

Exercises for the course  
“An introduction to R”

Exercise session Reading and writing data: Friday - March 6, 2020

**Exercise 1:** *Reshaping data frames.*

- a) Download the two data files `Catfish.csv` and `Treatment.csv` from the web page and import them into R. `Catfish.csv` contains weight measurements (variables March and April) of two catfish species that are commonly used in aquaculture. Both species have been reared under different temperature and food treatments, which are specified in `Treatment.csv`. Get an overview of the structure of the data frames using `str()` and `head()`.
- b) Convert the data frame into a long format (`Catfish_long`), so that weight measurements for March and April are combined in one column named `Weight`. Use the `gather()` function from the `tidyr` package.

Try also to convert the data frame back into its original format with separate columns for March and April.

**Exercise 2:** *Adding new variables.*

- a) Add a new column `sqrtWeight` to the data frame, which displays the square root of the weight measurements.
- b) You would like to merge the two columns `Genus` and `Species` into one variable called `Species`. The result should look like this: **Silirus.glanis**. Fortunately, the `dplyr` package provides functions to split and combine columns.

**Exercise 3:** *Combining data frames.*

- a) To learn how the functions `left_join()`, `right_join`, and `inner_join()` from package `dplyr` work, we will first practice on a very easy dataset containing student exam results. Open the script `dataframe_join_example.R` from the course website and run it in R. What is each function doing?
- b) Back to our Catfish example. The treatment data has been saved in a different file. Use one of the `dplyr` functions for joining datasets to produce a dataset named `Catfish_Treatment` that will contain weight measurements as well as temperature and food treatment.

**Exercise 4:** *Subsetting data.*

- a) Use `subset()` and logical operators to make a new data frame that just contains females with a weight over 72g.
- b) Make another subset for males, which contains all males that have a weight under or equal to 20g or over 70g.
- c) Take a random subset that contains 65% of the data.

**Exercise 5:** *Summarising data with dplyr.*

- a) Use the data frame `Catfish_Treatment` and the `summarise()` function from `dplyr` to calculate the mean, the standard deviation, and the variance of weight for all individuals.
- b) Get the mean, the standard deviation, and the sample size for each food treatment separately.

HINT: You have to group your data first before you calculate summaries