Paper / Subject Code: 50294 / Data Structures & Algorithm "ECS" May '2023

DSE Sem III (R-2019 C Scheme)

01/06/2023

Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required, and state it clearly.

1 Attempt the following. **[20]**

a Explain linear and nonlinear data structures.

b Explain infix, postfix and prefix expression with an example.

c Differentiate between stack and queue.

d Write an algorithm to traverse a singly linked list

2 a Write a C program to implement queue using Arrays. **[10]**

b Write an algorithm to convert infix expression to postfix using stack. **[10]**

3 a Explain BFS and DFS algorithm. **[10]**

b Write an algorithm for linear search and binary search algorithms **[10]**

4 a Consider the following sorted array DATA with 13 elements: 11, 22, 30, 33, 40, 44, 55, 60, 66, 77, 80, 88, 99 Illustrate the working of binary search technique while searching an element (i) 40 (ii) 85. **[10]**

b What is a Binary search tree? Construct a Binary search tree for the following elements. 50,33,44,22,77,35,60,40 **[10]**

5 a Explain selection sort using an example. Write an algorithm for it and comment on its complexity **[10]**

b Explain different graph representation techniques with an example. **[10]**

6 a Write a C program to implement a singly linked list. The program should be able to perform the following operations: **[10]**

1. insert a node in the end
2. delete the fisrt node
3. display the nodes.

b Write a program to implement a stack using array. **[10]**

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