

Reg. No : 21BCSE1846

Name :



VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test II – October 2022

Programme	: B.Tech (CSE)	Semester	: Fall 2022-2023
Course	: Data Structures and Algorithms	Code	: BCSE202L
Faculty	: Srinivasa Rao, Ramesh, Kavya, Manimegalai, Sangeetha, Abinaya, Suguna, Mercy, Vijayalakshmi, Rishikeshan, Muthukumaran, Pavithra	Slot	: D1+TD1
		Class No	: CH2022231001052, 1057, 1056, 1055, 1068, 1066, 1053, 1069, 1054, 1064, 1065, 1067
Time	: 90 Minutes	Max. Marks	: 50

Answer ALL the Questions:

Q.No.	Sub. Sec.	Question Description	Marks
1		Let S1 and S2 be two stacks and elements in the stacks are ranging from 1 to n. The integers are placed in increasing order in S1 and S2. Write two different algorithms to arrange the integers in S1 and S2 into a single stack (S) in increasing order. Compute the time complexities of your algorithms. For example if n=5, S1=[1,3,5] and S2=[2,4] output is S=[1,2,3,4,5].	10
2		Assume an n-digit number, where n (n>=2) is an even number. The given number is partitioned into two equal partitions L1 and L2 such that L1 is having digits from index position 1 to (n/2) of the given number and L2 is having the remaining digits from index position (n/2)+1 to n of the given number. For example, 785613 is a 6-digit number for which L1 = {7,8,5} and L2={6,1,3}. The elements of L1 and L2 are stored in stack and queue data structures respectively. Your task is to compute the sum of the digits of a given n-digit number by performing operations on L1 and L2 only. Note you should not apply sequence of operations on same list at a time.	10
3		Let L be a linked list with 'm' nodes and the j th node in list L has data l _j , 1≤j≤m. Let A be an array of 'n' integers, A[i], A[i+1],...,A[n], 1≤i≤n, such that they are the subset of the elements of list L. Write an algorithm to find the maximum subsequence that is common (occurs in same order) in both array A and list L.	10

	<p>Example 1: L = 1-> 2-> 6-> 4-> 3-> 7-> 8</p> <p>A=[1, 2, 4, 3, 7]</p> <p>Output: 4, 3, 7</p> <p>Example 2 : L = 15->26->2->11->8->9</p> <p>A= [8, 9, 15, 2, 26]</p> <p>Output: 8,9</p>	
4	<p>Assume S is a data set of n integers and another integer x. Write an algorithm using queue data structure to determine whether or not there exist two elements in S whose sum is exactly x.</p>	10
5	<p>TR1 and TR2 are two binary trees. Tree TR2 is said to be subtree of TR1 if there exists a node x in TR1 such that the subtree of x is identical to TR2. That is, if you cut off the tree at node x, the two trees would be identical. Given two trees TR1 and TR2, write an algorithm to check if TR2 is subset of TR1.</p>	10