

Problem Set 3

Assigned: June 8

Due: June 15

Problem 1.

Suppose that you are given the problem of returning in sorted order the k smallest elements in an array of size n , where k is much smaller than n , but much larger than 1.

- a. Describe how heapsort can be adapted to this problem.
- b. Find the worst-case running time of the modified heapsort as a function of k and n .

Problem 2.

Show that any comparison method for solving the problem in problem 1 must take at least $\Omega(k \cdot \lg(n))$ in the worst case

Problem 3. (CLR&S 7.5-6)

Give an $O(n \cdot \lg(k))$ time algorithm to merge k sorted lists into one sorted list, where n is the total number of elements in all the input lists. (Hint: Use a heap for k -way merging.)