Minor Test I – June 2022

MCAC 201 : Data Structures

Time: 1 Hour

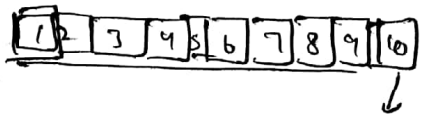
Max Marks: 20

1. Suppose a traveler Ravi decides his itinerary for a 10 day India tour and packs his clothes in a suitcase "Blue" according to the itinerary with first to be used at the top and last to be used at the bottom. Later he finds that the suitcase's lock is not working and hence he needs to change his suitcase to suitcase "Red". Help Ravi by writing an **efficient** recursive function Transfer_Clothes(suitcase B, suitcase R) to transfer clothes from suitcase B to suitcase R such that order of clothes in suitcase R is same as order of clothes in suitcase B. Explain the space and time complexity of your solution.

2. Give an O(n) time algorithm to compute the difference between the maximum and the minimum heights of the 'n' students of your class standing in a queue using only Enqueue() and Dequeue() operations and O(1) extra space. How many comparisons did your algorithm make? Can you do it in < 2n - 1 comparisons? 04

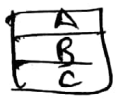
3. Hash function h(k) = k mod 10 and linear probing is used to insert elements into a hash table. Following is the current status of the table: 07

0	
1	
2	12
3	13
4	2
5	3
6	23
7	5
8	18
9	15



Perform the following operations:

a. Insert 28
b. Insert 25
c. Delete 13
d. Search 3



c. Insert 29

f. Search 3

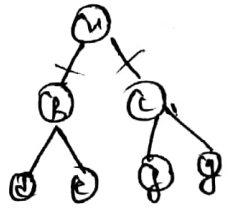
4.

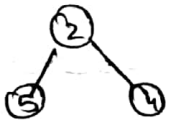
a. Assuming the binary tree is full, construct a binary tree from the following pre-order and post-order traversals respectively 2 5 4 1 6 7 3 and 3 7 6 1 4 5 2 using recursive algorithm done in the class. Show the status of the tree after every step.

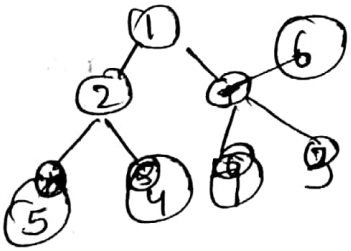
b. Can you construct another binary tree with the same pre-order and post-order traversal? 4 + 2

2 5 4 1 6 7 3

Root
left
Right

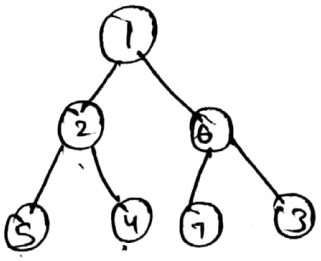


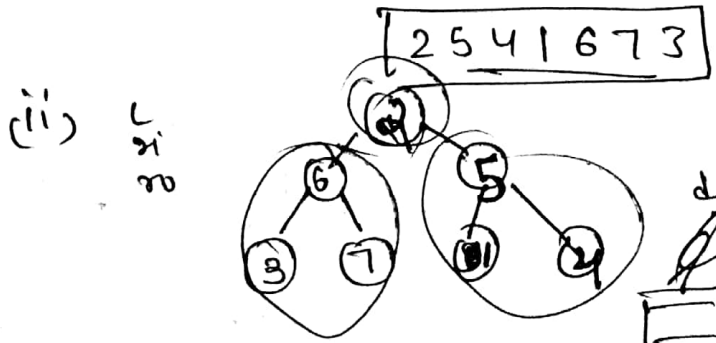




2 4 5 1 3 6 7

(i)





2 5 4 1 6 7 3

(ii)

dequeue

Lenque

3 7 6 5 2 1

1 4 5