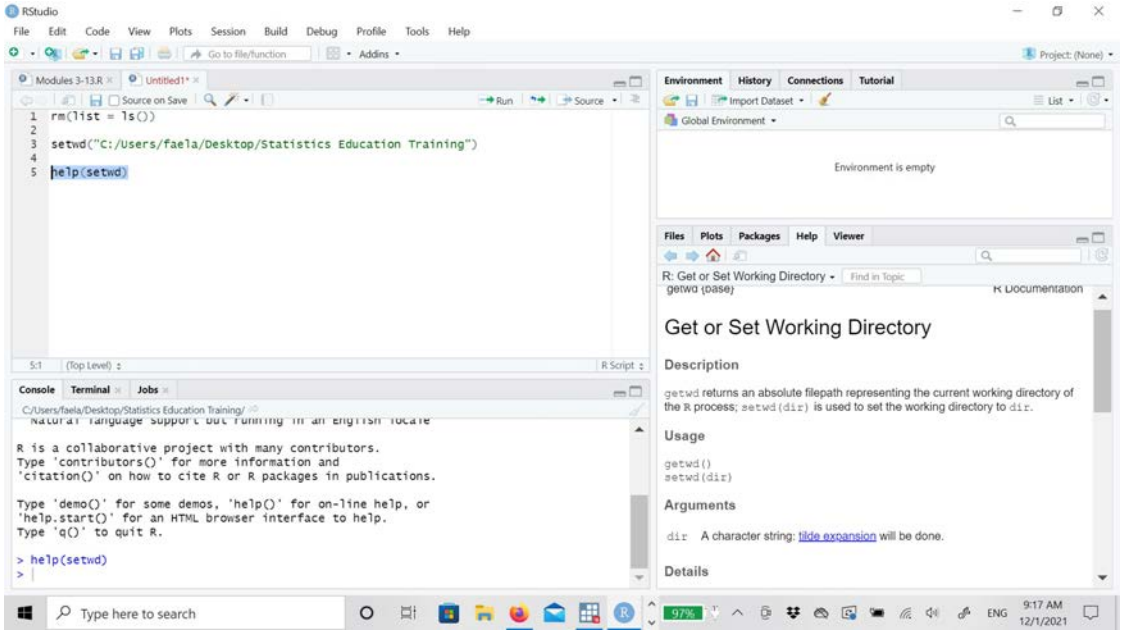
Find help and understand how to explore issues

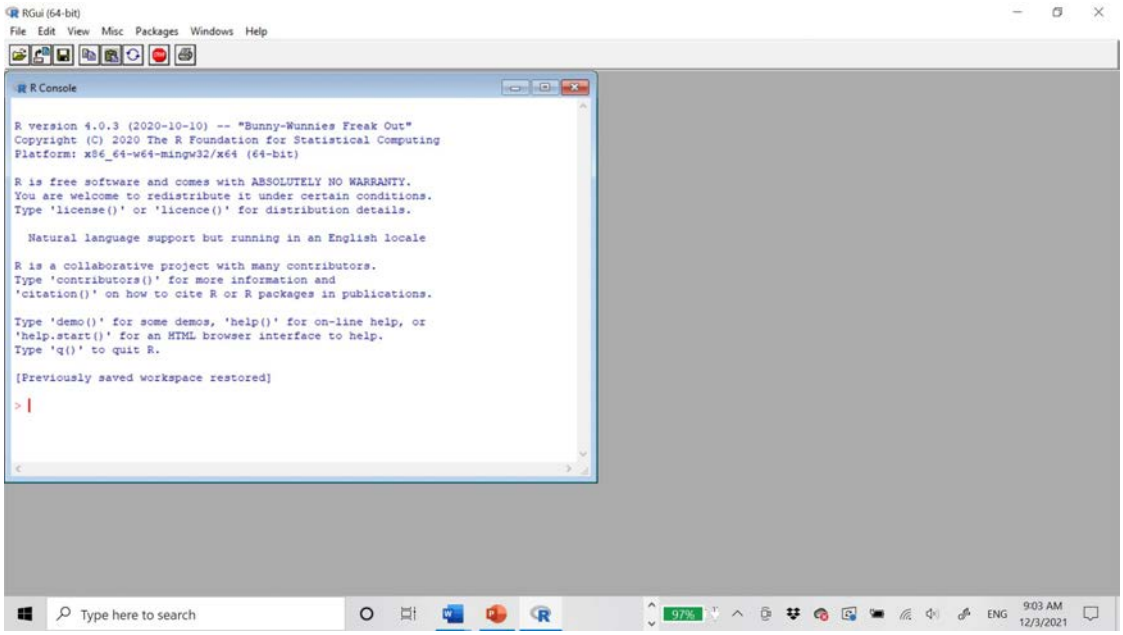
R and R-Studio

Two types of R: R and R-Studio

You need to download both (set the CRAN (Comprehensive R Archive Network) for your region)

But you can use either one for performing tasks


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Modules 3-13.R
Untitled1*
1 rm(list = ls())
2
3 setwd("C:/Users/faela/Desktop/Statistics Education Training")
4
5 help(setwd)
Environment History Connections Tutorial
Environment is empty
Files Plots Packages Help Viewer
R: Get or Set Working Directory
Get or Set Working Directory
Description
Usage
Arguments
Details
Console Terminal Jobs
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
> help(setwd)
Type here to search
ENG
9:17 AM
12/1/2021


RGui (64-bit)
File Edit View Misc Packages Windows Help
R Console
R version 4.0.3 (2020-10-10) -- "Bunny-Wunnies Freak Out"
Copyright (C) 2020 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.
Natural language support but running in an English locale
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
[Previously saved workspace restored]
Type here to search
ENG
9:03 AM
12/3/2021

Basic Syntax

R is case sensitive: var1 and Var1 would be treated as 2 different variable names

$ is usually between the name of the dataset and the variable you are interested in dat$var1

, usually separates components WITHIN a command

+ is usually BETWEEN commands

= and <– assign objects, but I would recommend using <-

The more you use R, the more you will get the feel of how the syntax works

Script Files

You do all your commands in what is called a script file

You can have multiple script files open at once

We will now go look at and explore the R environment and look at importing packages and libraries

Module 2: Data and Variables

- Understand how to import and export data
- How to recode variables
- How to view and explore data
- Basic variable types in R

Module 2: Data and Variables

Always set your working directory first!

Importing Data can be done through the “file” menu or through commands

```
dat <- read_file(file pathway/file name.file type)
```

Different file types can be read in this way:

```
dat <- read.excel(file pathway/file name.file type)
```

```
dat <- read.csv(file pathway/file name.file type)
```

Things to consider:

What is the file name?

What is the file type?

Where is the file located?

Does the file include variable names?

How are fields separated (e.g. tab, comma, white-space)?

How are missing values stored?

I would usually use .csv or .dat files, but you should always look at your data once you import!

Variable Types

- **character**: "a", "swc"
- **numeric**: 2, 15.5
- **integer**: 2L (the L tells R to store this as an integer)
- **logical**: TRUE, FALSE
- **complex**: 1+4i (complex numbers with real and imaginary parts)

Examining Variables

R provides many functions to examine features of vectors and other objects:
class() - what kind of object is it (high-level)?
typeof() - what is the object's data type (low-level)?
length() - how long is it? What about two dimensional objects?
attributes() - does it have any metadata?

Module 3: Descriptive and Graphs

1. Perform basic descriptive statistics (mean, median, range)
2. Create a descriptive statistics plot
3. Create basic graphics using base R
4. Understand what GGplot is

Descriptive Statistics

Calculate mean, median, range etc.

Format into table

Graphs

A lot of graphs in base R

GGplot makes much nicer plots

- Also much more complicated

Both types can be expanded with extra specifications

Module 4: Statistical Tests

Chi-square

T-test

ANOVA

Diagnostic Tests: homogeneity, Levene, Bonferroni

Thank you!