CSCI 305, Homework # 5

YOUR NAME HERE

Due date: Midnight, May 14

1. Analysis of d-ary heaps (problem 6-2 in the text).

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

   (a) How would you represent a d-ary heap in an array?

   (b) What is the height of a d-ary heap of n elements in terms of n and d?

   (c) Give an efficient implementation of EXTRACT-MAX in a d-ary max-heap. Analyze its running time in terms of d and n.

   (d) Give an efficient implementation of INSERT in a d-ary max-heap. Analyze its running time in terms of d and n.

   (e) Give an efficient implementation of INCREASE-KEY(A, i, k), which flags an error if $k < A[i]$, but otherwise sets $A[i] = k$ and then updates the d-ary max-heap structure appropriately. Analyze its running time in terms of d and n.