

R Basics

TM the Great Unread

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What is R

R is a programming language that was originally created for statistical computing.

Interpreted programming language ~ interface to compiled code (interface to Fortran and C).

Access it through a command-line interpreter.

```
1 > 5*5  
2 [1] 25
```

Install IDE on top of R: <https://www.rstudio.com/>

Vectors

Vector: sequence of data elements of the same basic type. The members are called components or elements.

Vector types: character, logical numeric (integer, double, complex)

R's atomic vectors (atomic classes include integer and complex)

```
1 > x.num <- c(1,3,5, 5, 1)
2 [1] 1 3 5 5 1
3
4 > x.char <- c('All hope abandon,', 'ye who enter here!')
5 [1] "All hope abandon," "ye who enter here!"
6
7 > x.log <- x.num == 5
8 [1] FALSE FALSE  TRUE  TRUE FALSE
9
10 > x.fac <- as.factor(x.num)
11 [1] 1 3 5 5 1
12 Levels: 1 3 5
```

Data structures

Vector is an data array

Matrix is a vector with added dimensions

List is a container that allows for different data modes/types (generic vectors)

Data.frames compound object, lists with row and column names made for tabular data

```
1 > x.mat <- matrix(data = c(1,2,3,3,2,1),nrow = 2)
2      [,1] [,2]
3 [1,]    1    3
4 [2,]    4    2
5 > x.ls <- list(x.num,x.char)
6 [[1]]
7 [1] 1 3 5 5 1
8
9 [[2]]
10 [1] "All hope abandon," "ye who enter here!"
11
12 > x.dt <- data.frame(x.num[1:2],x.char)
13   x.num.1.2.      x.char
14 1          1 All hope abandon,
15 2          3 ye who enter here!
```

Indexing/subsetting

R has three basic indexing operators

```
1 x[i]
2 x[i, j]
3 x[[i]]
4 x[[i, j]]
5 x$a
6 x$"a"
```

Vector and matrix: `[` returns any single element or, for multidimensional arrays, the *i* sequential element of *x*

List: `[[` to select any single element, whereas `[` returns a list of the selected elements

`[[` form allows only a single element to be selected using integer or character indices, whereas `[` allows indexing by vectors

The tag operator `$` is similar to `[` for lists (and data frames).

