GLOBAL INSTITUTE OF TECHNOLOGY, JAIPUR

BLOWN UP

II YEAR B.Tech. III SEMESTER 3CS4-05: Data Structures and Algorithms

Recommended books:

T1 :- Expert Data Structures with C: R. B. Patel , Khanna Publishing; Fourth edition (2019)

T2 :- Data-Structures-with-c- schaum-series

TOPIC AS PER RTU SYLLABUS	**BLOWN UP TOPICS (1x10 TIMES OF UNIV. SYLLABUS)**	PROPOSED DATE	REVISED DATE
Introduction: Objective, Scope And Outcome Of The Course			
Unit # 1 Stacks: Basic Stack Operations, Representation of a Stack using Static Array and Dynamic Array, Multiple stack implementation using single array, Stack Applications: Reversing list, Factorial Calculation, Infix to postfix Transformation, Evaluating Arithmetic Expressions and Towers of Hanoi.	1.1 Basic Stack 1.2 Stack Operations 1.2.1 algorithms for push 1.2.2 algorithms for pop 1.3 Representation of a Stack using Static Array and Dynamic Array, 1.4 Multiple stack implementation using single array 1.5 Stack Applications 1.6 Recursion 1.6.1 Reversing list 1.6.2 Factorial Calculation, 1.7 Evaluating Arithmetic Expressions 1.8 Transformation of Arithmetic Expressions 1.8.1 infix to postfix 1.8.2 Infix to prefix 1.9 Towers of Hanoi.		
Unit # 2 Queues: Basic Queue Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack,	2.1 Basic Queue 2.2 Queue Operations, 2.2.1 algorithms for Front 2.2.2 algorithms for Rear 2.3 Representation of a Queue using array 2.4 Implementation of Queue Operations using Stack,		

Applications of Queues Round Robin Algo. Circular Queues, DeQueue Priority Queues. Linked lists: Introduction, single linked list, representation of a linked list in memory, Different Operations on a Single linked list, Reversing a single linked list, Advantages and disadvantages of single linked list, circular linked list, double linked list and Header linked list.	2.5 Applications of Queues 2.6 Types of Queue 2.6.1 Linear Queue 2.6.2 Circular Queues 2.6.3 DeQueue 2.6.4 Priority Queues 2.7 Linked lists 2.8 Operations of Link list 2.9 Types of Link list 2.9.1 Single Link List 2.9.2 circular Link List 2.9.3 Doubly Link List 2.9.4 circular link list 2.10 Reversing a single linked list 2.11 Advantages and disadvantages of single linked list 2.12 Advantages and disadvantages of single linked list over array		
Unit # 3 Searching Techniques: Sequential and binary search.Sorting Techniques: Basic concepts, Sorting by: bubble sort, Insertion sort, selection sort, quick sort, heap sort, merge sort, radix sort and counting sorting algorithms.	3.1. Searching Techniques 3.2 Types of Searching 3.2.1 Sequential Search 3.2.2 Binary search 3.3 Sorting Techniques: Basic concepts 3.4 Types of Sorting 3.4.1 bubble sort 3.4.2 Insertion sort 3.4.3 selection sort 3.4.4 quick sort 3.4.5 heap sort 3.4.6 merge sort 3.4.7 radix sort 3.4.8 counting sorting		
Unit # 4 Trees: Definition of tree, Properties of tree, Binary Tree, Representation of	4.1 Trees: Definition of tree 4.2 Properties of tree 4.3 Binary Tree 4.3.1 Types of Binary tree 4.3.2 Traverse a Binary tree		

Binary trees using arrays and linked lists, Operations on a Binary Tree, Binary Tree Traversals (recursive), Binary search tree, B-tree , B+ tree, AVL tree, Threaded binary tree.	4.4 Representation of Binary trees using arrays and linked lists 4.5 Operations on a Binary Tree 4.6 Binary search tree 4.6.1 Operation of BST 4.6.2 Example of BST 4.7 B-tree 4.8 B+ tree 4.9 AVL tree 4.9.1 Operation of AVL tree 4.9.2 Example of AVL tree 4.10 Threaded binary tree.		
Unit # 5 Graphs: Basic concepts, Different representations of Graphs, Graph Traversals (BFS & DFS), Minimum Spanning Tree(Prims &Kruskal), Dijkstra's shortest path algorithms.Hashing: Hash function, Address calculation techniques, Common hashing functions, Collision resolution: Linear and Quadratic probing, Double hashing.	5.1 Graphs: Basic concepts 5.1.1 Graph Terminology 5.2 representations of Graphs in a memory 5.2.1 Adjacency list 5.2.2 Adjacency Matrix 5.3 Graph Traversals 5.3.1 BFS 5.3.2 DFS 5.4 Minimum Spanning Tree 5.4.1 Prims & 5.4.2 Kruskal 5.5 Shortest path algorithms 5.5.1 Dijkstra's 5.5.2 Warshall's 5.6 Hashing 5.6.1 Introduction 5.6.2 Hash function 5.7 Address calculation techniques, 5.8 Common hashing functions 5.9 Collision resolution 5.9.1 Linear 5.9.2 Quadratic probing, 5.10 Double hashing.		

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