CSC 411. Spring 2023

Homework #5

Due: Mar 30, 2022 (Thursday) 11:59 pm

1. Textbook #5.1-2 (a) (b) (c) (30 Points)

2. a. Write pseudocode for a divide-and-conquer algorithm for finding values of both the largest and smallest elements in an array of n numbers.

b. Set up and solve (for $n = 2^k$) a recurrence relation for the number of key comparisons made by your algorithm.

c. How does this algorithm compare with the brute-force algorithm for this problem?

2. Textbook #5.3-8 (a) (30 Points)

8. a. Draw a binary tree with 10 nodes labeled 0, 1, . . . , 9 in such a way that the inorder and postorder traversals of the tree yield the following lists: 9, 3, 1, 0, 4, 2, 7, 6, 8, 5 (inorder) and 9, 1, 4, 0, 3, 6, 7, 5, 8, 2 (postorder).

3. Textbook #5.5-4 (40 Points)

4. Implement the divide-and-conquer closest-pair algorithm, outlined in this section, in the language of your choice.