

Data Structure

Session 1: Stack and Queue

1. **Stack and Queue:** contiguous implementations of stack, various operations on stack,
2. Various polish notations-infix, prefix, postfix, conversion from one to another-using stack. Evaluation of post and prefix expressions.
3. Contiguous implementation of queue: Linear queue, its drawback; circular queue; various operations on queue.
4. Linked implementation of stack and queue- operations.

Session 2: General List

1. **General List:** list and it's contiguous implementation, it's drawback; singly linked list-operations on it.
2. Doubly linked list-operations on it; circular linked list; linked list using arrays.

Session 3: Tree

1. **Trees:** definitions-height, depth, order, degree, parent and child relationship etc.
2. Binary Trees- various theorems, complete binary tree, almost complete binary tree.
3. Tree traversals-preorder, in order and post order traversals, their recursive and non recursive implementations.
4. Expression tree- evaluation; linked representation of binary tree operations.
5. Threaded binary trees; forests, conversion of forest into tree. Heap-definition.

Session 4: Searching, Hashing and Sorting

1. Requirements of a search algorithm.
2. Sequential search, binary search, indexed sequential search, interpolation search.
3. Hashing-basics, methods, collision, resolution of collision, chaining.
4. Internal sorting- Bubble sort, selection sort, insertion sort, quick sort, merge sort on linked and contiguous list, shell sort, heap sort, tree sort.

Session 5: Graphs

1. **Graphs:** related definitions: graph representations- adjacency matrix, adjacency lists, adjacency multilist.
2. Traversal schemes- depth first search, breadth first search.
3. Minimum spanning tree; shortest path algorithm.
4. Kruskals & dijkstras algorithm.
5. Miscellaneous features Basic idea of AVL tree- definition, insertion & deletion operations.
6. Basic idea of B-tree- definition, order, degree, insertion & deletion operations.
7. B+-Tree- definitions, comparison with B-tree; basic idea of string processing.

Book References

1. Kruse R.L. Data Structures and Program Design in C; PHI.
2. Tennenbaum A.M. & others: Data Structures using C & C++; PHI
3. Trembly "Introduction to Data Structure with Applications".