

Advanced Topics in Algebra – Lab#3

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Topic: Graphics in R (4h)

For this lab use the Jupyter R environment – the library `ggplot2` is already installed there. Or use RStudio. The simple environment does not work with `ggplot2`.

Please download the ComputerWorld R introduction in PDF
www.if.pwr.edu.pl/~mjarema/R-pdf.zip

Password: only4BDAsstudents

Read pages 6,7, and 18,19,20.

If you use RStudio on your computer, execute:

```
install.packages("ggplot2") #internet connection required  
library(ggplot2)
```

Task 1. Get data for plotting.

- Execute in R console (one line at a time):

```
mtcars  
diamonds  
data()
```

These are two of many example datasets defined by default in R. Look at their column names and content. Imagine, how you can plot the information.

- Practice importing your external data into R.

Write using keyboard a short file containing two columns of numbers, for example a `.txt` file in Notepad or `.csv` in Excel (`csv` means Comma Separated Values – you can look into the `csv` file using notepad).

Import the data using `read.csv` or `read.table`

Task 2. Prepare at least 3 graphs of different types.

- Search for examples of data visualization in R.
- Execute the examples and make sure you understand how they work and what is the meaning of options. Use help of plotting functions. If an example is too difficult to understand, select a simpler one.
- Modify the code and customize as many properties of the graph as you can.

You can start by watching gallery of graphs made by `ggplot2`
<https://www.r-graph-gallery.com/portfolio/ggplot2-package/>
gallery of endless possibilities offered by extensions
<http://www.ggplot2-exts.org/gallery/>
and read also the following book chapters to understand the code
<https://r4ds.had.co.nz/data-visualisation.html>
<https://livebook.manning.com/#!/book/r-in-action/chapter-6/>

NOTES to list #3

Caveats of R code

```
a <- 1  
b <- 3  
a:b  
    1 2 3  
a:b-1  
    0 1 2      #this is not what we expect!  
a: (b-1)  
    1 2      #do not forget parentheses () in loops,  
                # always write   for( i in () :() ) {}  
  
b:a  
    3 2 1
```

```
# TRICK: what will this loop do if b>a ?  
for(i in b:a) { print(i) }  
# it executes counting downwards!  
# but in other programming languages the loop  
# for i from b to a  
# would execute zero times if b>a !
```

Getting Help, Import Data

Please read the cheat-sheet part of this website
<https://www.dummies.com/programming/r/r-for-dummies-cheat-sheet/>

Reading data from files - examples

```
mydata <- read.csv("filename.csv")  
data <- read.table(file="myfile", sep="\t", header=TRUE)
```

User input: string and simple integers

```
my.name <- readline(prompt="Enter name: ")  
my.age <- readline(prompt="Enter age: ")  
# convert character into integer  
my.age <- as.integer(my.age)  
print(paste("Hi, ", my.name, "next year you  
will be", my.age+1, "years old."))
```

Today We Learned:

default datasets
making and customizing graphs (`ggplot2`)
`read.table`, `read.csv`
`readline`, `as.integer`,
`print(paste(..., ...))`

Task 3*. Make an animation using `gganimate` or `tweenr`