Data Structures and Algorithms (IDST232C)

Algorithm

Data Structure def, classification, ADT
Algorithm representation, complexity

Pointers, arrays (1-D and n-D), strings
Elapsed time calculation (L1)

Stacks

Stacks (L2)
Pre-, in-, post-fix conversions
Evaluations of expressions

Recursion

Simple recursion
Fibonacci numbers
Backtracking: 8-queen problem (L3)

Lists and Queues

Linked lists
Queues (L4)
Circular queues

Searching and Sorting

Binary search (L5)
Selection sort, Insertion sort

Mergesort
Quicksort (L6)
Quickselect

Graph Theory

Graphs, trees
Binary trees, *n*-ary trees
Heaps, heapsort (L7)

Priority queues
Binary search trees (L8)
Trie tree

Disjoint sets (L9)
Kruskal's MST using disjoint sets
Dijkstra's Algorithm

Floyd-Warshall's algorithm (L10)
BFS and DFS searches (L11)
AVL trees, B-trees

Hashing

Hashing by chaining (L12)
Perfect hashing function

String algorithms

Simple string manipulations
Rabin-Karp approach (L13)

Tools

Operating system: GNU/Linux
Langauges: C++ (C++98)
Graph visualization tool: graphviz
Data and function plotter: gnuplot

Books

1. **Introduction to Algorithms** by *Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein* (3Ed) (Text)

2. **Data Structures Using C and C++** by *Yedidyah Langsam, Moshe J. Augenstein and Aaron M. Tenenbaum* (Text)

3. **C Programming Language** (Ed 2) by *Brian W. Kernighan* and *Dennis M. Ritchie*, Prentice Hall (Ref)

4. **Expert C Programming: Deep C Secrets** by *Peter van der Linden*, Prentice Hall (Ref)