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UNIT I

Chapter 1 : Introduction to Data Structure 1-1 to 1-18

Syllabus : Concept and need of DS, Abstract Data Type.

Types of Data Structures :
(i) Linear Data Structures, (ii) Non-Linear Data Structures

Algorithm Complexity : (i) Time, (ii) Space

Operations on Data Structures :
(i) Traversing, (ii) Searching, (iii) Insertion, (iv) Deletion, (v) Sorting

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UNIT II

Chapter 2 : Searching and Sorting 2-1 to 2-44

Syllabus :

Searching : searching an item in a data set using following methods : (i) Linear Search, (ii) Binary Search

Sorting : sorting of data set in an order using following methods : (i) Bubble Sort, (ii) Selection Sort (iii) Insertion Sort, (iv) Radix Sort.

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UNIT III

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Syllabus :

Introduction to Stack :

Stack representation in memory using array

Stack as an ADT

Stack Operations : PUSH, POP

Stack Operations Conditions : Stack Full/Stack Overflow, Stack Empty/Stack Underflow.

Applications of stack

- o Reversing a Stack
- o Polish notations

Conversion of infix to postfix expression, Evaluation of postfix expression, Converting an infix into prefix expression, Evaluation of prefix expression Recursion, Tower of Hanoi.

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Syllabus :

Introduction to Queue :

Queue representation in memory using array

Queue as an ADT

Types of Queues : Linear Queue, Circular Queue, Concept of Priority queue.

Queue Operations : INSERT, DELETE

Queue Operations Conditions : Queue Full, Queue Empty

Applications of Queue.

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Syllabus :

Introduction to Linked List Terminologies : node, Address, Pointer, Information field/Data field, Next pointer, Null Pointer, empty list.
Type of lists : Linear list, Circular list

Operations on a singly linked list : Traversing a singly linked list, Searching a key in linked list, Inserting a new node in a linked list, Deleting a node from a linked list.

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UNIT V

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Syllabus :

Terminologies : tree, degree of a node, degree of a tree, level of a node, leaf node. Depth/Height of a tree, In-degree and Out-Degree, Path, Ancestor and descendant nodes

Tree Types and Traversal methods Types of Trees : General tree, Binary tree, Binary search tree (BST).

Binary tree traversal : In order traversal, Preorder traversal, Post order traversal.
Expression tree.

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Syllabus :

Introduction to Graph terminologies : graph, node (Vertices), arcs (edge), directed graph, undirected graph, in-degree, out-degree, adjacent, successor, predecessor, relation, path, sink, articulation point.
Adjacency List, Adjacency Matrix of directed/undirected graph.

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- **Appendix A :** Solved MSBTE Question Paper of Winter 2018 ..... A-1 to A-3
- **Appendix B :** Solved MSBTE Question Papers of Summer 2019 and Winter 2019 ..... B-1 to B-12

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