

Syllabus for Data and File Structures

Subject Code: DFS-232

Algorithm

Data Structure def, classification, ADT
Algorithm representation and complexity
Pointers, strings, arrays (1-D and n-D)

Programming Tools

Elapsed time (Lab 1, C)
Documentation generation (Lab 1, C)

Recursion

Simple recursion
Fibonacci numbers
Towers of Hanoi (Lab 2, C)
Simulation of recursion

Sorting

Mergesort (Lab 2, C)
Binary search (Lab 3, C)
Selection sort
Insertion sort
Quicksort (Lab 3, C) and Quickselect
Radix sort
Stacks
Pre-, in-, post-fix conversions
Evaluations of expressions (Lab 4, C)

Lists and Queues

Linked lists
Simple queues
Circular queues (Lab 5, C) **F1**

Graph Theory

Graphs
Simple trees
Heaps, heapsort (Lab 5, C++)
Priority queues (Lab 6, C++)
Traversals **F2**
Binary trees
Binary search trees (Lab 7, C++)
Threaded trees
Tries (Lab 8, C++) **F3**
B- and B⁺-trees
Set union and find operations (Lab 9, C++)
Minimum spanning trees **F4**

Dijkstra's Algorithm

Floyd-Warshall's algorithm (Lab 10, C)

AVL trees **M1**

Tables and Information

BFS and DFS searches (Lab 11, C++)
Backtracking: 8-queen problem (12, C) **M2**
Memoization (Lab 13, C)
Hashing (Lab 13, C)

String algorithms

Simple string manipulations (Lab 14, C) **A1**
Pattern search (Lab 14, C)

Tools

Operating system: GNU/Linux
Langauges: ANSI C (C88) and C++ (1998)
Graph visualization tool: graphviz
Documentation generator: doxygen
Data and function plotter: gnuplot

Books

1. Data Structures Using C and C++ by Yedidyah Langsam, Moshe J. Augenstein and Aaron M. Tenenbaum
2. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein (Ref)
3. The C Programming Language (2nd Edition) by Brian W. Kernighan and Dennis Ritchie (Ref)
4. Thinking in C++ (Vol. 1 and 2) by Bruce Eckel (Ref)