

Homework 5 (Posted 26th February, Due during or before class 5th March)

Problem 1: (Grade 5 pts) Consider a generalization of the binary heap structure. Every node has d children. It is an almost complete, d -ary tree, and a node must be less than or equal to all its children. Design an array representation of the heap. Design a delete min and increase key procedure here.

Problem 2: 9 pts Consider a binary heap. Print the keys as encountered in a preorder travel. Is the output sorted? Justify your answer (Either prove that it is sorted or give counter examples). Attempt the same question for inorder and postorder travel.

Problem 3: 6 pts Give an algorithm to find all nodes less than some value X in a binary heap. Analyze its complexity.

Problem 4: 5 pts Given any n , design an input of n elements such that the insertion sort takes $\Omega(n^2)$ operations.

Problem 5: 15 pts Problem 6.15 a, b, c from Mark Alan Weiss.