**Day 2 : 9 February 2025**

**1,2,3, 1000**

**LinkedList :** LinkedList is a type of linear data structure which internally use node concept to store the data. Generally linked list internally use dynamic memory allocation. Linked list is good option if we want to do more insertion or deletion operation.

Linked list mainly divided into 3 types.

1. Single linked list
2. Double linked list
3. Circular linked list (single or double).

Value nref value nref value nref ---------------🡪null

100 200 300

Null null

Pref value nref pref value nref pref value nref

1 2 3

**Non linear data structure**

Non linear data structure is use to store the non sequence order.

Graph

Tree

Set

Map

**Graph :** it is a type of non linear data structure which consists of nodes (vertices) and edges (connection between nodes).

Edge can be unidirectional or bi-directional

Cities are nodes connecting more than one cities by road. Road can be one way to two ways.

Google map

Social media

**Tree :** It is a type of non linear data structure where each element or item in tree is known as node and they are organized in hierarchical manner.

Root Node : The topmost node in the tree is root node.

Parent – Child relationship : each node can have more than one children

Root node (parent node)

Child1 node (Parent node) child2 node

Child3 node child4 node

Leaf node : the node with no children.

Child1 node is a parent node, child3, child4 and child4 are leaf node.

Depth : distance from the root node.

Height : the maximum depth in the tree.

All DOM parent, html parser, OS directory and file internally follow tree structure concept.

Binary tree : Binary tree in which each node has at most two children. Which refer as left child node as well as right child node.

50

40 30 20

John -🡪 CEO , Root node

Mike -🡪 CTO

Alice -🡪 Tech Lead Sara -🡪 HR

Bob Charlie Lex Lily

Dev1 dev2 test1 test2

**Set** : Set is a non linear data structure which is use to store unique value. Set doesn’t provide index concept like array.

In JS Set is pre defined object which provided set of method which help to do some operation on those item or data. Data can be any type like number, string, Boolean or object etc

**Map :** Map is a non linear data structure which is use to store the information in key-value pairs

Key is unique and value can be duplicate using key we can get the value.

JavaScript provided pre defined object is Map which contains set of method which help to do the operation on key-value pairs.

**Sorting**

Sorting mainly use to arrange the element or item in specific order like Ascending or descending

Data can be any type number, string, object type etc.

JavaScript generally we store the data in array.

Array already provided pre defined method as sort which help to do sorting ascending order by default.

Depending upon the version of JS as well browser or node js sort method internally use different algorithm.

Depending upon requirement we can use different algorithm to improve sorting technique

1. Bubble sort
2. Insertion sort
3. Selection sort
4. Quick sort
5. Heap sort
6. Merge sort

Etc

To display the data from node in tree data structure we use two technique

1. DFS : Depth – First Search

In DFS will visit node deeply by traversing one branch before backtracking.

John, Mike, Alice, Bob, Charlie, Lex, Lily , Sara,

1. BSF : Breadth – First Search

In BFS we read node value level by level. In this algorithm first we read root then read all children part of that node this process execute till last node of each tree branch.

John, Mike, Alice, Sara, Bob, Charlie , Lex, Lily