

Introduction to R

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Introduction to R

The introduction to R document in the official repository of packages for the R language has 105 pages and 14 sections (<https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf>). It covers data structures, reading and writing (I/O) to files, probability distributions, statistical models, conditional statements and other forms of controlling the execution of a program, user functions, graphics, extension via packages, and commands to interact with the host operating system.

Undoubably too much for a 45 minute session. Therefore the focus will be on two aspects:

- language specific syntax
- basic I/O and interoperability with the operating system

These two aspects can give the student a quick sense of usability for the R language. This approach leaves an essential strength of R for later, its nature as a statistical computing and graphics language.

Language Syntax

Programming languages model information using data structures. At its core, R represents everything either as an object or a function. There are two immediate consequences from this: there is no absolute need to use for loops —although they exist— because functions are designed to work very effectively on vectorized data structures, and scalars only exist as unidimensional data structures of length 1.

We will emphasize these two points to set the stage for elegant and fast R code. R was a functional language long before this became a buzz word in Computer Science.

Data structures

R can be used to model information depending on the data type as homogeneous or heterogeneous and also depending on the dimension as uni-dimensional, bi-dimensional, or n-dimensional.

The following table from (Wickham 2015).

	Homogeneous	Heterogeneous
1d	Atomic vector	List
2d	Matrix	Data frame
nd	Array	

Data types

Built in functions

The magic of the generic dispatch mechanism of S3 R objects.

Iteration over data structures

I/O

Interoperatibility with the host operating system

User-functions

Execution control

References

Wickham, Hadley. 2015. *Advanced R*. Chapman & Hall/Crc the R Series (Crc Press).