TIN092 — Algorithms

Exercise Set 1

Note: Don't forget to read, on the course website, the directions & guidelines for solving & submitting exercise sets (http://www.cse.chalmers.se/edu/course/TIN092). Write on a printout of this PDF, and write each solution only in the space given (indicated by horizontal bars). Feel free to refer to parts of the book (do that instead of copying definitions and algorithms from it, for instance).

Exercise 1

As exercise [KT 1.6]. Points: 3.

Exercise 2

As exercise [KT 2.6].

a) In addition to what is requested in [KT 2.6] a), give (a rough estimate of) the number of operations performed by the given algorithm, as a function of n by counting operations, and simplify it as much as possible, like we did in the exercise session, and as shown in the course notes. Points: 2

b) Points: 1

c) Points: 2

Exercise 3

- a) Prove that, if f is in O(g), then O(f + g) = O(g). Points: 1
- *b) Prove that $\log n! = \Theta(n \log n)$. Hint: For the upper bound, compare n! with n^n . For the lower bound, compare n! with $(n/2)^{n/2}$. Points: 1