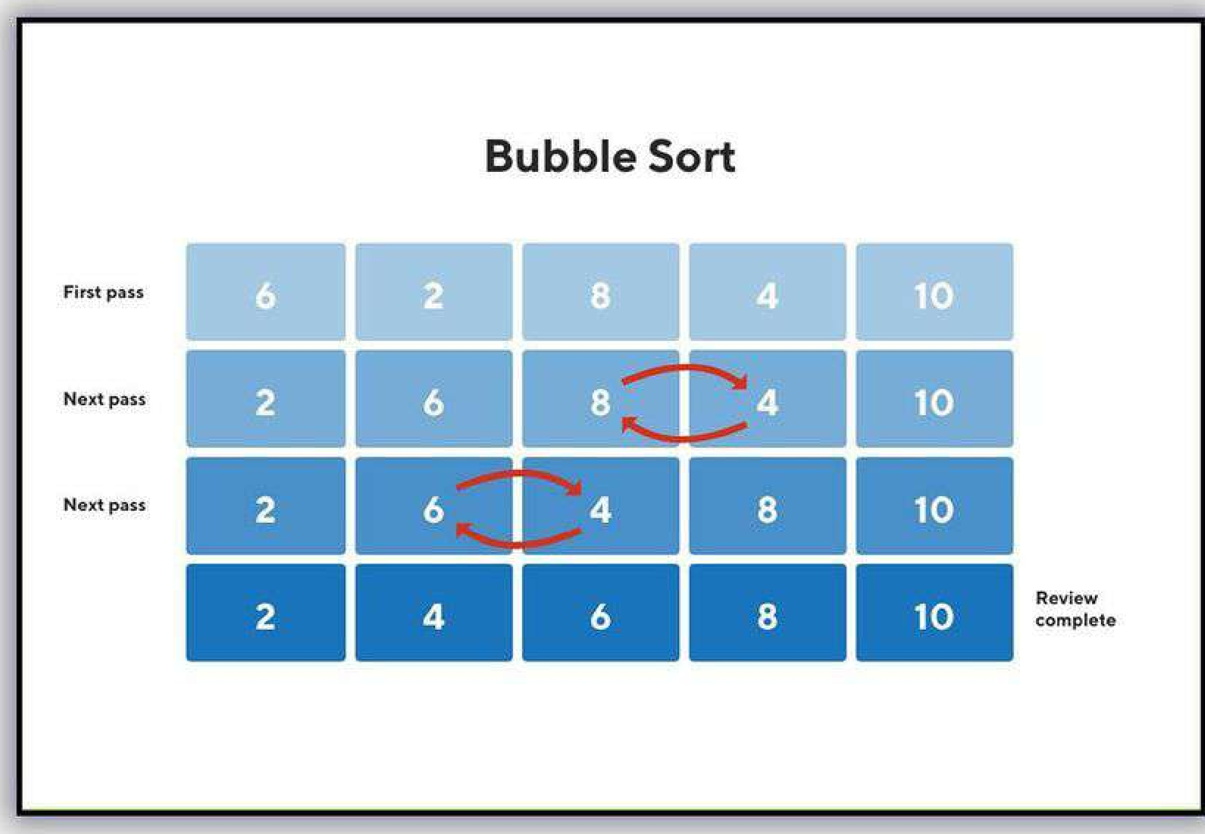
Manish Kumar Shah

SORTING ALGORITHMS

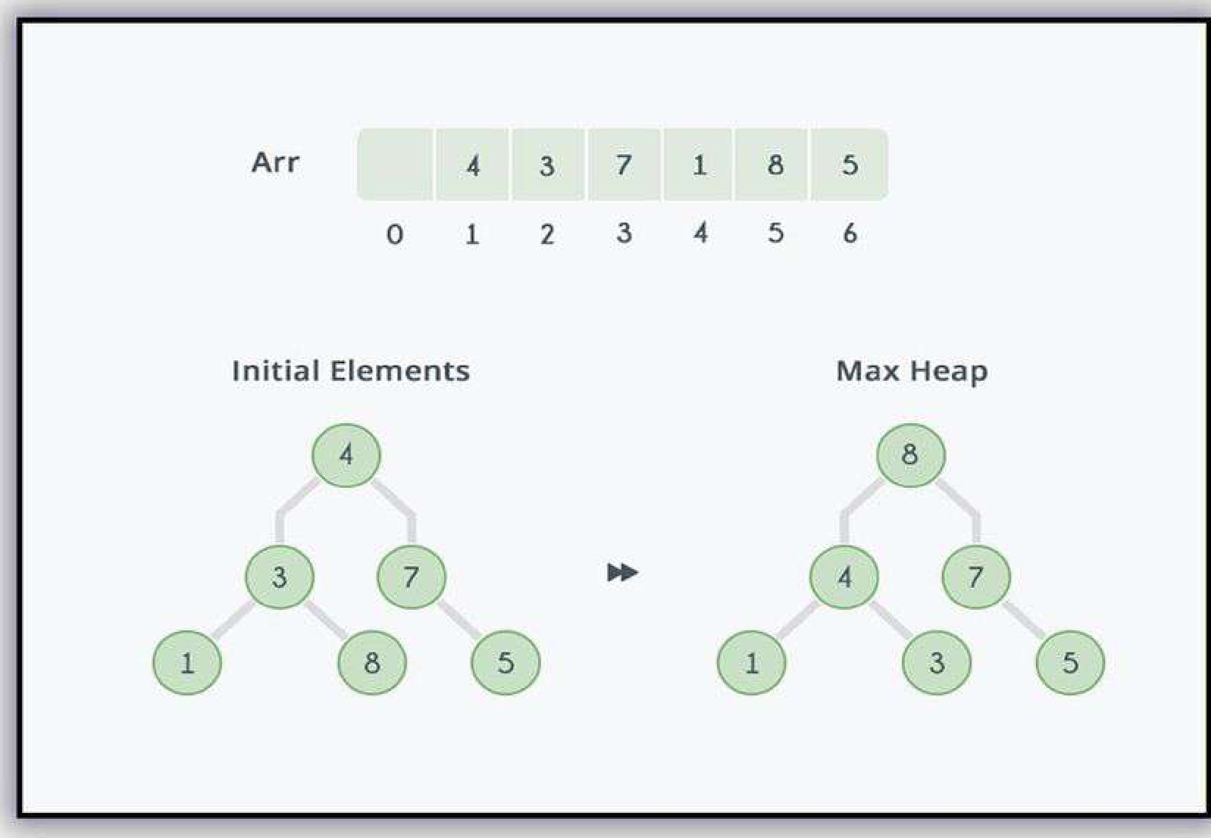
Bubble Sort

Bubble sort is the simplest sorting algorithm that works by repeatedly swapping the adjacent elements if they are in the wrong order. This algorithm is not suitable for large data sets as its average and worst-case time complexities is quite high.



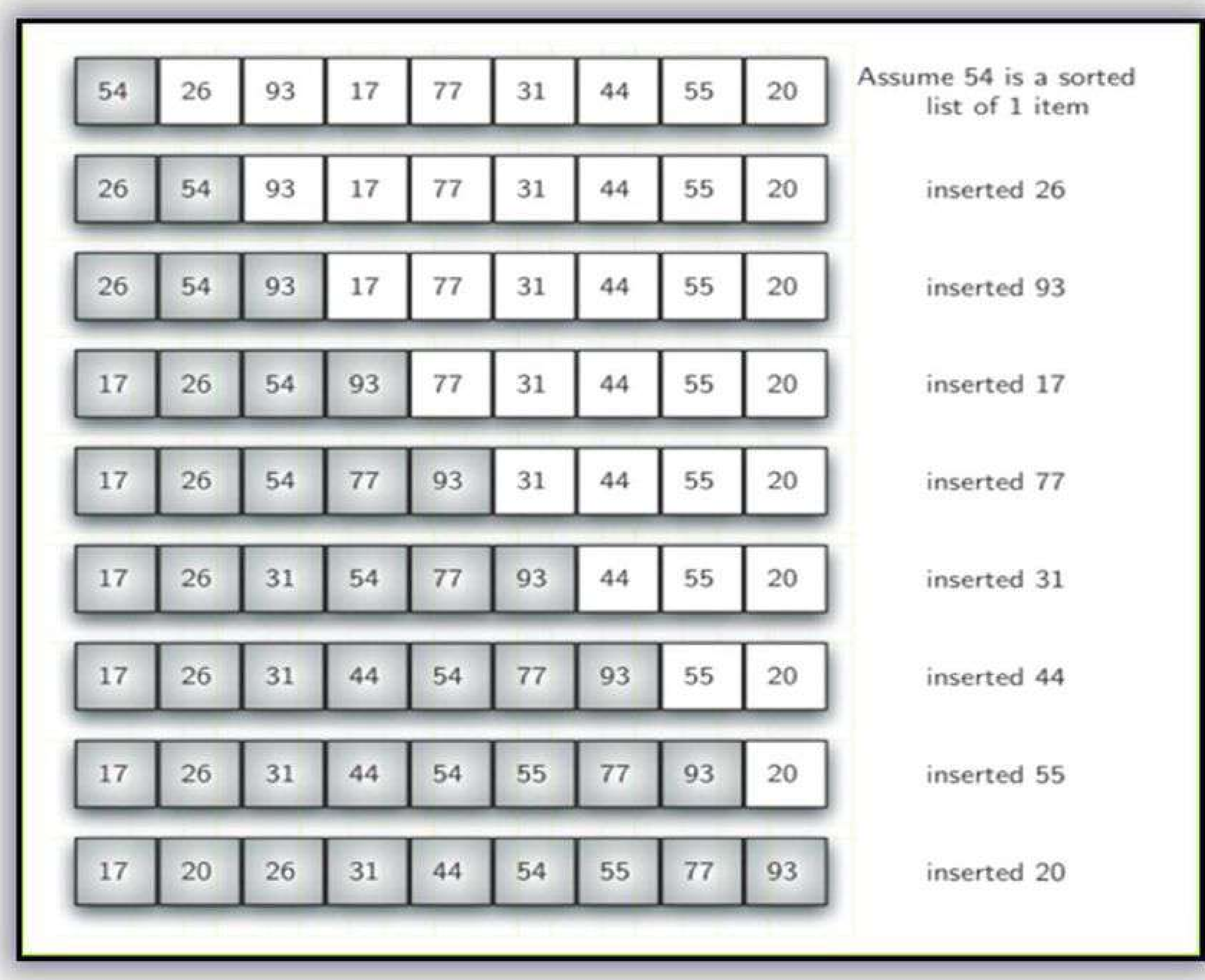
Heap Sort

Heap sort is a comparison-based sorting technique based on Binary Heap data structure. It is similar to the selection sort where we first find the minimum element and place the minimum element at the beginning. Repeat the same process for remaining elements.



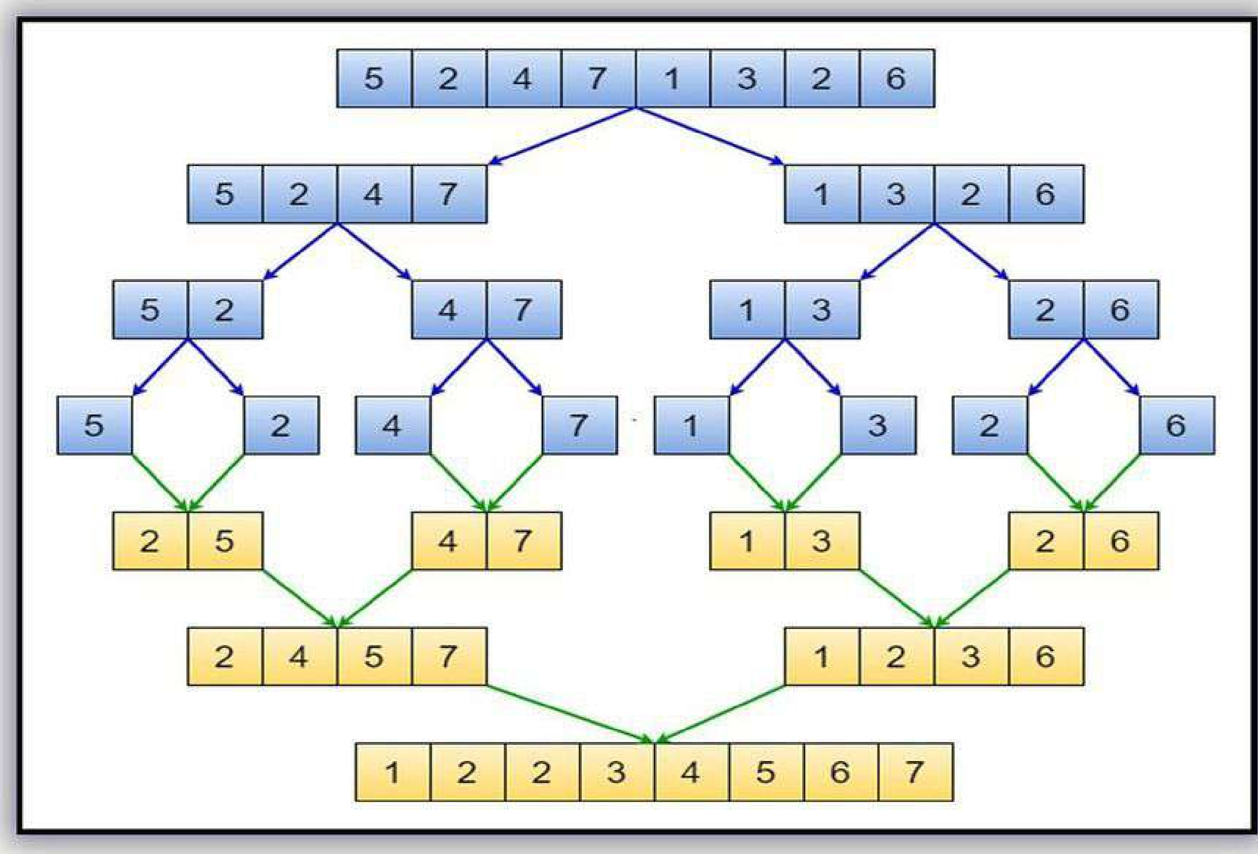
Insertion Sort

Insertion sort is a simple sorting algorithm that works similar to the way you sort playing cards in your hands The array is virtualy split into a sorted and an unsorted part. Values from the unsorted part are picked and placed at the correct position in the sorted part.



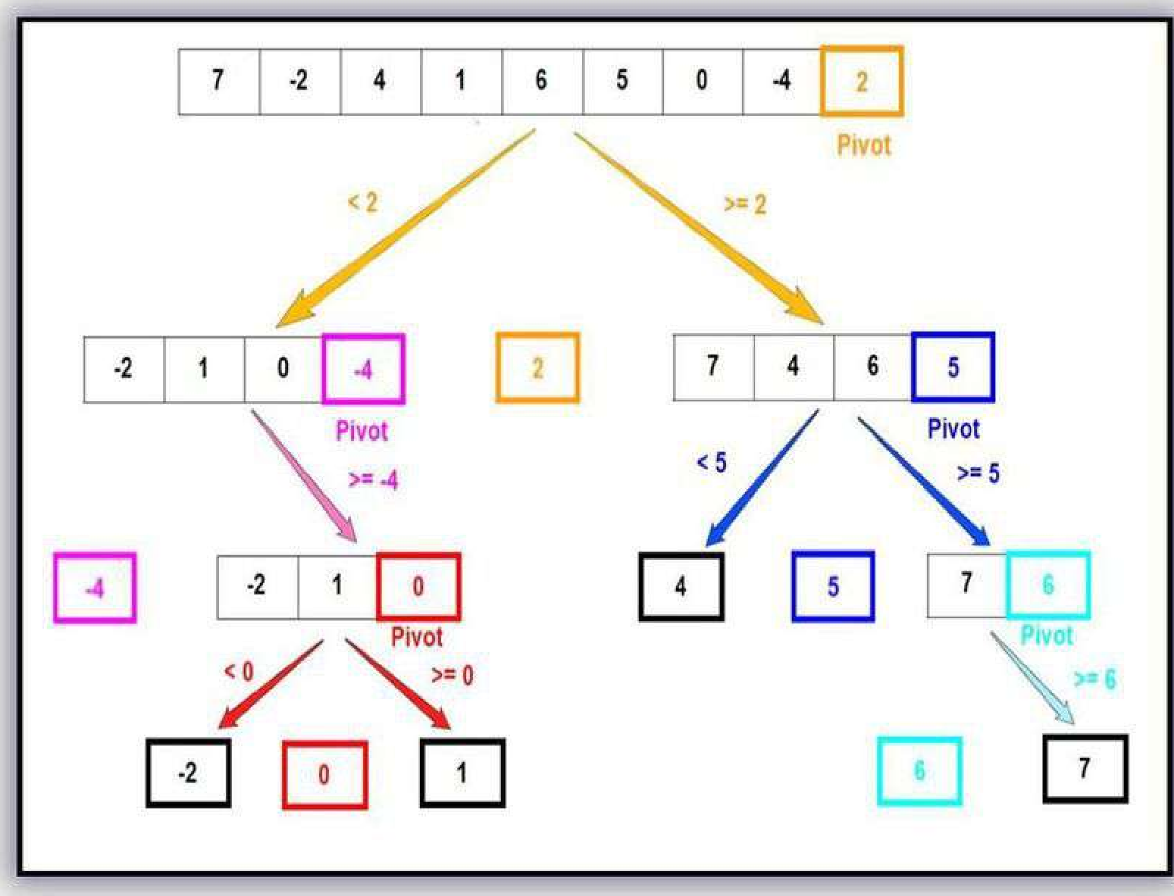
Merge Sort

Merge Sort is a algorithm that is considered an example of the divide and conquer strategy. So, in this algorithm the array is initially divided into two equal halves and then they are combine in a sorted manner.



Quick Sort

Quick sort is also an divide and conquer algorithm. It picks an element as a pivot and partitions the given array around the picked pivot. This algorithm is used to quickly sort items within an array no matter how big the array is.

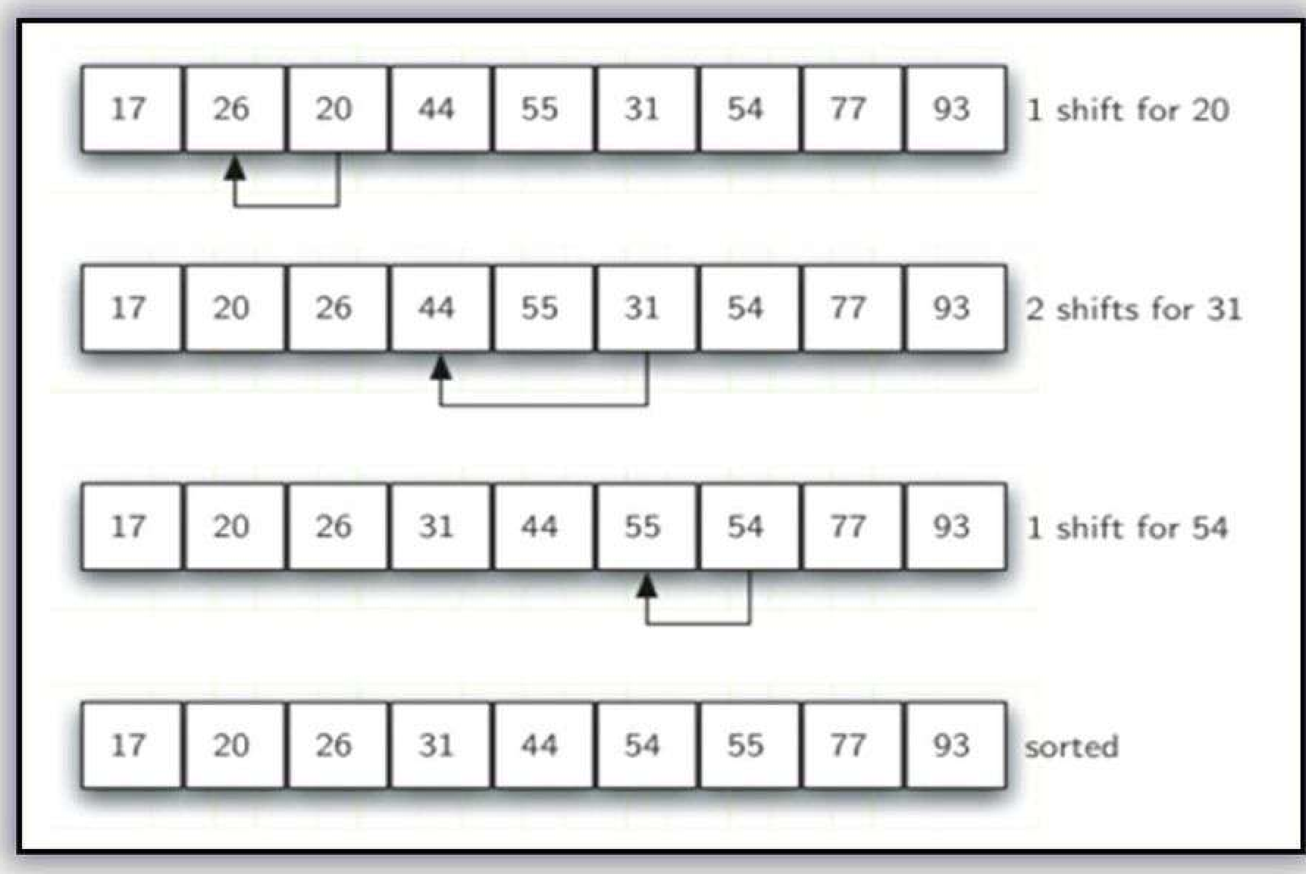


Selection Sort

The Selection sort algorithm sorts an array by repeatedly finding the minimum element (considering ascending order) from unsorted part and putting it at the beginning.

Shell Sort

Shell sort is mainly a variation of Insertion Sort. In insertion sort, we move elements only one position ahead. When an element has to be moved far ahead, many movements are involved. The idea of ShellSort is to allow the exchange of far items. In Shell sort, we make the array h-sorted for a large value of h. We keep reducing the value of h until it becomes 1. An array is said to be h-sorted if all sublists of every h'th element are sorted.



Time Complexities

Sorting Algorithm	Best Case	Average Case	Worst Case
Bubble Sort	$O(n)$	$O(n^2)$	$O(n^2)$
Heap Sort	$O(n\log n)$	$O(n\log n)$	$O(n\log n)$
Insertion Sort	$O(n)$	$O(n^2)$	$O(n^2)$
Merge Sort	$O(n\log n)$	$O(n\log n)$	$O(n\log n)$
Quick Sort	$O(n\log n)$	$O(n\log n)$	$O(n^2)$
Selection Sort	$O(n^2)$	$O(n^2)$	$O(n^2)$
Shell Sort	$O(n(\log n)^2)$	$O(n^{3/2})$	$O(n)$

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