OHJ-2016 Utilization of Data Structures

Exam 22.5.2006

It is forbidden to use any written material such as cheatsheets, books, lecture notes etc. Electrical devices (calculators, cell phones, computers, etc.) may not be used during the exam.

Make sure you've answered all questions.
Answer shortly and clearly - the answers are not graded based on their length.
Incorrect answers don't, normally, reduce points. However, the examiner reserves the right to make point reductions if the answer is completely irrational or in clear contradiction with itself, i.e. clearly a guess.

1. Explain shortly (max. 3 lines/point) the following terms:

   a) What is meant by the *greedy choise property*? (1 p)

   b) What is a *dynamic set* (1 p)

   c) What is meant by the *stability* of sorting algorithms? (1 p)

   d) Sort the array below with the given algorithm. Show what the algorithm prints. Use the subscripts to indicate the order of the elements with the same value. (3 p)

10	2	8_1	5	8_2	3	8_3	9

```
MERGE-SORT(A, p, r)
    if p < q then
        q := ⌊(p + r)/2⌋
        MERGE-SORT(A, p, q)
        MERGE-SORT(A, q + 1, p)
        MERGE(A, p, q, r)
        PRINT(A)
```

```
MERGE(A, p, q, r)
    for i := p to r do
        B[i] := A[i]
    i := p
    j := p; k := q + 1
    while j ≤ q and k ≤ r do
        if B[j] ≤ B[k] then
            A[i] := B[j]
            j := j + 1
        else
            A[i] := B[k]
            k := k + 1
        i := i + 1
    if j ≤ q then
        k := 0
    else
        k := q - r
    for j := i to r do
        A[j]:=B[j + k]
```