

Vidya Vikas Mandal's
Shree Damodar College of Commerce & Economics, Margao-Goa
SY B.Voc.(ST), Semester-III, Semester End Examination, November 2023
STG 301 Data Structures

Duration: 2 hours

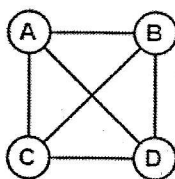
Max Marks: 60

*Instructions: 1) Figures to the right indicate Full Marks.**2) All Questions are compulsory, however there are internal choice***Q1. Answer any 5 of the following.****5 x 2 = 10**

- State the syntax to define a 1D array.
- What is the use of strcat() function in strings?
- How many comparisons will be required to search for element 35 using linear search and binary search in the following array: 12, 23, 35, 56, 89, 90
- What is the use of free() function in C?
- What is a doubly linked list?
- Convert the following expression from Infix to Prefix: $A+B*C/D-E$
- What is push and pop operation on stacks?

Q2. Answer any 5 of the following.**5 x 2 = 10**

- Differentiate between Static Stacks and dynamic stacks (2 points).
- State the importance of Rear and Front pointer in queue data structure.
- Cite an example of Expression tree with atleast 3 operators.
- What is a B Tree?
- When can we say that a tree is a complete binary tree?
- What is a Digraph?
- Draw the adjacency matrix for the following graph.

**Q3. Answer the following.****10**

- A. Apply linear search algorithm in step by step manner to search element 15 in the array : (5)

2	5	9	12	20	15	3
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OR

- B. Perform Selection Sort on the following array. Show the step by step method. (5)

19	23	8	54	17
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C. Answer the following questions with respect to the given array named 'arr': (5)

3	6	9	12	15
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- What is the index of element 15 ?
- Write the steps to insert an element 30 at location 3
- Write the steps to delete the first element.

Q4. Answer the following.

10

A. Explain the different types of Non- Linear Data structures. (5)

OR

B. Construct a Doubly linked list with 3 nodes diagrammatically in a step by step manner, showing the position of the relevant pointers. (5)

C. Illustrate insertion and deletion of 2 nodes each in a singly linked list with your own labeled example. (5)

Q5. Answer the following.

10

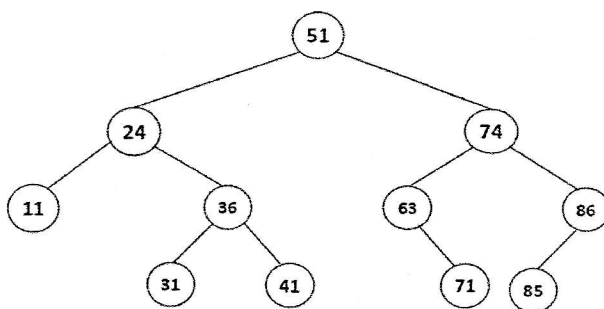
A. Differentiate between Stack and Queue Data structure. Give any 5 points. (5)

OR

B. Convert the following expression from Infix to Postfix using Stack data Structure in a step by step manner: (5)

$$(P + Q) * (R - S)$$

C. Find the Inorder, Preorder and Postorder tree traversals for the following tree. (5)



Q6. Answer the following.

10

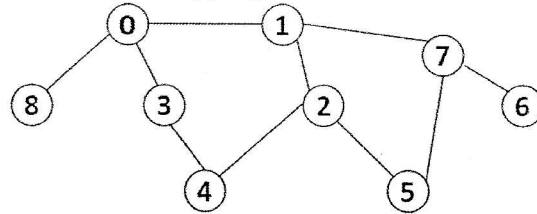
A. Construct a Binary Search tree with the following elements in a step by step manner: 40, 34, 67, 89, 2, 6, 56, 90, 1, 60 (5)

OR

B. Define the following with respect to Tree data structure giving examples wherever necessary. (5)

- Root node
- Leaf node

- c. Depth of a node
 - d. Siblings
 - e. Degree of a node
- C. Show the DFS and BFS traversals for the following graph starting with node 0 in a step by step manner using the appropriate data structure: (5)



=====ALL THE BEST=====