

## Homework 2

1. Make sure to include your name in the file header, and in the filename.
2. Imagine a factor that contains “categories” **c,a,z,s**.
  - How many levels does this factor have?
  - Make an object of class factor named **f** containing the **c,a,z,s** (as factor!).
  - Now make an object of class character named **c** that contains the same letters.
  - Have a look at the two objects. Why is the order different in the levels of **f** in comparison with **c**?
  - Change the levels of the factor **f** so that the order is **c,a,z,s**.
3. Create a for loop for a range between 1 and 8, it has to print each element of the range + 5.
4. Use one of the two functions in R that help you find out what these two functions do: `cbind()` `rbind()`
5. Create a new vector containing the name of 3 of your friends.
6. Create another vector containing their ages.
7. Join the two previous vectors and create a new object named “friends1”. Do that by using the correct function: `cbind` or `rbind`?
8. Now create a new object named “friends2” with the vectors from ex. 5 and 6 but this time use the function `data.frame()` and give names to your columns, i.e., “names” and “age”.
9. Change the class of the second column of friends2 to **factor**.
10. What is one big difference between a matrix and a data frame?
11. With the variables created below, type the code to find out whether: a is greater or equal than c; b is equal to a; c is less than b. Is c smaller than b? why? (hint: check the class of the variables)

```
a <- 20
b <- "20"
c <- 10
```

12. **If statements:** create a variable ‘x’ and assign the value ‘6’ to it. Then create an if statement as follows: If x is equal or bigger than 0, create a new variable called ‘y’ that is equal to ‘x’ multiplied by 10 (and print y). Else, the variable ‘y’ should be equal to x multiplied by 5 (and print y). Then run the code.
13.
  - a) Create a data frame with two columns. The first column, named condition, has 10 observations corresponding to condition **a**. The second column, called group, contains two factors: L1 and L2. The group column contains 10 observations, 10 for each group
  - b) add a new column called `grp_contrast`. If the column group has value L1, the column `grp_contrast` should have -1, otherwise 1. Use the `ifelse` function.
  - c) add a new column called `grp_cond1`. If condition is a and group is L1, values of `grp_cond1` should be 1, otherwise 0 (hint: the `ifelse` expression can be as long as needed; you can add more than one condition by joining them using logical operators).
  - d) add a new column called `grp_cond2`. If condition is not a and group is not L1, values of `grp_cond1` should be 1, otherwise 0.

- e) add a new column called `grp_cnd3`. If condition is a or b, and group is L2, values of `grp_cnd3` should be 1, otherwise 0. (Use the logical operators discussed in class.)
  - f) print the content of the data frame to check that you did the previous exercises correctly.
- 14.
- a) Using the previous data frame, create a new data frame that contains only the observations corresponding to the L1 group.
  - b) create a new column called `RT` that contains data points drawn from a lognormal distribution with location 6 and scale 1. (hint: use the function `rlnorm`). Remember that the number of data points needs to be the same as the number of observations (or rows) in the data frame.
  - c) Compute the mean and the sd of the `RT` column, and round it up.
  - d) change all the column names to whatever names you like.
15. In the range 1 to N, where  $N=100$ , sample 50 data points from a normal distribution with mean 40 and sd 10. Then take the mean of each sampled distribution, and store it in a previously created vector with length equal to N (see the slides for an example of this). Finally, print the content of the vector, which should contain 100 means.