



MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.

Department of Artificial Intelligence and Data Science Question Bank - Academic Year (2021-22)

Course Code & Course Name : 19ADC01 & Data Structures and Files
Name of the Faculty : M.S.Soundarya
Year/Sem/Sec : II/III

Unit-I: Introduction

Part-A (2 Marks)

1. Define data structures
2. Define static data structures.
3. What are the different types of data structure?
4. Define linear data structures
5. What is variable and entity?
6. Give the Basic Operations on Data Structures
7. Define list and its types
8. List the advantages in using a linked list
9. Distinguish between linear and non linear data structures
10. Compare singly linked list with circular linked list.

Part-B (16 Marks)

1. With suitable examples explain the operations performed on singly linked list. (16)
2. Discuss about the operations performed on doubly linked list with example (16)
3. Explain the operations performed on Circular Doubly linked list with example (16)
4. Write short notes i. array and structure (16)
ii. pointer and recursion function
5. Enumerate the operations of queue ADT using linked list (16)

Unit-II : Linear Data Structure

Part-A (2 Marks)

1. Mention the advantages of representing stacks using linked lists than arrays.
2. Define a stack.
3. State the different ways of representing expressions.

4. State the rules to be followed during infix to postfix conversions.
5. Define a priority queue.
6. What are the applications of priority queue?
7. Mention the advantages of representing stacks using linked lists than arrays.
8. Mention the overflow condition in array implementation of Queue?
9. Differentiate LIFO and FIFO?
10. Write the Algorithm for DEQUEUE operation.

Part-B (16 Marks)

1. Write down and explain the operations performed in Stack ADT using array with its Algorithms and their complexity analysis (16)
2. Enumerate the Applications of Stacks with example (16)
3. Explain briefly about the operations for enqueue and dequeue on queue ADT using array with its Algorithms and their analysis (16)
4. Explain the basic concept of Circular Queue Operations with example (16)
5. List and Explain various operation of Circular Queue with example (16)

Unit-III : Non Linear Data Structure

Part-A (2 Marks)

1. Define a tree
2. Define terminal nodes in a tree
3. Define a binary tree
4. Define a right-skewed binary tree
5. What is meant by binary tree traversal and list out the different binary tree traversal techniques
6. What are the basic operations performed in a binary search tree
7. List out the heap property
8. What are the tasks performed while traversing a binary tree?
9. Define a path in a tree.
10. What are the different ways of representing a binary tree?

Part-B (16 Marks)

1. Explain three standard ways of traversing a binary tree T with a recursive algorithm. (16)
2. Illustrate B Tree operations with their algorithms with Complexity analysis. (16)
3. Enumerate the algorithm for AVL. Show the result of inserting 15,17,6,19,11,10,13,20,8,14,12 one at a time into an initially empty tree (16)

4. Write an algorithm for inserting and deleting a node in a binary search tree (BST) with example (8)
5. With example explain the B+ Tree operation write the algorithms and its analysis (16)

Unit-IV : Graphs
Part-A (2 Marks)

1. **What** is a graph and its types?
2. **When** do you say a graph is bi-connected?
3. **Give** the purpose of Dijkstra's algorithm.
4. **Differentiate** cyclic and acyclic graph.
5. **Give** two applications of graphs.
6. **Prove** that the number of edges in a complete graph of n vertices is $n(n-1)/2$
7. **Explain** procedure for Depth first search algorithm.
8. **Define** minimum spanning tree. **Give** an example
9. **Create** a complete undirected graph having five nodes.
10. **Define** the length of the graph.

Part-B (16 Marks)

1. **Describe** in detail about the following representations of a graph. (16)
 - i. Adjacency Matrix
 - ii. Adjacency List
2.
 - i. Explain the topological sorting of a graph G with example. (16)
 - ii. **Quote** the step wise procedure for topological sort
3. **Differentiate** depth-first search and breadth-first search traversal of a graph with suitable examples. (16)
4. **Describe** any one of the shortest path algorithms with suitable example (16)
5. **Discuss** the prim's algorithm for minimum spanning tree. Give an example (16)

Unit-V : Searching, Sorting, Hashing Techniques and Files
Part-A (2 Marks)

1. Define Hashing
2. What do you mean by collision in hashing?
3. What do you mean by separate chaining?
4. What do you mean by open addressing?
5. List out various collision resolution techniques.
6. Define sorting and its type
7. What is Insertion Sort?
8. How Selection Sort operate?
9. Write the steps involved in Quick Sort

10. What do you mean by Probing?

Part-B (16 Marks)

1. Briefly describe hashing techniques with its collision resolution strategies (16)
2. Describe in detail about insertion sort (16)
3. With example enumerate the operation of selection sort (16)
4. Discuss in detail about bubble sort (16)
5. Illustrate the operation of Merge sort with explanation (16)

Course Faculty

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