R notes – Day 1

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- Note: We are in a `Rmarkdown` document
- **Bold** *underline italic*

1 The philosophy of R

R is a **functional programming language**.

Which means that it operates around the **object-function** metaphor:

- Everything that exists in an R environment is an **object**
- Everything that happens inside an R environment is a **function**

Today we delve into *objects*

1.1 Asssignment

Assignment is done by the sign (`<-`) symbol.

(`=` works too, but we don't use it).

```r
x <- 2
a <- "Thanh"
y <- TRUE
```

Object names must only contain letters and `_`

1.2 Listing and removing objects

Listing objects:

```r
ls()
```

```
## [1] "a" "x" "y"
```

Remove objects:

```r
skldfjsdklj <- 1
rm(skldfjsdklj)
```

1.3 How to inspect things

You can just type it out!

```r
y
```

```
## [1] TRUE
```

... or use `str()` (for complicated objects).

2 Data types

Why are objects different? (Thanh) Type: - Boolean: `TRUE` or `FALSE` - Integer: e.g. 1, 2,... - Float: e.g. `1.0` (is annoying to compares) - Strings: e.g. `"I am a string!!"` - ...

Be careful with comparisons using floats!!

```
0.1 + 0.2
```

```
## [1] 0.3
```

```
(0.1 + 0.2) == 0.3
```

```
## [1] FALSE
```

3 Working with vectors

The **atomic** object in R is a `vector` (instead of scalars)

Vector: A list of value in the same **type**.

3.1 Create a vectors

Vectors are created using `c()`

Sequences is created with `:`

```
1:40
```

```
##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
## [26] 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
```

3.2 Concaternate vectors

`c()` is also concaternate vectors.

```
c(TRUE, 5, 13.5, "Hello")
```

```
## [1] "TRUE"  "5"     "13.5"  "Hello"
```

With different types: Data are coerced into the same type. - Boolean -> Interger -> Float -> String

Almost all functions works with vectors out of the box.

```
c(TRUE, FALSE) + c(3, 4)
```

```
## [1] 4 4
```

If vector lengths are uneven

```
1:10 + c(TRUE, FALSE)
```

```
##  [1]  2  2  4  4  6  6  8  8 10 10
```

```
1:10 + c(TRUE, FALSE, FALSE)
```

```
## Warning in 1:10 + c(TRUE, FALSE, FALSE): longer object length is not a multiple
## of shorter object length
```

```
##  [1]  2  2  3  5  5  6  8  8  9 11
```

3.3 Vector indexing

- Index by position number

```
letters[c(1:4, 6:length(letters))]
```

```
##  [1] "a" "b" "c" "d" "f" "g" "h" "i" "j" "k" "l" "m" "n" "o" "p" "q" "r" "s" "t"
## [20] "u" "v" "w" "x" "y" "z"
```

- Index by a logic (boolean) vector

```
letters[letters == "f"]
```

```
## [1] "f"
```

4 Puzzle

Part 1: Count the number of times a depth measurement increases from the previous measurement.

```
input <- scan("~/Desktop/R-notes/day-1_puzzle")
```

Hint: Create a logic vector and use `sum()`

```
sum(c(TRUE, FALSE, TRUE))
```

```
## [1] 2
```

- Part 2: Count the number of times the 3-period moving sum of depth measurement increases from the previous measurement