



Continuous Assessment Test II – October 2022

Programme	: B.Tech CSE	Semester	: Fall 22-23
Course	: Data Structures and Algorithms	Code	: BCSE202L
Faculty	: Srinivasa Rao, Kavya, Ramesh, Manimegalai, Sangeetha, Abinaya, Kalaipriyan, Suguna, Mercy, Muthukumaran, Pavithra, Rishikeshan, Vijayalakshmi.	Slot	: D2+TD2
		Class No	: CH2022231001081, 1203,1206, 1082, 1210,1084,1078,1080, 1205,1077,1079,1207, 1083
Time	: 90 Minutes	Max. Marks	: 50

Answer ALL the Questions:

Q.No.	Sub. Sec.	Question Description	Marks
1		Assume a stack-S contains a set of positive integers. A number 'x' is said to be a duplicate number if it is present more than one time in the stack. Write an algorithm to remove all duplicate numbers in the stack S and also illustrate your algorithm for any <u>sample input</u> . Compute running time of your algorithm.	10 <i>normal</i>
2		Let S be a stack of non-negative integers of size n, write an algorithm with linear time to move all the zeros in the stack S to bottom of the stack and move positive integers to the top by maintaining their order. Your algorithm should use stack data structure only, you can't use any other data structures like arrays, list, queue, etc.	10 <i>reverse transfer?</i>
3		Let L be a singly linked list having n nodes and let k, with $1 < k < n/2$ , be a positive integer. Write an algorithm to arrange the elements that are occurring at every position divisible by k in a non-decreasing order, using only the link field of the node and not using the data values.  Example 1: If L:1->9->4->6->3->5->8 and k=2 then the re-arranged list (positions are 2, 4 and 6, the respective elements in L are 9, 6 and 5) is L':1->5->4->6->3->9->8  Example 2: If L:1->2->6->4->9->3->7->8->5->10 and k=3 then the re-arranged list is L':1->2->3->4->9->5->7->8->6->10	10 <i>position divisible increasing order.</i>
4		The <b>Circle Game</b> : N people, numbered 1 to N, are sitting around a circle. Starting at person 1, a hot potato is passed. After M ( $1 \leq M \leq N$ ) passes,	10

the person holding the hot potato is eliminated. With this elimination the first round gets over. Then the second round of the game continues with the person who was sitting after the eliminated person (in the first round) picking up the hot potato make  $M$  passes. The game continues like this, for many rounds and the last remaining person wins. For example, if  $M=1$  and  $N=5$ , the order of elimination is 2,4,1,5. Given values of  $M$  and  $N$ , write an algorithm using linked list data structure to identify the winner of **Circle Game**. Compute the running time of your algorithm.

delete from linked list. circular? ✓

5

**Level Order** traversal is defined as follows: It is a kind of binary tree traversal where elements in the binary tree are traversed by levels, top to bottom and within levels, left to right. Write an algorithm to compute the **Level Order** traversal of a binary tree. For example, **Level order** traversal of the following binary tree is: 8(Root node), 4,7, 5,3 9.

traversal? pre order, post order, in order ✓

