DATA STRUCTURES FOR ENGINEERING APPLICATIONS

Course Code: 15IT1111  L  T  P  C
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Course Outcomes:
At the end of the course, a student will be able to

CO 1  Choose searching algorithms.
CO 2  Develop programs for sorting and stacks.
CO 3  Explain concepts of queues.
CO 4  Outline concepts of linked lists.
CO 5  Interpret concepts of trees.

UNIT-I  (10 Lectures)

RECURSION AND LINEAR SEARCH:
Preliminaries of algorithm, Algorithm analysis and complexity, Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Linear and binary recursion, recursive algorithms for factorial function, GCD computation, Fibonacci sequence, Towers of Hanoi.

SEARCHING TECHNIQUES:
Introduction, Linear Search, Transpose Sequential Search, Interpolation Search, Binary Search, Fibonacci Search.

UNIT-II  (10 Lectures)

SORTING TECHNIQUES:
Basic concepts, insertion sort, selection sort, bubble sort, quick sort, merge sort.

STACKS:
Basic Stack Operations, Representation of a Stack using Arrays, Stack Applications: Reversing list, Factorial Calculation, In-fix to postfix Transformation, Evaluating Arithmetic Expressions.
UNIT-III (10 Lectures)

QUEUES:
Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack.

APPLICATIONS OF QUEUES:
Applications of Queues- Enqueue, Dequeue, Circular Queues, Priority Queues.

UNIT-IV (10 Lectures)

LINKED LISTS:
Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, merging two single linked lists into one list, Reversing a single linked list, Circular linked list, Double linked list.

UNIT-V (10 Lectures)

TREES:
Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, operations on a Binary tree, Binary Tree Traversals (recursive), Creation of binary tree from in-order and pre(post)order traversals.

TEXTBOOKS:

REFERENCES:

Note: A small application may be implemented in software from their respective disciplines at the end of the course.