4/11 **2504E177** Candidate's Seat No :_____

Integrated M.Sc. Cybersecurity & Forensics Semester- 2 (Repeater)
ICSF 202
Data Structure
April-2024

Duration: 2hr 30 min **Total Max. 70**

Instructions: Illustrate your answers with neat diagrams wherever necessary.

Que 1 Write the following

(i) Explain the difference between an array and a linked list. (7 Marks)

(ii) Explain the concept of recursion and give an example of a problem that can be solved using recursion. (7 Marks)

OR

(i) Define what a data type is and explain its importance in the context of data structures. (7 Marks)

(ii) Differentiate between primitive and non-primitive data types. Provide examples of each. (7 Marks)

Que 2 Write the following

(i) Define what a linear data structure is and provide two examples. (7 Marks)

(ii) What is the primary difference between a stack and a queue? (7 Marks)

OR

(i) Explain the concept of "First In, First Out" (FIFO) and "Last In, First Out" (LIFO) in the context of linear data structures. (7 Marks)

(ii) What is the difference between a singly linked list and a circular linked list? (7 Marks)

Que 3 Write the following

(i) Describe collision resolution techniques in hashing with suitable examples. (7 Marks)

(ii) Define Binary Search Tree (BST) and explain its properties. (7 Marks)

OR

(i) Define breadth-first search (BFS) algorithm. Explain its primary purpose in graph traversal. (7 Marks)

(ii) Define depth-first search (DFS) algorithm. Explain the basic concept behind DFS traversal. (7 Marks)

Que 4 Write the following

(i) Explain the basic idea behind the bubble sort algorithm and how it works. (7 Marks)

(ii) Compare selection sort with other sorting algorithms like bubble sort and insertion sort in terms of efficiency and simplicity of implementation. (7 Marks)

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OR

(i) Explain the basic idea behind the Quicksort algorithm. How does it work? Provide a step-by-step description of the algorithm with an example. (7 Marks)

(ii) Explain what sequential search is and how it works. Describe its basic algorithm and mention its time complexity. (7 Marks)

Que 5 Attempt any ten out of twelve (14 Marks)

(i) Describe the difference between a breadth-first search (BFS) and a depth-first search (DFS) algorithm.

(ii) A _____ is a collection of elements where each element has a unique key.

(iii) A _____ data structure is similar to a stack but follows the principle of First In First Out (FIFO).

(iv) BFS stands for _____.

(v) One drawback of BFS is that it requires more _____ compared to Depth-First Search (DFS).

(vi) DFS stands for _____.

(vii) DFS can be used to detect _____ in a graph.

(viii) In _____ search, the array must be sorted beforehand.

(ix) Binary search has a time complexity of _____.

(x) The worst-case time complexity of quick sort is _____.

(xi) Data structure is a way of _____ and organizing data in a computer so that it can be used efficiently.

(xii) Stacks follow the Last In First Out (_____) principle, where the last element added is the first one to be removed.

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