***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: Maximizing likelihood***

1. File *data.RData* contains a sample from normal distribution with some parameters μ, σ. Load the data to R environment.
2. State the likelihood function for 100 observations and derive maximum likelihood estimators for μ, σ. Use formulas derived to obtain parameter estimates for the data loaded.
3. Now you are assumed to derive maximum likelihood estimates numerically. Why it is a bad idea to maximize likelihood directly? If this question seems to be complex, try to apply *optim()* function to the likelihood function to obtain maximum and understand why it has problems to find maximum.
4. Use log-likelihood function instead with initial parameters μ=0, σ=1. Try both Conjugate Gradient method and BFGS algorithm with gradient specified and without. Try other initial parameters.
5. Did algorithms converge in all cases? What were the optimal values of parameters and how many function and gradient evaluations it required for algorithms to converge?

## 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 6* which is in the folder *Seminars*. Specify Active : “Set time span”. Specify activation time as **19 maj 15:00. 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 **19 maj 15:00** in the folder*Seminars->Lab 6*