

Dr. Shyama Prasad Mukherjee University, Ranchi
PG Department of Mathematics & M.Sc.IT

Model Question Paper
M.Sc.IT, SEMESTER-I
Data Structure through C (CCMIT 103)

<p>Group-A Multiple Choice Questions (Compulsory)</p>

1. Which of the following data structure is not a Linear Data Structure?
 - a. Arrays
 - b. Linked lists
 - c. Both of these
 - d. None of these
2. Which of these best describes an array?
 - a) A data structure that shows a hierarchical behaviour
 - b) Container of objects of similar types
 - c) Arrays are immutable once initialised
 - d) Array is not a data structure
3. What are the advantages of arrays?
 - a) Objects of mixed data types can be stored
 - b) Elements in an array cannot be sorted
 - c) Index of first element of an array is 1
 - d) Easier to store elements of same data type
4. Which of the following stack operations could result in stack underflow?
 - a) is_empty
 - b) pop
 - c) push
 - d) Two or more of the above answers
5. Which of the following data structures can be used for parentheses matching?
 - a) N-array tree
 - b) queue
 - c) priority queue
 - d) stack
6. Which value is assigned/set at rear end during the Initialization of a Queue?
 - a) 0
 - b) 1
 - c) - 1
 - d) infinity

7. A data structure in which elements can be inserted or deleted at/from both the ends but not in the middle is?
 - a) Queue
 - b) Circular queue
 - c) Dequeue
 - d) Priority queue
8. What should be the value of rear (end) if the queue is full (elements are completely occupied)?
 - a) 1
 - b) - 1
 - c) MAX + 1
 - d) MAX - 1
9. Which data structures are used for finding in DFS and BFS Traversal mechanisms on a Tree respectively?
 - a) Graph & Stack
 - b) Queue & Stack
 - c) Queue & Graph
 - d) Stack & Queue
10. Which data structure allows deleting data elements from front and inserting at rear?
 - a) Stacks
 - b) Queues
 - c) Deques
 - d) Binary search tree
11. Which of the following techniques represents the precise sequence of an In- Order Traversal of a Binary Tree?
 - a) Visit the Root, Traverse Left Subtree, Traverse Right Subtree
 - b) Traverse Left Subtree, Visit the Root, Traverse Right Subtree
 - c) Traverse Left Subtree, Traverse Right Subtree, Visit the Root
 - d) None of the Above
12. _____ is a tree where each parent node have only one associated child node.
 - a) Balanced Binary Tree
 - b) Rooted Complete Binary Tree
 - c) Complete Binary Tree
 - d) Degenerate Tree
13. Which amongst the following cannot be a balance factor of any node of an AVL tree?
 - a) 0
 - b) 1
 - c) -1

- d) 2
14. What is the maximum number of children that a binary tree node can have?
- a) 0
 - b) 1
 - c) 2
 - d) Many
15. Leaves of which of the following trees are at the same level?
- a) Binary tree
 - b) B-tree
 - c) AVL-tree
 - d) Normal Tree
16. Which graph consists of an unordered pair of vertices representing the similar edge? (Data Structure)
- a) Directed Graph
 - b) Undirected Graph
 - c) Both a & b
 - d) None of the above
17. Which of the following sorting methods would be most suitable for sorting a list?
- a) Bubble Sort
 - b) Insertion Sort
 - c) Selection Sort
 - d) Quick Sort
18. Which of the following is the faster operation in AVL Trees?
- a) Insertion
 - b) Deletion
 - c) Updation**
 - d) Retrieval
19. How is an insertion of a node into an AVL tree carried out?
- a) By treating an AVL tree as a binary search tree
 - b) By updating the balance factors working upward from insertion point to the root
 - c) Only option a
 - d. Both options a & b
20. From where the insertion starts with a B tree?
- a) Root node
 - b) Any node
 - c) Could be A or B
 - d) Leaf node

Group-B

Short Answer Type Questions

1. What is Non Linear Data Structure? Explain with example of its types.
2. Explain insertion operation in Array. Write an algorithm and program of insert an element in an array.
3. Write a program input 10 integer values to sort the values in ascending order with using insertion sort technique.
4. Write a program to calculate factorial of a given number using recursion function.
5. Explain with example of Infix, Prefix and Postfix expression evaluation.
6. What is Binary Tree traversal? Explain with example of Inorder traversal.
7. Explain with example of an Adjacency Matrix graph representation.
8. What are AVL rotations? Explain Left rotation and Right rotation of an AVL Tree.
9. Explain with example of a Full Binary Tree and Complete Binary Tree.
10. What is Heap Data Structure? Explain with example of Min Heap.
11. Construct a tree for the given Inorder and Postorder traversals.
Inorder : D H B E A F C I G J
Postorder: H D E B F I J G C A
12. Explain with an example of M-way trees.

<p style="text-align: center;">Group-C Long Answer Type Questions</p>

1. **a)** What is Stack? Why it is known as LIFO? Write algorithm of PUSH and POP operation on Stack.
b) What is Queue? Why it is known as FIFO? Write an algorithm to insert and delete an element from a simple Queue.
2. **a)** Write a program input 10 integer values to find out a specific value with position using binary search technique.
b) Explain Breadth First Search traversal of Queue using an example.
3. What is Binary Search Tree? Explain Insertion and Deletion Operation on Binary Search Tree with Example.
4. Write a menu base program to implement all the operations of DEQUE
5. What do you mean by Link list? Write an algorithm to insert and delete a node in Singly Linked List.