Lab 3

Analysis of *d*-ary heaps

A *d*-**ary heap** is like a binary heap, but (with one possible exception) non-leaf nodes have *d* children instead of 2 children.

1. How would you represent a *d*-ary heap in an array? (10%)
2. What is the height of a *d*-ary heap of *n* elements in terms of *n* and *d*? (10%);
3. Given an efficient implementation of EXTRACT-MAX in a *d*-ary max-heap. Analyze its running time in terms of *d* and *n*. (20%);
4. Given an efficient implementation of INSERT in a *d*-ary max-heap. Analyze its running time in terms of *d* and *n*. (20%);
5. Give an efficient implementation of INCREASE-KEY(A, i, k), which first sets $A[i]$ max($A[i]$, k) and then updates the *d*-ary max-heap structure appropriately. Analyze its running time in terms of *d* and *n*. (20%);
6. Document. (20%)