- **MEDIUM**

- **Max Score: 40 Points**

-

-

-

-

-

Implementing Merge Sort

Given an array A[] of size N, containing positive integers. You need to sort the elements of array using the merge sort algorithm.

Input

The input consists of two lines.

The first line of input is the size of array N and the second line consists of N array elements separated by space.

Output

Print the sorted array in a new line.

Example 1

Input

```
5
4 1 3 9 7
```

Output

```
1 3 4 7 9
```

Explanation

The array after performing merge sort: 1 3 4 7 9.

Example 2

Input

```
10
10 9 8 7 6 5 4 3 2 1
```

Output

```
1 2 3 4 5 6 7 8 9 10
```

Explanation

The array after performing merge sort: 1 2 3 4 5 6 7 8 9 10.

Constraints

1 <= N <= 10^5

-10^6 <= A[i] <= 10^6

My code

// n java
import java.util.*;

```java
import java.lang.*;
import java.io.*;

public class Main
{
static void merge(int arr[], int l, int m, int r)
    {
        int n1 = m - l + 1;
        int n2 = r - m;
        int L[] = new int[n1];
        int R[] = new int[n2];
        for (int i = 0; i < n1; ++i)
            L[i] = arr[l + i];
        for (int j = 0; j < n2; ++j)
            R[j] = arr[m + 1 + j];
        int i = 0, j = 0;
        int k = l;
        while (i < n1 && j < n2) {
            if (L[i] <= R[j]) {
                arr[k] = L[i];
                i++;
            }
            else {
                arr[k] = R[j];
                j++;
            }
            k++;
        }
        while (i < n1) {
            arr[k] = L[i];
```

```java
            i++;
            k++;
        }
        while (j < n2) {
            arr[k] = R[j];
            j++;
            k++;
        }
    }

    static void merge_sort(int arr[], int l, int r)
    {
        if (l < r) {
            int m = l + (r - l) / 2;
            merge_sort(arr, l, m);
            merge_sort(arr, m + 1, r);
            merge(arr, l, m, r);
        }
    }

    public static void main (String[] args) throws
java.lang.Exception
    {
            //your code here
            Scanner s=new Scanner(System.in);
            int n=s.nextInt();
            int arr[]=new int[n];
            for(int i=0;i<n;i++)
                    arr[i]=s.nextInt();
            merge_sort(arr,0,n-1);
```

```java
        for(int i=0;i<n;i++)
            System.out.print(arr[i]+" ");
    }
}
```