***Preliminaries***

The solutions to the assignments involving R coding should be reported in details, all R code that you write should be **included** into the report. Also, all appropriate pictures or diagrams should be included.

***Assignment 1: Cluster sampling***

An opinion pool is assumed to be performed in several locations of Sweden by sending interviewers to this location. Of course, it is economically unreasonable to visit each city. Instead, a decision was done to select randomly 20 cities with the probabilities proportional to the number of inhabitants of the city. Explore the file ***population.xls***

1. Import necessary information to R
2. Write a random number generator which could select 20 cities from the whole list with probability scheme offered above.
3. Run the program. Which cities were selected? What can you say about first three cities?
4. Plot one histogram showing the size of locations of the country. Plot similar histogram for the selected cities. Conclusions?

***Assignment 2: Different distributions***

The double exponential distribution is given by formula:

1. Write a code generating double exponential distribution DE(0,1) from U(0,1) by using inverse CDF method. Explain how you obtained that code step by step.
2. Use Acceptance/rejection method with and DE(0,1) as majorizing function to generate N(0,1) variables. Explain step by step how this was done. How did you choose constant *c* in this method?Generate 2000 random numbers N(0,1) using your code and plot the histogram. Find out the average rejection rate in the acceptance/rejection procedure. Generate 2000 numbers from N(0,1) using standard *rnorm* procedure, plot the histogram and compare the obtained two histograms.

## Submission procedure

If you are neither speaker or opponent, you should just send-in the solutions via It’s learning. **Note that there is a deadline for submission!** If you are *speaker*, you must also do the following:

* Put your report and PowerPoint presentation to the folder *Lab 2* which is in the folder *Seminars*. Specify Active : “Set time span”. Specify activation time as **9 november 13:00. Make sure that the time settings are specified!**

If you are *opponent*, you may find the report and PPT-file for revision available immediately after **9 november 13:00** in the folder*Seminars->Lab 2*