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)

Graph Theory

- Graphs
- Simple trees
- Heaps, heapsort (Lab 5, C++)
- Priority queues (Lab 6, C++)
- Traversals
- Binary trees
- Binary search trees (Lab 7, C++)
- Threaded trees
- Tries (Lab 8, C++)
- B- and B+-trees
- Set union and find operations (Lab 9, C++)
- Minimum spanning trees
- Dijkstra's Algorithm
- Floyd-Warshall's algorithm (Lab 10, C)
- AVL trees

Tables and Information

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

String algorithms

- Simple string manipulations (Lab 14, C)
- 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)