# Programming (ERIM)

1. Exercise

Deadline for submission: 2014-11-02 23:59 CET

## Instructions / exercise

In this exercise we will iterate over a set of integers while computing properties on them, and store these properties in order to visualize them later on with a barplot. Visualization is in general quite language- and library-specific: plotting in matlab requires calling more than one function (see plotting examples accessible through the help-menu), whereas plotting barplots in R is achieved with a single function call `barplot` (documentation accessible with `? barplot`).

## Exercise

Implement a script that computes all primes from 2 until $n = 100$ with the Sieve of Eratosthenes algorithm (see `http://en.wikipedia.org/wiki/Sieve_of_Eratosthenes`). To achieve this, you need to compute remainders, which can be achieved in matlab with function `mod`, and in R with the operator `%%`. In addition to computing whether a number $p$ is prime, you should compute the amount of numbers $k \leq n$ for which $p$ is a factor. For example, in case $n = 6$, then the number 2 is a factor for 3 numbers (2, 4 and 6). The script should also construct a barplot that has on x-axis the primes and on y-axis the counts of numbers they are factors for. Label the axes accordingly and include a title for the plot. Note that even though some primes are factors for no other numbers, they should be included in the plotted series (and have a corresponding bar of height 0).

## Instructions / submission

Include in each source file your names and student numbers as a comment in the beginning of the file. Submit the exercise as a zip file containing only the source files (.m or .R) in root of the zip. Submit via Blackboard. Note that incorrectly submitted or non-running exercises are automatically awarded 0 points. Remember to document your code and use descriptive variable names.