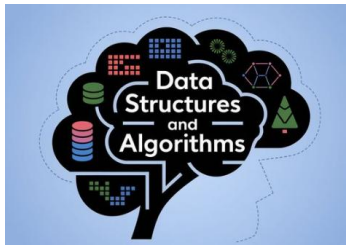
ORANGE ITECH

Data Structures and Algorithms Syllabus

DURATION – 2 MONTHS
MODE OF TRAINING – OFFLINE/ONLINE



Data Structures and Algorithms

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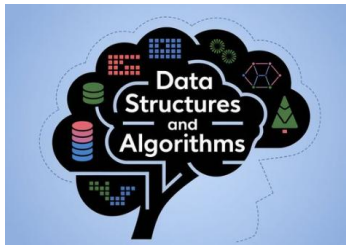
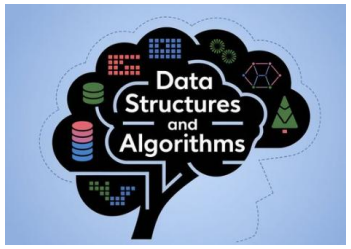
- **Introduction to Data Structure**
- **Understanding Data types**
- **What is Data Structure**
- **Need of Data Structure**
- **The Mathematical model**
- **Algorithms**
- **Understanding algorithms**
- **How to write algorithms**
- **Optimizing algorithms**
- **Finding time complexity of an Algorithm**
- **Lists**
- **what is List and what is it's need**
- **Squentails lists (Arrays) ,Advantages and Limitations**
- **Implementing sequential lists**



Data Structures and Algorithms

- **Linked Lists**
- **The LinkedList structure**
- **Advantages, Limitations**
- **Singly Linked List**
- **Doubly Linked List**
- **Circular Linked List**
- **Time complexity of Linked List and**
- **Sequential lists**
- **Stacks**
- **Understanding stacks**
- **Stack usage**
- **Implementing Stack**
- **Sequential implementation**
- **Linked implementation**
- **Double stack and it’s implementation**



Data Structures and Algorithms

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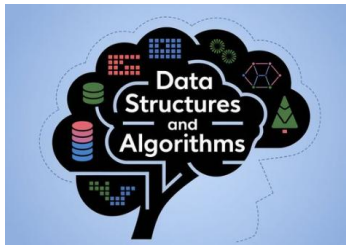
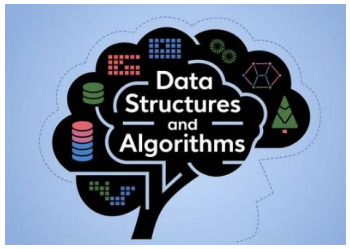
- **Tree**
- **Introduction to Tree data structure**
- **Tree usage**
- **Types of Trees**
- **General Tree**
- **Binary Tree**
- **Binary Search Tree**
- **Binary Search Tree (BST)**
- **Understanding Binary Search Tree**
- **BST usage**
- **Insertion and deletion**
- **Understanding BST algorithms**
- **Inorder, Preorder, Postorder**
- **BFS and DFS**



Data Structures and Algorithms

- Time complexity of BST algorithms
- Implementing BST using arrays
- Constructing BST back using the tree traversals
- Threaded BST
- Why Threaded BST
- Understanding threaded BST
- Threaded BST Algorithms
- Insertion and deletion
- Inorder, Preorder, Postorder
- Time Complexity of Threaded BST
- Height Balanced Trees (AVL Trees)
- What is AVL Tree
- Balance factor, right heavy and left heavy tree



Data Structures and Algorithms

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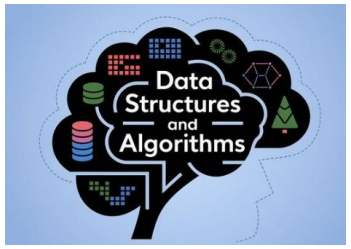
- Height balancing algorithm
- Insertion and deletion algorithms
- Few other types of trees
- Strictly binary tree
- Symmetric tree
- Red Black Tree
- B Tree and B+ Tree
- Queues
- What is Queue?
- Understanding Queue usage
- Implementing Queues
- Sequential implementation
- Linked implementation
- Circular Queue
- Usage and implementation



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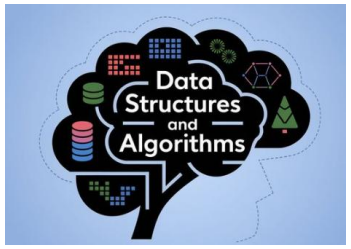
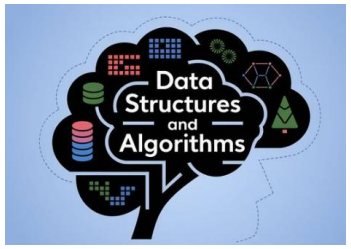
- Types of Queue
- Priority queue
- Double ended queue
- Graphs
- Introduction to Graphs
- Types of Graph
- Directed Graph
- Undirected Graph
- Implementing Graphs
- Sequential implementation
- Linked implementation
- Graph Algorithms
- BFS
- DFS
- Shortest Path Algorithm



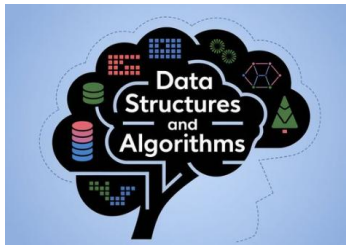
Data Structures and Algorithms

- Minimal Spanning Tree
- Creating minimal spanning tree from a graph using
- Kruskal's algorithms
- Prim's algorithm
- Hash Tables
- The hashing technique
- Understanding Hash tables
- Time complexity of operations on Hash Table
- Collision resolution algorithms
- Rehashing
- Improving performance using Hash Tables



Data Structures and Algorithms

- **Infix, Prefix and Postfix Expression**
- **Infix to prefix conversion and it's evaluation**
- **Infix to postfix conversion and it's evaluation**
- **Searching Algorithms**
- **Linear Search**
- **Binary Search**
- **Indexed sequential search**
- **Fibonacci Search**
- **Sorting Algorithm**
- **Bubble Sort**
- **Selection Sort**
- **Insertion Sort**
- **Radix Sort**



Data Structures and Algorithms

- Merge Sort
- Quick Sort
- Heap Sort
- Finding Time and Space Complexity of Algorithms
- Omega notation
- Big O notation

Key Feature

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