* Sorting Algorithm :-

Sorting is a process of arranging items systemitcally. like alphabetically or ascending to descending or viceversa. e.g sort names, sorting numbers, etc.

unsorted list

20	12	10	13	2

sorted list

2	10	12	15	20

* Types of sorting algorithm:

Elementary

i) Bubble sort.

ii) Selection Sort.

iii) Insertion Sort.

Advanced

i) Merge sort.

ii) Quick Sort.

* Bubble Sort :

Bubble sort is based on the idea of repeatedly comparing pairs of adjecent elements and the swapping their positions if they exists id the wrong order.

-2	45	0	11	-9

→

-9	-2	0	11	45

i = 0

-2	45	0	11	-9

check index(0) > index(1), No

i = 1

-2	45	0	11	-9

index(1) > index(0) swap.

i = 2

-2	0	45	11	-9.

index(2) > index(3) Swap.

i = 3

-2	0	11	45	-9

index(3) > (index(4)) Swap.

-2	0	11	-9	45

Iteration I completed.

Iteration 2 starts leaving $\boxed{45}$ out as it is already sorted in end.

i = 0

-2	0	11	-9

and soon.......

- * The complexity of bubble sore is $O(n^2)$. This is for the worst case. For best case it is $O(n)$ and in average case also it is $O(n^2)$.

→ Best case when the list is already sorted.

- * <u>Selection Sort</u> :- It selects the smallest element from the unsorted list in each iteration and try to place at the beginning of the unsorted list.

20	12	10	18	2	→	2	10	12	18	20

Unsorted List   Sorted List.

→ The complexity of the selection sort is $O(n^2)$ for the worst case and $O(n^2)$ for the Best case.

* **Insertion Sort** :- Insertion sort we divide our list into 2 parts the 1st part is sorted and the 2nd part is unsorted.

Complexity of insertion sort is $O(n^2)$ in woorst case and in best case $O(n)$.

Problem Solving Pattern.

- Sliding Window
- Two Pointer
- Divide and Conquer.
- Using Hash table
- Fast and Slow pointer.