

2056
B.Sc. Data Analytics (FYUP)
Fourth Semester
BDAD -404: Data Structure

Time allowed: 3 Hours

Max. Marks: 45

NOTE: Attempt five questions in all, including Question No. 9 (Unit-V) which is compulsory and selecting one question from each Unit I - IV

x-x-x

UNIT - I

1. (a) Define Data Structure. Explain the concept of time complexity and space complexity in data structures with suitable examples.
(b) Define Arrays. Explain the types of arrays with suitable examples. (5,4)
2. (a) Write a program or an algorithm to insert and delete an element in an array and explain the steps involved.
(b) Explain the implementation of a stack using a linked list and compare it with a stack using arrays. (5,4)

UNIT - II

3. (a) Define Linked List. Explain its advantages and disadvantages compared to arrays.
(b) What are the different types of linked lists? Explain Singly Linked List, Doubly Linked List, Header Linked List, and Circular Linked List with diagrams. (4,5)
4. (a) Describe the searching operation in a linked list with an algorithm/program and example.
(b) Describe the enqueue and dequeue operations of the queue with algorithms/program. (5,4)

UNIT - III

5. (a) Define Tree. Explain the basic terminology of trees, such as root, node, parent, child, sibling, leaf node, level, degree, and height.
(b) Explain the searching operation in a Binary Search Tree with an algorithm. (3,6)

P.T.O.

(2)

6. (a) Explain the Depth First Search (DFS) graph traversal technique with an algorithm and example.
- (b) Explain the memory representation of graphs. (5,4)

UNIT - IV

7. (a) Explain the Linear Search algorithm with a suitable example and analyze its time complexity.
- (b) Explain the Bubble Sort algorithm with an example and discuss its time complexity. (5,4)
8. Explain the Quick Sort algorithm with an example. (9)

UNIT - V

9. (a) What are primitive data structures? 1
- (b) What is recursion? 1
- (c) What is a circular queue? 1
- (d) What are the advantages of a doubly linked list over a singly linked list? 1
- (e) What are preorder, inorder, and postorder traversal of a binary tree? 1
- (f) What are the different searching techniques? 1
- (g) What are the different types of graphs? 1
- (h) Which is the best sorting technique? 1
- (i) What is an Adjacency Matrix? 1

x-x-x