Algorithms (COT 6405): Assignment 6

Due date: October 2 (Thursday)

Problem 1 (6 points)
A *d-ary heap* is like a binary heap, but instead of 2 children, nodes have d children.

(a) How would you represent a d-ary heap with n elements in an array? What are the expressions for determining the parent of a given element, $\textsc{Parent}(i)$, and a j-th child of a given element, $\textsc{Child}(i, j)$, where $1 \le j \le d$?

(b) Write an efficient implementation of HEAPIFY and HEAP-INSERT for a d-ary heap, and give the running time of your algorithms in terms of n and d.

Problem 2 (4 points)
What is the height of a d-ary heap of n elements in terms of n and d? You need to give an *exact* expression for the height, without using the Θ-notation.