

Exercises for the course  
**“An introduction to R”**

Exercise session Algorithmics in R: Friday, March 3 2017

**Exercise 1:** *The role of the heartbeat in the relation between mother and infant.*

We will study a dataset containing data about an experiment done with newborn babies. Newborns of different weight classes (variable `wghtcls`) are submitted or not to a treatment (variable `treatment`) that consists of hearing the sound of the heartbeats of the mother. The increase in weight (variable `wghtincr`) during a certain period of time is measured.

Download the file 'heartbeats.txt' from the course web page. Read the data from 'heartbeats.txt' into a data frame named `heartbeats`. Get an overview of the structure of the data frame. The group of newborns which had the heartbeat treatment is referred to as 'heartbeat group'. Calculate

- the mean of the increase in weight of all newborns,
- the mean of the weight increase of the control group,
- the mean of the weight increase in the heartbeat group,
- the mean of the weight increase in each weight class of the control group,
- the mean of the weight increase in each weight class of the heartbeat group,
- the standard deviation of the weight increase of all newborns.

Are the means in the heartbeat group higher than in the control group?

**Exercise 2:** *Exchanging A and B*

Write an R script allowing to exchange the values of two variables A and B. At the end of the script, B must have the initial value of A and A must have the initial value of B.

You can start your script with values of your choice for A and B.

**Exercise 3:** *Bird nests*

Do you remember from Day 1 the bird species with females from 1 year and above building nests and males from one year and below 6 years also building a nest?

Write an R script reading in the dataset `birdnests.txt`.

Add a column named `nest` to the dataset which says whether the bird will build a nest or not (factor TRUE or FALSE)

Now for each nest in the population the expected number of eggs will be :

- 1,2,3,4 or 5 with equal probability for nests built by a female
- 0 for male nest when no female is attracted (50% chance)
- 3, 4 or 5 with equal probability for male nest with female (the female has saved energy as she did not build the nest)

Following these rules assign a number of eggs to each nest and then the total number of eggs produced by this bird population (maybe you should `subset` the dataset and consider adding a new column).

Repeat this last step 100 times and compute the mean and standard deviation of the total number of eggs.

HINT: you might need the functions `sample()` and `rbinom()`. Look for help on these functions if needed.

**Exercise 4:** *The infinite loop*

Execute the following commands:

```
x <- 0  
while (x < 1) {  
  x <- 0  
}
```

Hint: Use Strg + C to stop the execution or STOP in RStudio.

What happened?