

R programming: vectorization

2024-09-02

- M1 MIDS
- [Université Paris Cité](#)
- Année 2024-2025
- [Course Homepage](#)
- [Moodle](#)



Vectors in R

[vctrs package](#)

⚠ Objectives

Vectorization

In pseudo code, we meet different uses of `for` loops. A specially interesting setting consists of `for` loops with a simple *body* and where we know that the loop iterates over all items in `collection` (there is no hidden `break` inside the body)

Listing 1 A very simple for loop

```
for (identifier in collection) {  
  # something simple  
}
```

A body is considered *simple* if each item in `collection` is processed independently of all other items in the `collection`. This entails that items may be processed in any order.

Such simple loops can be *vectorized* using functional programming tools such as those provided by package [purrr](#). `purrr::map_xxx()` or base R functions like `apply`, `lapply`, `sapply`.

```
map_xxx(collection, # something simple)
```

where `xxx` indicates the type of collection that is used to collect the result. This streamlines the task of the interpreter and this helps the reader.

i Functional programming tools are both powerful and expressive. If we use them instead of plain `for` loops, we tell the reader that iteration is simple.

Examples of vectorized functions

Most mathematical functions

i Question

What is the type of the input? of the output?

```
x <- c(6:-4)
```

```
sqrt(x)
```

```
log(x)
```

Vectorized choice if `ifelse()`

```
ifelse(test, yes, no)
```

i Question

Compare the outputs of

```
sqrt(ifelse(x >= 0, x, NA))
```

```
ifelse(x >= 0, sqrt(x), NA)
```

Explain differences if any.

i Question

Consider the vector of base class `Date`

```
x <- seq(  
  as.Date("2000-02-29"),  
  as.Date("2004-10-04"),  
  by = "1 month"  
)
```

Which items are not the 29th day of a (Gregorian) calendar month?

We attempt to turn those items into `NA`

```
y <- ifelse(as.POSIXlt(x)$mday == 29, x, NA)
```

Check the result. Explain. Fix.

i Question

What happens if argument `test` is shorter than arguments `yes` and `no`?

i Question

What happens if some entry in argument `test` is NA?