

Exercises for the course
“An introduction to R”

Exercise session Algorithmics in R (continued): Wednesday, March 14 2018

Exercise 1: *Factors, conditional execution and functions*

Write a function `myfact` that loops over the columns of a dataframe and answers which one is a factor.

Here is how it should work:

```
> myfact(heartbeats)
NULL

> ht2 <- heartbeats
> ht2$wghtcls<-as.factor(ht2$wghtcls)
> myfact(ht2)
[1] "wghtcls"
```

Hint: Use `dim()` to know the number of rows and columns of a dataframe.

One more hint: Use `names()` to know the names of the columns of a dataframe.

Exercise 2: *Functions to handle NAs*

Write a function `which.NA()` which returns the vector of indices at which the function argument has NAs. Here is how it should work:

```
> which.NA(c(1,2,NA,7,NA,6))
[1] 3 5
```

Hint: `is.na()`.

Write a function `rm.NA()` which returns its argument without NAs.

```
> rm.NA(c(1,2,NA,7,NA,6))
[1] 1 2 7 6
```

Exercise 3: *One more exercise on functions*

Write a function `se()` which calculates the standard error

$$\frac{\text{sd}(x)}{\sqrt{\text{length}(x)}} \quad (1)$$

of its argument `x`. What happens if you apply this function to `c(3,5,"a",7)` or to `c(3,NA,8,2)`?

In a second step, improve the definition of `se()` as follows. Use `is.numeric()` to check whether the argument is numeric. If it is not numeric, then print the warning message "Argument is not numeric: returning NA" with the command `warning()` and return NA. Furthermore add an argument `na.rm` to the definition of your function and let its default value be `FALSE`. If that argument is `TRUE`, then remove all NAs from the argument vector and continue as before. Here is how it should work:

```
> se(c(3,5,"a",7))
[1] NA
Warning message:
In se(c(3, 5, "a", 7)) : Argumnt is not numeric: returning NA
> se(c(3,NA,8,2))
[1] NA
> se(c(3,NA,8,2),na.rm=TRUE)
[1] 1.855921
```

Exercise 4: *Code optimization*

On Wednesday in exercise 3 we used loops to produce the expected number of eggs.

Try to optimize your code following the rules we discussed at the end of the lecture. You might want to compute the total number of eggs directly without defining the specific column.