

CS-3004 DATA STRUCTURES-II

Objectives

Data structures play a central role in modern computer science. In addition, data structures are essential building blocks in obtaining efficient algorithms. The objective of the course is to teach students how to design, write, and analyze the performance of programs that handle structured data and perform more complex tasks, typical of larger software projects. Students should acquire skills in using generic principles for data representation & manipulation with a view for efficiency, maintainability, and code-reuse. Another goal of the course is to teach advance data structures concepts, which allow one to store collections of data with fast updates and queries.

Course Contents

Introduction –Common operations on data structures, Types of data structures, Data structures & Programming, Program Design, Complexities, Time Complexity, order of Growth, Asymptotic Notation.

Advanced Data Structures-Hash tables ,Heaps , Complexity , Analysis of Heap Operations , Application of Heap , AVL tree , Insertion & Deletion in AVL tree , Red Black Trees , Properties of Red Black trees ,Insertion & Deletion in Red Black tree .

Sorting –Need for sorting , Types of sorting algorithm-Stable sorting Algorithm, Internal & External sorting algorithm , Outline and offline algorithm ,Sorting Techniques-Insertion , Shell , Selection , Merge ,Quick sort, Radix sort ,bucket sort .

Augmenting Data structures – Augmenting a red black trees, Retrieving an element with a given rank , Determining the rank of element ,Data structure Maintenance ,An augmentation strategy ,Interval Trees.

File structures- Basic file operations, File organization –Sequential file organization, Indexed sequential file organization, Direct file organization. External merge sort, Multiway Merge sort, Tournament Tree ,Replacement Selection .

REFERENCES:

1. Horowitz and Sahani, “Fundamentals of data Structures”,University Press
2. Trembley and Sorenson , “Data Structures”, TMH Publications
3. M. Tenenbaum, “Data Structures using C & C++”, Pearson Pub
4. Venkatesan , Rose, “Data Structures” Wiley India Pvt.Ltd
5. Pai; Data structure and algorithm , TMH Publications
6. T.H.Coreman,”Introduction to algorithm”,PHI.