Bubble sort Algorithm

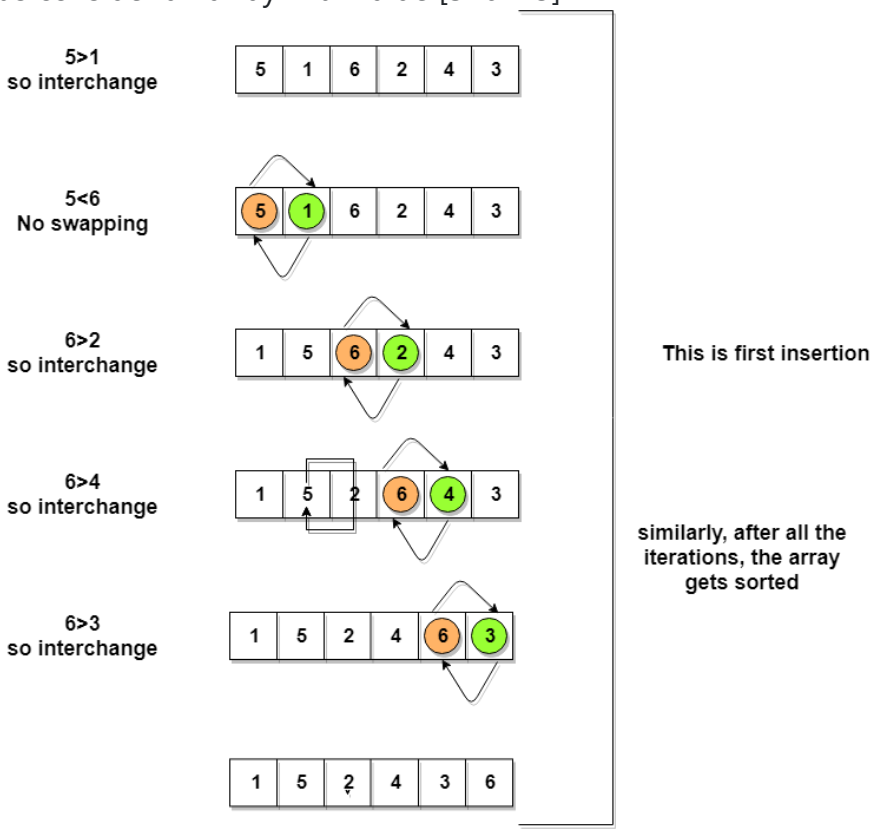
Bubble Sort is a simple algorithm which is used to sort a given set of n elements provided in form of an array with n number of elements. Bubble Sort compares all the element one by one and sort them based on their values.

Implementing Bubble Sort Algorithm

Following are the steps involved in bubble sort(for sorting a given array in ascending order):

1. Starting with the first element(index = 0), compare the current element with the next element of the array.
2. If the current element is greater than the next element of the array, swap them.
3. If the current element is less than the next element, move to the next element. **Repeat Step 1**.

Let's consider an array with value [516243]



From above representation -> 6 is placed at the last index, which is the correct position for it. Similarly after the second iteration, 5 will be at the second last index, and so on.

Although the above code will sort an unsorted array, still the above algorithm is not efficient

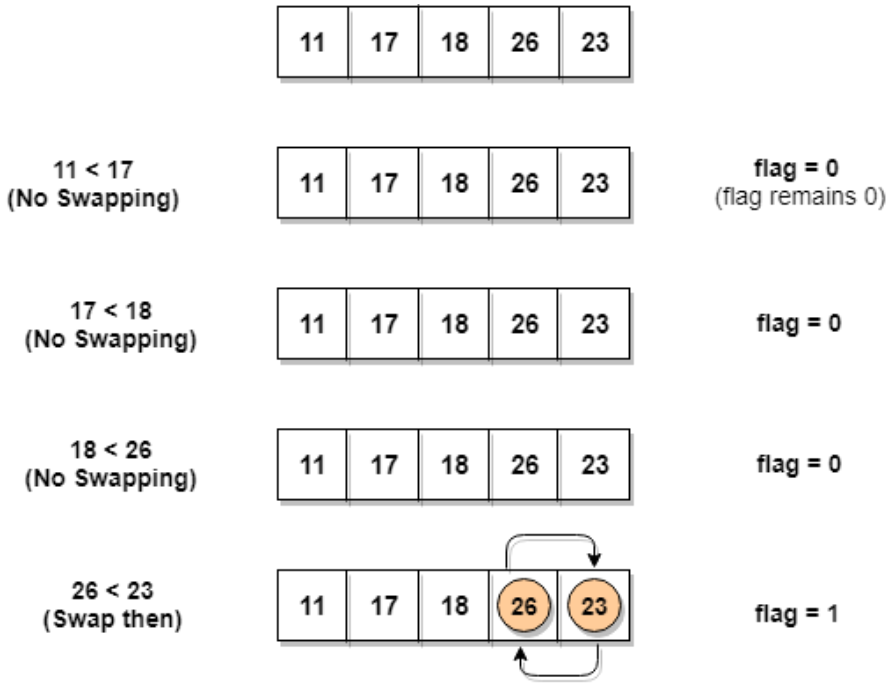
Optimise approach

To optimize our bubble sort algorithm, we can introduce a flag to monitor whether elements are getting swapped inside the inner for loop.

Hence, in the inner for loop, we check whether swapping of elements is taking place or not, everytime.

If for a particular iteration, no swapping took place, it means the array has been sorted and we can jump out of the for loop, instead of executing all the iterations.

Let's consider an array with values {11, 17, 18, 26, 23}



- Worst Case Time Complexity **O(n^2)**
- Best Case Time Complexity **O(n)**
- Space Complexity: **O(1)**

Reference Studytonight.com