

Lesson 19/01/23

Introduction to R and R studio

In the following we want to introduce the fundamentals of programming in R. This R Markdown module is supplementary to the Software Carpentry lesson on R for Reproducible Scientific Analysis, with additional discussion and exercises.

Work flow within RStudio

You have now gotten some familiarity with the R Studio environment, and you should know where to find the R console and the file editor (the current window). We will try running some commands and see how code can be run interactively or from a script.

Exercise 1.1

Try running the following classic programming command by typing the following line in the console:

- `print('hello world')`

How does the output differ when we remove the quotation marks? That is, what does the console return when we type

- `print(hello world) ?`

Lets try printing another value to find out what is happening. Type the following lines into the console to compare the output

- `print('pi')`
- `print(pi)`

Can you conjecture an explanation of what the quotation marks signify? Do you think that the following two statements will have the same output?

- `print(2 + 2)`
- `print('2 + 2')`

Discussion

R is a programming language that is designed for statistical analysis. While many of our analyses can be performed only with numerical values, we may wish to manipulate more complicated data.

Try typing the following lines into the console and finding what the console returns

- `print(typeof("pi"))`
- `print(typeof(pi))`

We will return to the 'types' of different kinds of data in a subsequent lecture.

Mathematical functions

Now we know about using R as a calculator, and the precedence of elementary operations. But R knows how to compute complex functions and operations by default. Many standard mathematical and statistical operations can be computed automatically without writing them explicitly.

Exercise 1.2

Use the help option in R to pull up documentation on the following standard statistical functions:

- mean
- var
- median

this is performed by typing “?FUNCTION_NAME” where “FUNCTION_NAME” is the name of the function.

Try typing in the following expressions:

- mean(1:11)
- var(1:11)
- median(1:11)

Can you conjecture what the variable “1:11” represents?