Tutorial for
# Introduction to Computational Intelligence in Winter 2009/10

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`http://ls11-www.cs.tu-dortmund.de/people/rudolph/teaching/lectures/CI/WS2009-10/lecture.jsp`

## Sheet 9, Block C
06.01.2010
**Return: 13.01.2010, 10 a.m.**

**Exercise 9.1: (1+1)EA** (10 Points)

Implement a (1+1)EA as described on slide 10 of lecture 10a). Optimize the following functions and empirically determine the number of generations until the optimum is found. Give a function for this time in Landau notation depending on the input size $n$. To this end, choose different values of $n$ (e.g. 10, 100, 500, 1000 and others) and use whatever tools may help you (e.g. using statistics, plotting the time). Document and explain your studies and results.

a) Minimize $f(\mathbf{x}) = \sum_{i=1}^{n} x_i$, with $x_i \in \{0, 1\}$, for $1 \leq i \leq n$.

b) Minimize $g(\mathbf{x}) = -\sum_{i=1}^{n} \prod_{j=1}^{i} x_j$, with $x_j \in \{0, 1\}$, for $1 \leq j \leq n$.

Hand in your solutions as an offprint or a pdf file. Send your source code by e-mail to Nicola including instructions how to compile and execute your program. Demonstrate your program in the tutorial and therefore bring your own laptop with you if possible.