**Day 4 :**

**29 June – 2024**

**Data Structure**

Graph: Graph is non linear data structure.

It consists of finite set of vertices connected by a collection of edge.

A graph denoted by G, is defined by a pair of set (V,E)

V🡪 Vertices Edge

E->Edge A

C

Vertices

B

D E

F G

Sorting and searching technique

Few sorting algorithms

1. Bubble sort :Bubble sort is a type of simplest sorting algorithms. This sorting technique also knows as comparison-base sorting algorithms. It repeatedly steps through the container ie list or array to be sorted. Compare each pair of adjacent element items data and if conditions true it swap. This process is repeated perform until the all data sorted from a container.

1. Selection sort : it is type of another simplest comparison – based sorting technique. It works by dividing the input list into two parts.

First sorted sub-list and second one unsorted sub-list. Initially first sorted sub-list is empty and unsorted sub list contains all elements or data.

1. Firs the minimum or maximum elements.
2. Iterate through the unsorted sub list to find the smallest or largest element comparing the our minimum or maximum elements.
3. If condition true swap with first unsorted elements and store that data in first sub list
4. Repeat this process till second sub list become empty.

Bubble Sort Vs Selection Sort

1. Bubble Sort : it repeatedly step through the list, compare adjacent elements and swap them if they are in wrong position. Selection sort it divides the input list into a sorted sub-list and unsorted sub-list. It iterates through the unsorted sub-list to find the minimum (or maximum ) element and swap it with the first element of the unsorted sub-list
2. Number swap :Bubble sort : it generally required more swap compare to selection sort because it swap adjacent element. But Selection sort required minimum swap it check it minimum or maximum number elements or data.
3. Bubble sort is slightly less efficient than selection sort in terms of both time and space complexity dure to more frequent swap.

Both are good for small data-set.

Insertion Sort : it is a also type of comparison-base sorting technique.

It is a like playing card in our hands

1. Start from the second elements from the array or list. Assuming that the first element consider as sorted.
2. Take the current elements and compare with the elements in the sorted parts(which is initially first elements). Move the elements that are greater than the current elements one position to the right.
3. (repeat this process) : insert the current elements into its correct position within the sorted part of the array.

Insertion sort when we compare with bubble sort more efficient. Because which have fewer comparison and swaps.

But this 3 sorting technique is good for small data-set.

Merge sort : Merge sort is an efficient sorting technique for large data set. Because this sorting technique follow divided and conquer paradigm or rules.

It works by dividing the input data or items into two parts or halves, and sorting each half part (ie left and right ) recursively and then merge the sorted data set is final data-set (left and right) and produce sorted output.