1.**BUBBLE SORT**

Bubble sort is a simple sorting algorithm. This sorting algorithm is **comparison-based algorithm in which each pair of adjacent elements is compared and the elements are swapped if they are not in order**.

This algorithm is not suitable for large data sets as its average and worst case complexity are of Ο(n2) where **n** is the number of items.

**How Bubble Sort Works?**

We take an unsorted array for our example. Bubble sort takes Ο(n2) time so we're keeping it short and precise.

Bubble Sort

Bubble sort starts with very first two elements, comparing them to check which one is greater.

Bubble Sort

In this case, value 33 is greater than 14, so it is already in sorted locations. Next, we compare 33 with 27.

Bubble Sort

We find that 27 is smaller than 33 and these two values must be swapped.

Bubble Sort

The new array should look like this −

Bubble Sort

Next we compare 33 and 35. We find that both are in already sorted positions.

Bubble Sort

Then we move to the next two values, 35 and 10.

Bubble Sort

We know then that 10 is smaller 35. Hence they are not sorted.

Bubble Sort

We swap these values. We find that we have reached the end of the array. After one iteration, the array should look like this −

Bubble Sort

Notice that after each iteration, at least one value moves at the end.

Bubble Sort

And when there's no swap required, bubble sorts learns that an array is completely sorted.

Bubble Sort

**2**.**INSERTION SORT**

An element which is to be 'insert'ed in this sorted sub-list, has to find its appropriate place and then it has to be inserted there. Hence the name, **insertion sort**.

The array is searched sequentially and unsorted items are moved and inserted into the sorted sub-list (in the same array)

Again we find 14 and 10 in an unsorted order.

Insertion Sort

We swap them again. By the end of third iteration, we have a sorted sub-list of 4 items.

Insertion Sort

This process goes on until all the unsorted value

We take an unsorted array for our example.

Unsorted Array

Insertion sort compares the first two elements.

Insertion Sort

It finds that both 14 and 33 are already in ascending order. For now, 14 is in sorted sub-list.

Insertion Sort

Insertion sort moves ahead and compares 33 with 27.

Insertion Sort

And finds that 33 is not in the correct position.

Insertion Sort

It swaps 33 with 27. It also checks with all the elements of sorted sub-list. Here we see that the sorted sub-list has only one element 14, and 27 is greater than 14. Hence, the sorted sub-list remains sorted after swapping.

Insertion Sort

By now we have 14 and 27 in the sorted sub-list. Next, it compares 33 with 10.

Insertion Sort

These values are not in a sorted order.

Insertion Sort

So we swap them.

Insertion Sort

However, swapping makes 27 and 10 unsorted.

Insertion Sort

Hence, we swap them too.

Insertion Sort

Again we find 14 and 10 in an unsorted order.

Insertion Sort

We swap them again. By the end of third iteration, we have a sorted sub-list of 4 items.

Insertion Sort