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Exercises for the course

"An introduction to R"

Exercise session Algorithmics in R (continued): Wednesday - March 11, 2020

Exercise 1: *Factors, conditional execution and functions*
Write a function `myfact` that loops over the columns of a dataframe and answers which column is a factor.
The function should work as follows:

```
 > myfact(heartbeats)
NULL

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

Hints:

- Use the function `dim()` to get to know the number of rows and columns of a dataframe.
- Use the function `names()` to get to know the names of the columns of a dataframe.

Exercise 2: *Functions to handle NAs*

Write a function `which.NA()` that returns the vector of indices at which the function argument has `NA`s.
The function should work as follows:

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

Hint: Have a look at the function `is.na()`.

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

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

Exercise 3: *One more exercise on functions*
Step 1: Write a function `se()` that calculates the standard error

$$\frac{\mathrm{sd}(x)}{\sqrt{\mathrm{length}(x)}} \qquad (1)$$

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

Step 2: 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 `NA`s from the argument vector and continue as before.
The function should work as follows:

```
> se(c(3, 5, "a", 7))
[1] NA
Warning message:
In se(c(3, 5, "a", 7)) : Argmunt 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
```