CAP267:DATA STRUCTURES

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

Course Outcomes: Through this course students should be able to

- understand the basics and representation of data structures
- implement the various data structures
- evaluate the performance of various algorithms
- apply the suitable data structures to solve real life problems

Unit I

Basic concepts and Arrays : Introduction to data structures and algorithms, Data structure operations, Control structures, Complexity of algorithms, Asymptotic notations for complexity, Representation of linear arrays, Traversing linear arrays, Insertion and deletion in linear arrays, Introduction to pointers

Unit II

Linked Lists : Representation of linked lists in memory, Traversing a single linked list, Searching a linked list, Insertion in to a linked list, Deletion from a linked list, Header linked lists, Circular linked lists, Memory allocation of two way lists, Operations on two way lists

Unit III

Stacks and Queues : Array representation of stacks, Linked representation of stacks, Stack applications in arithmetic expression conversion and evaluation, Tower of Hanoi problem, Use of stacks in recursion, Linked representations of queues, Array representation of circular queues, Deques, Priority queues, Quick sort

Unit IV

Trees : Binary trees concept and terminology, Sequential and linked representation of binary trees, Expression trees, Traversal algorithms of binary trees, Binary search trees and its operations, AVL trees and its operations, Binary heaps and its operations, Heap sort

Unit V

Graphs : Graph theory terminology, Memory representation of graphs, Operations on graphs, Breadth first search traversal, Depth first search traversal, Warshall's algorithm for shortest path, Topological sorting

Unit VI

Searching and sorting : Linear searching, Binary Search, Bubble sort, Selection sort, Insertion sort, Merge sort, Introduction to hashing methods

Text Books:

1. DATA STRUCTURES by SEYMOUR LIPSCHUTZ, MCGRAW HILL EDUCATION

References:

1. DATA STRUCTURES AND ALGORITHMS by ALFRED V. AHO, JEFFREY D. ULLMAN AND JOHN E. HOPCROFT, PEARSON

2. DATA STRUCTURES AND ALGORITHM ANALYSIS IN C by MARK ALLEN WEISS, PEARSON