Exercises

Algorithm theory

Winter term 2008/09

Exercise sheet 14

TASK 1 (1 point)**:**
Insert 2, 7, 27, 5, 56, 1, 34, 16 in an empty binominal queue. After this perform one `deletemin` operation. Illustrate the resulting binomial queue for each step.

TASK 2 (1 point)**:**

1. Execute the following operations on an initially empty Fibonacci Heap:

$$insert(15), insert(27), insert(6), insert(34), insert(42)$$
$$insert(35), insert(3), insert(41), insert(22), insert(12)$$
$$deletemin(), decreasekey(27, 2), decreasekey(34, 17), deletemin()$$

    For all intermediate stages illustrate the structure of the Fibonacci Heap. A new element is inserted to the right of the current minimum. The consolidation during the operation *deletemin* starts with the element to the right of the deleted minimum.

2. Show that the following claim is not true:

    The maximum height of a tree within a Fibonacci Heap with n nodes is *O(log n)*.

    Proceed as follows: For an arbitrary $n > 0$ give a sequence of operations that creates a Fibonacci Heap that finally consists of one tree that is a linear chain of n nodes.