CSE331:CODING PEARLS

L:0 T:0 P:3 Credits:2

Course Outcomes: Through this course students should be able to

CO1 :: relate the theoretical knowledge and insights gained to formulate working code

CO2 :: devise time and space efficient algorithms to solve abundant ubiquitous problems

CO3 :: identify the intricacies present in the design of a solution to devise an optimal solution

CO4 :: deduce the appropriate and efficient algorithms and data structures for optimal solution to the problems at hand

CO5 :: extend and utilize the knowledge base of various algorithmic paradigms to build optimized solutions to real world problems

CO6 :: validate the logic building and code formulation by designing optimal code capable of passing various test cases

List of Practicals / Experiments:

Heaps (Priority Queues)

- Max Heap
- Min Heap
- Heap Sort
- K'th Largest element in array
- Sort an almost sorted array
- Connect n ropes with minimum cost
- Array representation of binary heap

Disjoint Set Union

- Union-Find algorithm
- Union by Rank and Path Compression

Binary trees

- Types of Binary Tree
- Insertion in a tree
- Deletion in a tree
- Tree traversals
- Inorder, Preorder, Postorder
- Inorder traversal without recursion
- Print Postorder traversal from given Inorder and Preorder traversals
- Populate Inorder Successor for all nodes
- Find n-th node of inorder traversal
- Level Order Tree Traversal
- Level Order traversal in spiral form
- Boundary traversal of binary tree
- Finding Lowest Common Ancestors

Graph algorithms

- Graph and its representations
- Breadth First Traversal for a Graph
- Depth First Traversal for a Graph
- Finding connected components in an undirected graph

- Dijkstra’s shortest path algorithm
- Bellman Ford algorithm
- Minimum Spanning Tree algorithms namely Prim’s algorithm, Kruskal algorithm
- Eulerian path and circuit

References:

1. CRACKING THE CODING INTERVIEW by GAYLE LAAKMANN MCDOWELL, CAREERCUP

2. DATA STRUCTURES AND ALGORITHMS : CONCEPTS, TECHNIQUES AND APPLICATIONS by G. A. V. PAI, MCGRAW HILL EDUCATION