

Homework 6 – due Oct 26th, 4:40pm (before class)

Reminders:

- You may work either alone or in teams of two. If working in pairs, you should hand-in a single assignment, with both of your names on it.
- The solution must be typed (Word is recommended). No handwritten work will be accepted or graded.
- Remember to use the header page provided on Angel.
- Late homework will not be accepted, but you are allowed to drop one lowest homework grade at the end of the semester.
- You are not allowed to discuss any aspects of the homework solutions problem with anyone except your partner. Finding answers to problems on the Web or from other outside sources (these include anyone not enrolled in the class) is strictly forbidden.

Problem:

1. 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 as 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 Heapify-Up (also called Heap-Increase-Key in the book). Analyze its running time in terms of *d* and *n*.

For parts (c) (d) and (e), please either give pseudocode or use plain English to describe your algorithm very precisely.