Sorting

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Bubble Sort $O(n^2)$

[7, 4, 2, 3, -2] $n = 5 \rightarrow$ 4 iterations

↳ If n-1 elements are at their correct positions, n^{th} element is as well.

1.

1.1) 7 4 2 3 −2

↳ are these relatively sorted? No. → swap them

1.2) 4 7 2 3 −2

1.3) 4 2 7 3 −2

1.4) 4 2 3 7 −2

---

4 2 3 −2 [7] (one element is now at it's correct position)

2.

2.1) 4 2 3 −2 [7]

2.2) 2 4 3 −2 [7

2.2) 2 4 3 -2 [7

2.3) 2 3 4 -2 [7

---

2 3 -2 [4 7] (two elements are now sorted

3.

3.1) 2 3 -2 [4 7]

3.2) 2 3 -2 [4 7]

---

2 -2 [3 4 7] (three elements sorted

4.

4.1) 2 -2 [3 4 7]

-2 [2 3 4 7]

If 4 (n-1) elements are sorted, n^{th} element is also sorted.

Code

```java
import java.io.*;
import java.util.*;

public class Solution {

    public static void main(String[] args) {
        Scanner scn = new Scanner(System.in);
        int n = scn.nextInt();
        int[] arr = new int[n];
        for(int i = 0; i < n; i ++) arr[i] = scn.nextInt();
        bubbleSort(arr, n);
    }

    public static void bubbleSort(int[] arr, int n) {
        for(int itr = 1; itr < n; itr ++) {
            for(int j = 0; j < n - itr; j ++) {
                if(arr[j] > arr[j + 1]) swap(arr, j, j + 1);
            }
        }
        for(int ele : arr) System.out.print(ele + " ");
    }

    public static void swap(int[] arr, int i, int j) {
        int temp = arr[i];
        arr[i] = arr[j];
        arr[j] = temp;
    }
}
```