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R Basics– knowing your way around

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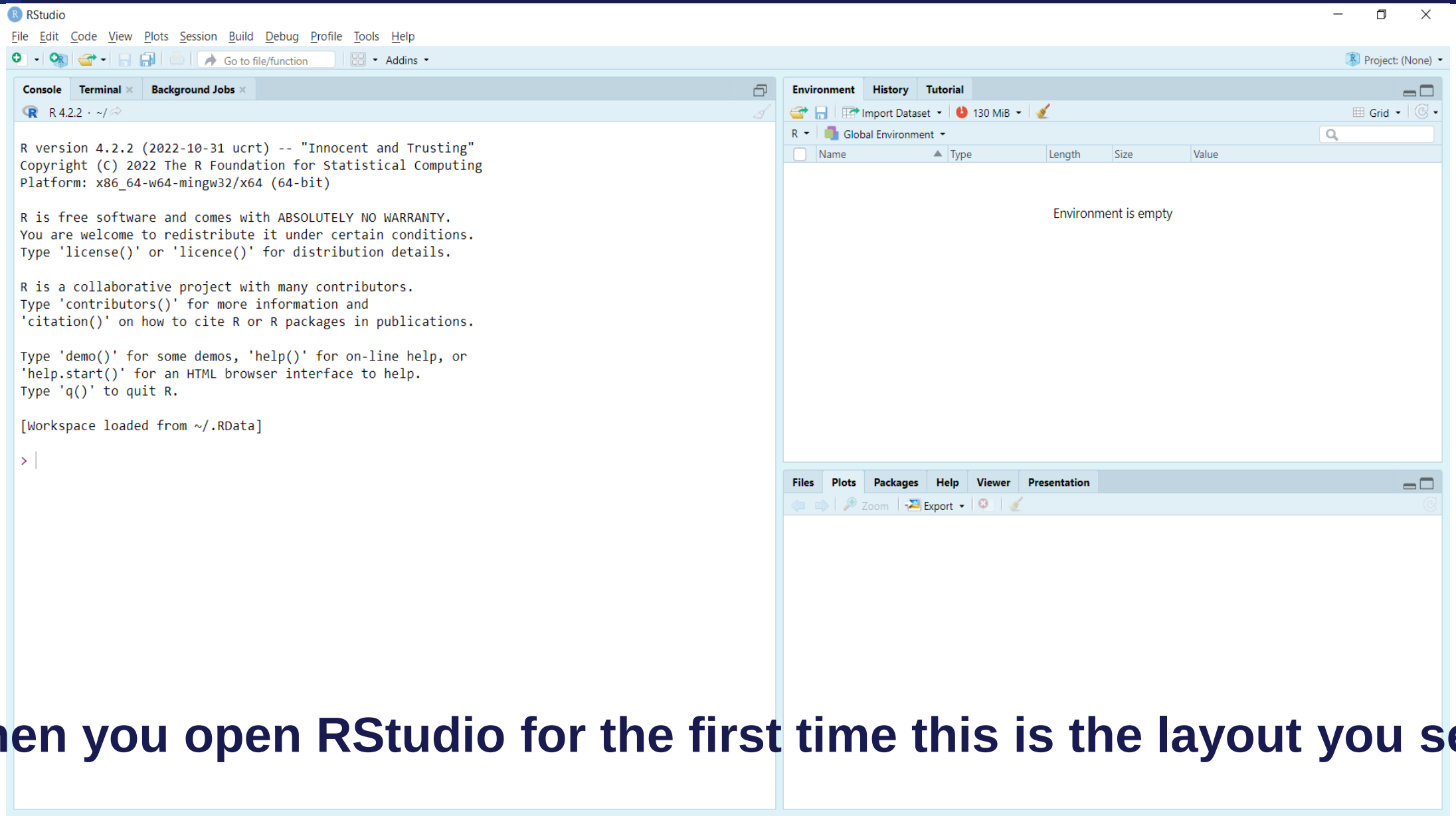
Introduction to R and RStudio

- R is a popular programming language for statistical computing and graphics.
- R is open-source, and there are many external packages suited for different purposes (e.g., data cleaning, visualization)
- RStudio, on the other hand, is an Integrated Environment (IDE) for R and is available in two formats: RStudio Desktop & RStudio server

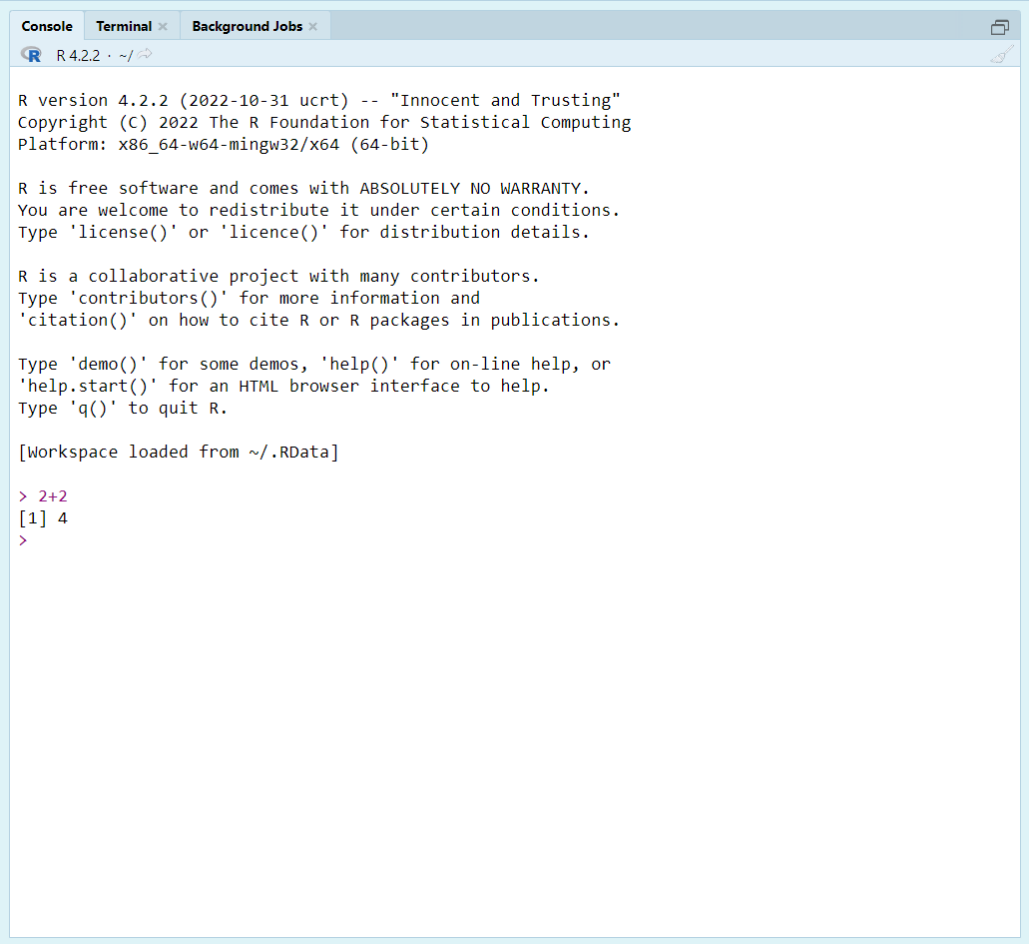
RStudio interface



When you open RStudio for the first time this is the layout you see

Console

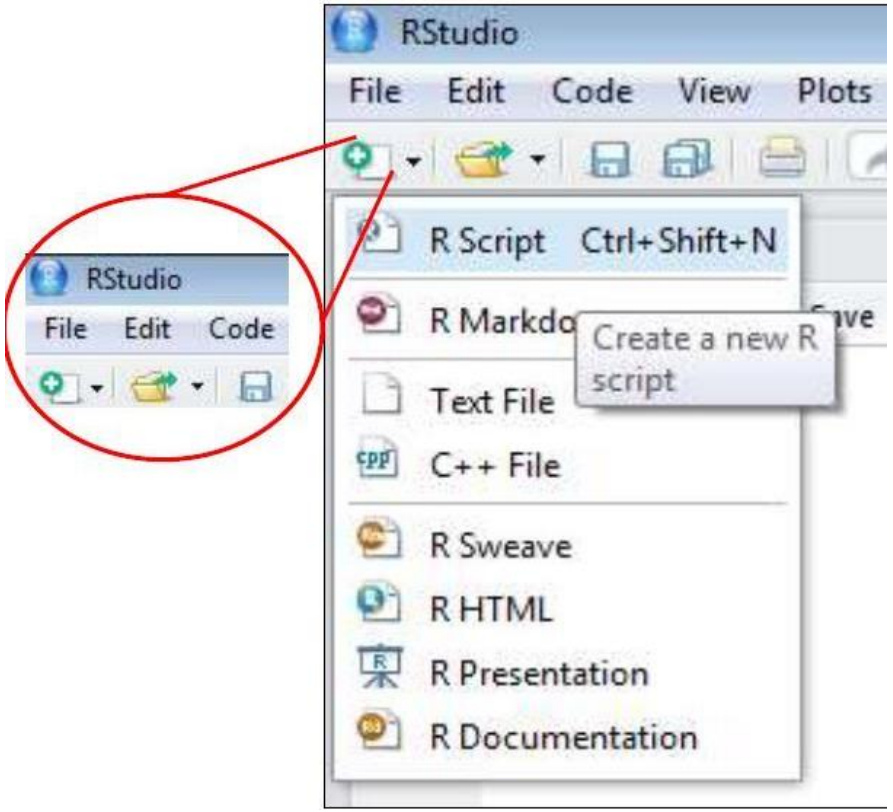
- **The Console is the workhorse of R. This is where R evaluates all the code you write.**



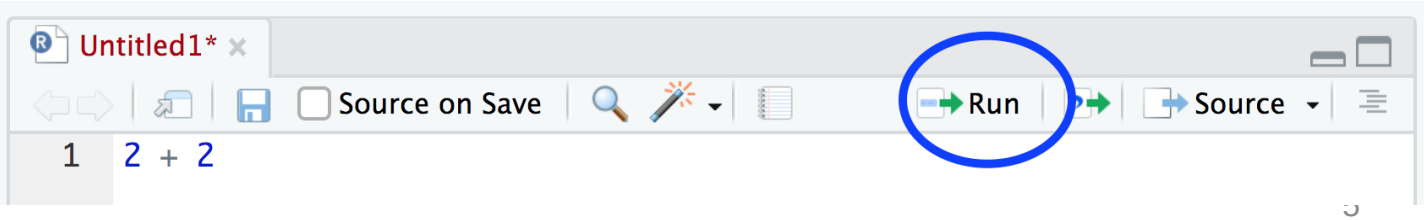
You can type R code directly into the Console at the command line prompt, >.

e.g. Please type 2+2 in the console and press the enter key

R Script



- **Instead of typing R code directly into the Console a better approach is to create an R script.**
- **The new window is a script editor and where you will write your code, execute, and save it.**
- **e.g.** Please type 2+2 in the script and click the icon run

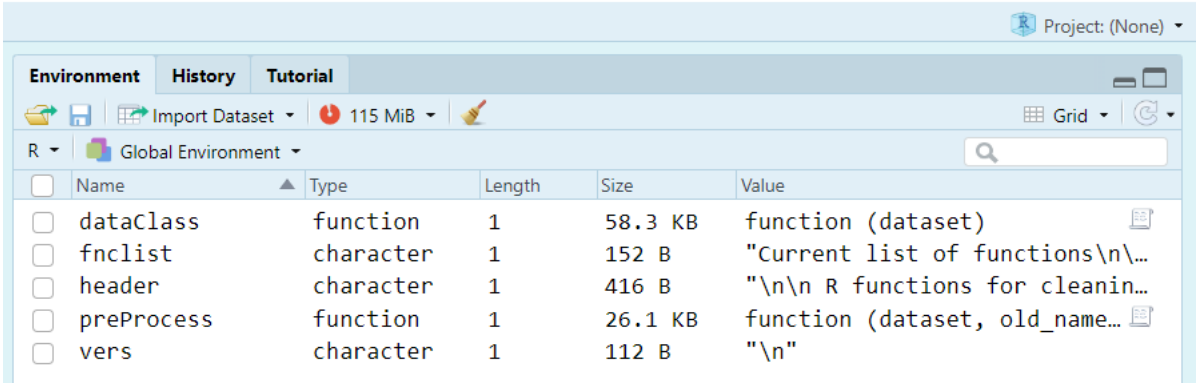


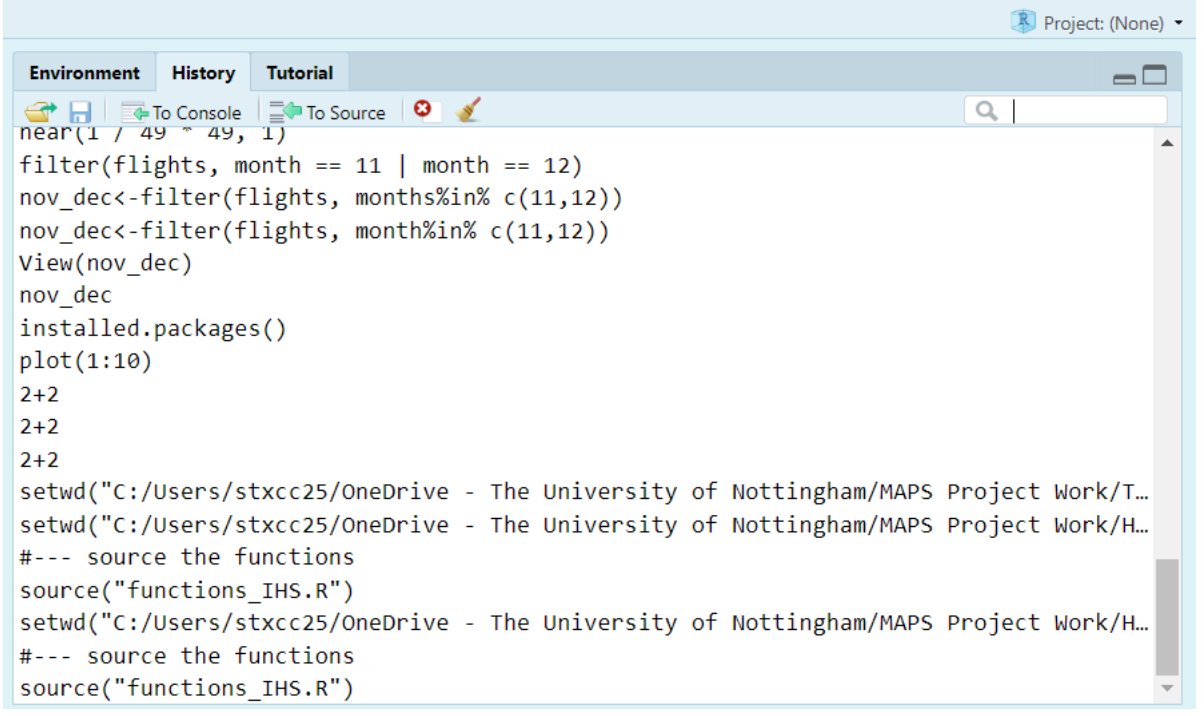
Environment/History/Tutorial

- **The Environment / History / Tutorial window shows you lots of useful information.**

- **The ‘Environment’ tab displays all the objects you have created in the current (global) environment.**

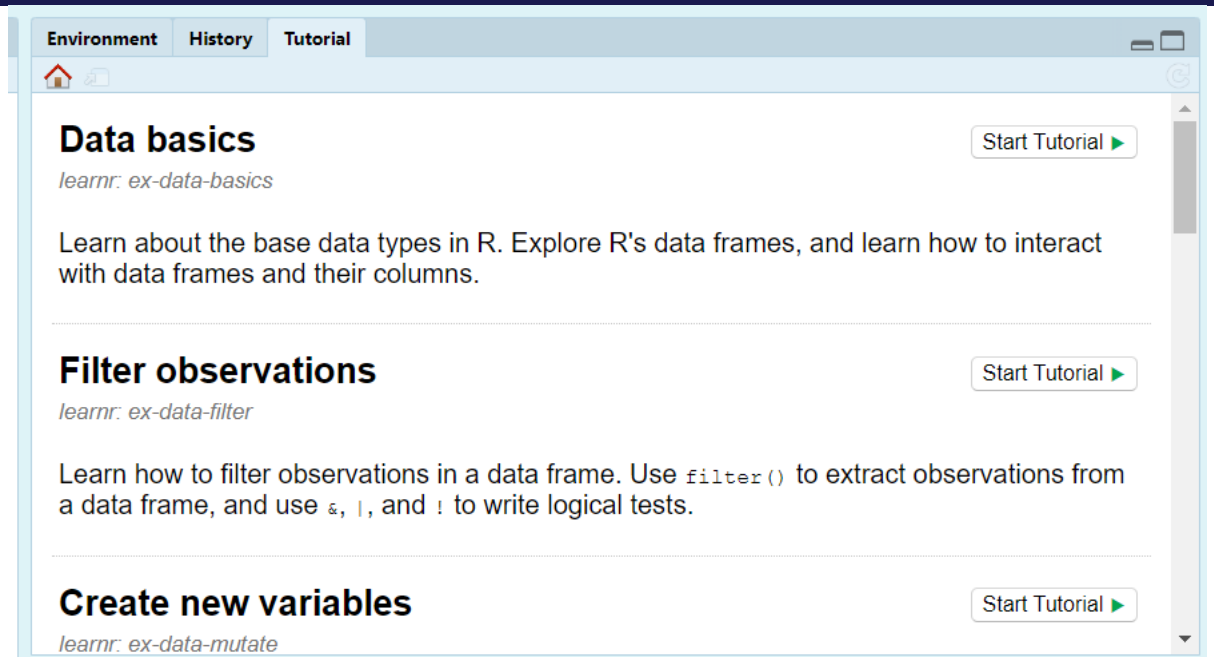
- **The ‘History’ tab contains a list of all the commands you have entered into the R Console.**



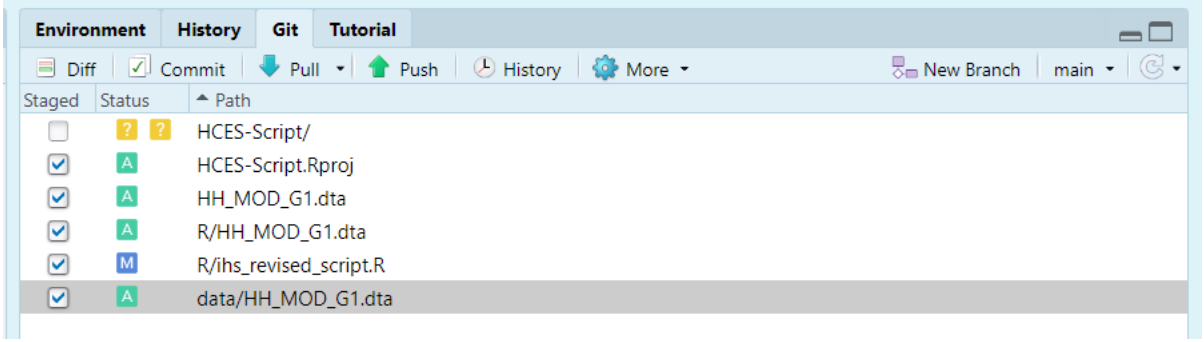


Environment/History/Tutorial

- The ‘Tutorial’ tab allows you to access tutorials to help you better understand RStudio (very helpful resources there)



- The ‘Git’ tab provides a links with your GitHub account (NB: this will appear later)



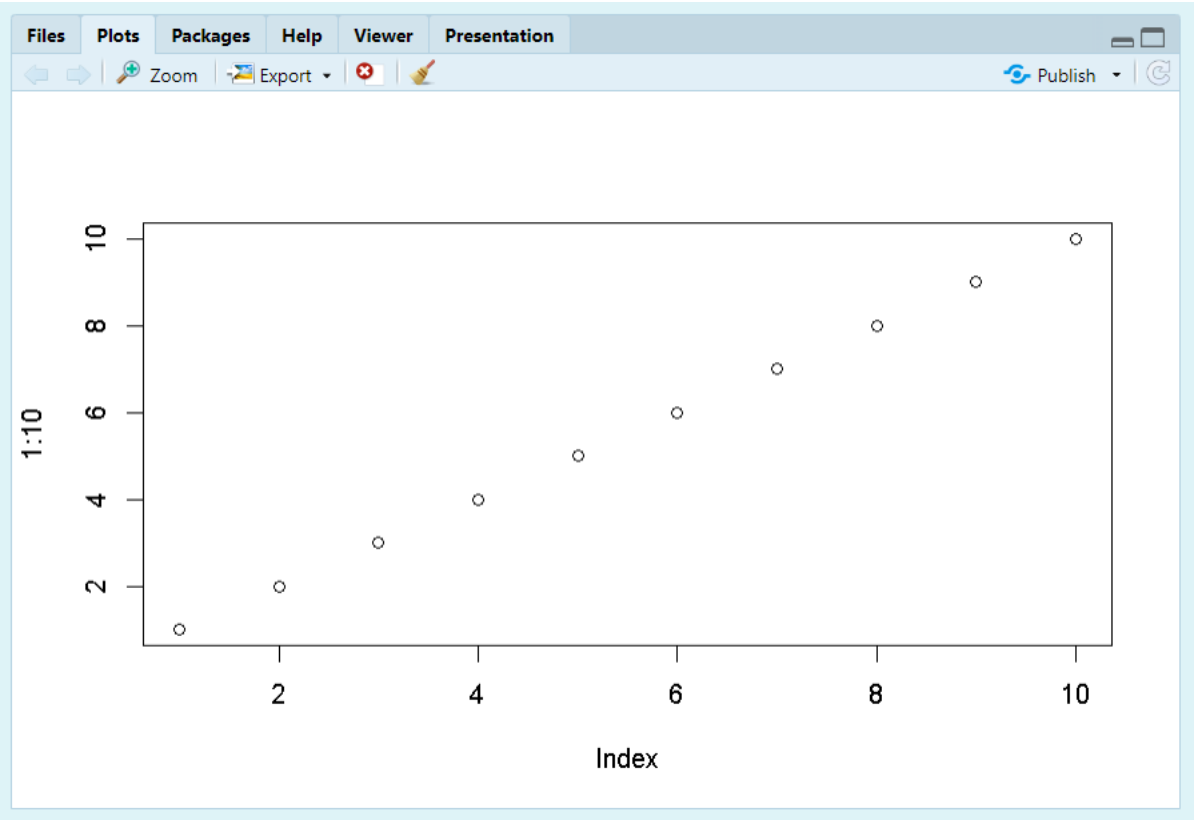
Files/Plots/Packages/Help/Presentation

- The ‘Files’ lists all external files and directories in the current working directory on your computer.
- The ‘Packages’ tab lists all of the packages that you have installed on your computer.

Files/Plots/Packages/Help/Presentation

- **The ‘Plot’ tab is where all the plots you create in R are displayed (unless you tell R otherwise)– you can export, zoom your images**

- **The ‘Help’ tab displays the R help documentation for any function.**



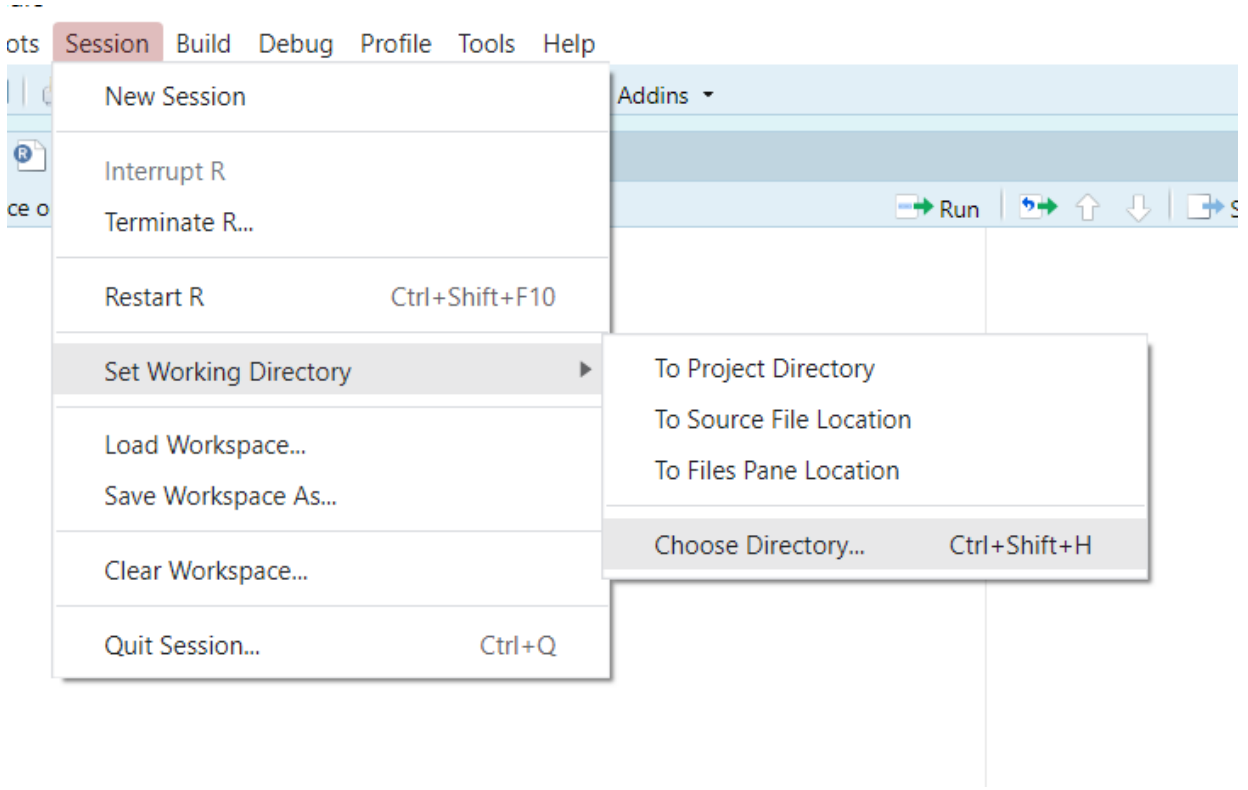
Can you type **plot(1:10)** in your script

Working directories

- The working directory is the default location where R will look for files you want to load and where it will put any files you save.

- setwd() function uses an absolute file path which is specific to the computer you are working on

- getwd() function in the Console which returns the file path of the current working directory



Any questions so far?

Objects in R

- **Everything in R is an object**

- **Objects - can be almost anything, from a single number or character string (like a word) to highly complex structures like the output of a plot, a summary of your statistical analysis or a set of R commands that perform a specific task.**

- **Can then assign a value to this object using the assignment operator <- (sometimes called the gets operator).**

Some R basics

- **R is case sensitive i.e. A is not the same as a and anova is not the same as Anova.**
- **# symbol is interpreted as a comment and ignored by R.**
- **+ appears in the console after you execute your code this means that you haven't completed your code correctly.**
- **R is fairly tolerant of extra spaces inserted into your code**

Something fun: Please type the following in you script

A<-1

A<- 1

A < -1

What do you notice?

Basic arithmetic and variable assignment

- **In its most basic form, R can be used as a simple calculator. Consider the following arithmetic operators:**

- Add: +
- Subtract: -
- Multiply: *
- Divide: /
- Power: ^
- Modulo (remainder after division): %%

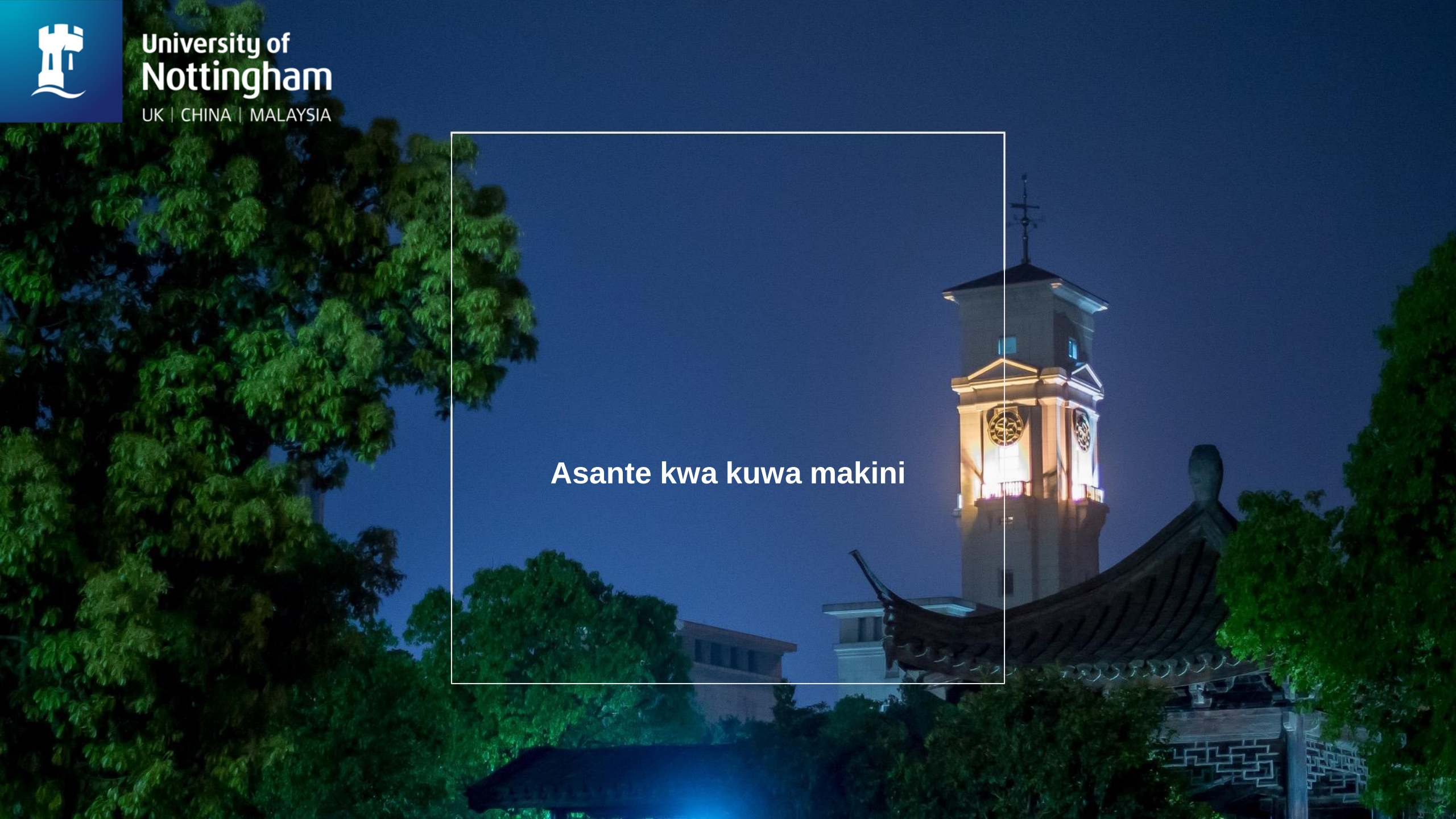
Basic data types in R

- **R works with numerous data types. Some of the most basic types to get started are:**
- **Numeric – numbers e.g. (**4.5, 4, 100)
- **Logical**– Boolean values e.g., true or false
- **Characters**– containers text (or string), numbers and special character e.g. “hello”

Basic arithmetic and variable assignment

Exercise 2.1

- In RStudio please open the script "exer2.1.R"
- Set a working directory
- In this exercise you'll familiarise with basic arithmetic and variable assignment operations in R
- Then push your changes to GitHub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Asante kwa kuwa makini