**Data Structure and Algorithm**

**Introduction to Structure and Algorithm**

**Basic:**

* Stack vs Heap Memory
* Physical and Logical Data Structure
* Abstract Data type (ADT)
* Time Complexity and Space Complexity

**Recursion:**

* Introduction to recursion
* How recursion works
* How recursion uses stack memory
* Static and instance variable in Recursion
* Tree building in recursion
* Head and Tail recursion
* Nested recursion
* Program using recursion

**Arrays:**

* Introduction to Array
* How Array works in Java
* How to declare and initialize an Array
* 2D, 3D Array
* Program using Array

**Searching:**

* Linear search
* Binary search

**Sorting:**

* Insertion sort
* Selection sort
* Bubble sort
* Merge sort
* Quick sort
* Heap sort

**Array List:**

* Introduction to ArrayList
* How ArrayList works
* Coding

**LinkedList:**

* Introduction to LinkedList
* Single LinkedList and Doubly LinkedList
* Fast and Slow pointer
* Cycle detection, reversal of linkedlist
* LinkedList with recursion
* Coding

**Tree:**

* Introduction to binary trees
* Binary search trees
* BFS, DFS and ALV trees
* Segment trees

**HashMap:**

* Introduction to HashMap
* How HashMap works
* How to code using HashMap

**Backtracking**:

* Introduction to backtracking
* Maze problems
* N-queens
* N-knights

**Stack**:

* Introduction to Stack
* Push, POP
* Stack using queue

**Queue**:

* Introduction to Queue
* Push, pop
* How queue using stack
* Circular queue

**Graph Theory**:

* Introduction to graph theory
* Breadth First Search (BSF)
* Depth First Search (DSF)
* Spanning trees
* Kruskal’s program
* Prim’s program
* Disjoint subsets