

Code  *Random*
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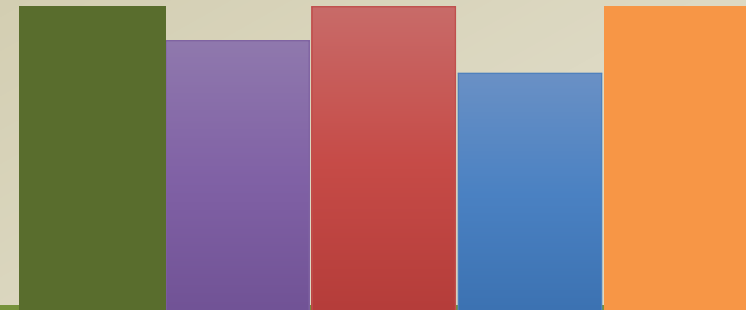
Sorting in Arrays with JAVA



Program

Logic

Syntax



Sorting In Arrays

- The sorting is a way to arrange elements of a list or array in a certain order. The order may be in ascending or descending order.
- The numerical and lexicographical (alphabetical) order is a widely used order.
- We can perform sorting in the following ways:
 - *Using the sort() Method*
 - *Without using the method*
 - *Using the loop – Various sorting techniques*
 - *Using the User Defined Method*

Using Sort() Function

- In Java, **Arrays** is the class defined in the java.util package that provides **sort()** method to sort an array in ascending order.
- **Syntax:** **public static void** sort(**int**[] a), Where **a** is an array to be sort.
- **Example:**

```
public static void main(String[] args)
{
    int [] array = new int [] {90, 23, 5, 109, 12, 22, 67, 34};
    Arrays.sort(array);
    System.out.println("Elements of array sorted in ascending order: ");
    for (int i = 0; i < array.length; i++)
    {
        System.out.println(array[i]);
    }
}
```

Without Using Sort() Function

- The first method to sort an array without using sort function is to use loops. Applying loops usually for loop will classify the sorting methods in various sorting techniques:
 - *Exchange Selection Sort*
 - *Bubble Sort*
 - *Insertion Sort*
 - *Merge Sort etc...*
- We will only learn the first two techniques as others are beyond the syllabus.
- Other method is using user defined function- Here, we will define a method like `array_sort()` which contains the logic to sort an array in a order.

Exchange Selection Sort

- In Exchange Selection Sort algorithm, we search for the lowest element and arrange it to the proper location. We swap the current element with the next lowest number.
- How it works-
 - The selection sort algorithm works in a very simple way. It maintains two subarray for the given array.
 - *The subarray is already sorted.*
 - *And the second subarray is unsorted.*

Bubble Sort

- Bubble Sort is the simplest sorting algorithm that works by repeatedly swapping the adjacent elements if they are in wrong order.
- It is an sorting algorithm that compares two adjacent elements and swaps them until they are not in the intended order.
- Just like the movement of air bubbles in the water that rise up to the surface, each element of the array move to the end in each iteration. Therefore, it is called a bubble sort.
- **Algorithm:**

```
function bubbleSort(array)
  for i <- 1 to indexOfLastUnsortedElement-1
    if leftElement > rightElement
      swap leftElement and rightElement
  end bubbleSort
```

Selection Sort Vs Bubble Sort

BUBBLE SORT

A simple sorting algorithm that continuously steps through the list and compares the adjacent pairs to sort the elements

Compares the adjacent elements and swap accordingly

Less efficient

Slower

Uses item exchanging

SELECTION SORT

A sorting algorithm that takes the smallest value (considering ascending order) in the list and moves it to the proper position in the array

Selects the minimum element from the unsorted sub-array and places it at the next position of the sorted subarray

More efficient

Faster

Uses item selection