

Data Structures, first mid-term exam October 26th, 2001

Write on every paper the name of the exam, date, your name, your personal identification number and your signature. Enumerate the pages.

1. Show precisely, based on the definition of \mathcal{O} symbol, that

$$n \cdot \log n + (\log n)^2 \in \mathcal{O}(n \cdot \log n).$$

(5 p)

2. Implement, using Java, a stack as a linked structure. Don't use any ready-made data structures such as lists etc. Try to hide the inner structure of the stack as well as possible. Use exceptions to deal with special situations. (7 p)

Obs! You can use C as an implementation language, if you have informed the lecturer beforehand.

3. Write an algorithm, which computes the height of a binary tree. Write both a recursive and iterative algorithm. (8 p)
4. Explain the following concepts:
 - a) Heap. (1p)
 - b) Stable sorting algorithm. (1 p)
 - c) Priority queue.(1 p)
 - d) Collision in hashing. (1 p)
 - e) The upper bound for the number of nodes at level i in a binary tree. (1 p)
 - f) Decision tree. (2 p)