

158. You are given an unsorted array 31,23,35,27,11,21,15,28. Write a program for Merge Sort and implement using any programming language of your choice.

Test Cases :

Input : N= 8, a[] = {31,23,35,27,11,21,15,28}

Output : 11,15,21,23,27,28,31,35

Test Cases :

Input : N= 10, a[] = {22,34,25,36,43,67, 52,13,65,17}

Output : 13,17,22,25,34,36,43,52,65,67

PROGRAM :-

```
def merge_sort(arr):
```

```
    if len(arr) > 1:
```

```
        mid = len(arr) // 2
```

```
        L = arr[:mid]
```

```
        R = arr[mid:]
```

```
        merge_sort(L)
```

```
        merge_sort(R)
```

```
    i = j = k = 0
```

```
    while i < len(L) and j < len(R):
```

```
        if L[i] < R[j]:
```

```
            arr[k] = L[i]
```

```
            i += 1
```

```
        else:
```

```
            arr[k] = R[j]
```

```
            j += 1
```

```
        k += 1
```

```
    while i < len(L):
```

```
        arr[k] = L[i]
```

```
        i += 1
```

```
        k += 1
```

```
    while j < len(R):
```

```
        arr[k] = R[j]
```

```
        j += 1
```

```
        k += 1
```

```
# Test the Merge Sort implementation
```

```
arr = [31, 23, 35, 27, 11, 21, 15, 28]
```

```
merge_sort(arr)
```

```
print("Sorted array:", arr)
```

OUTPUT:-

```
Sorted array: [11, 15, 21, 23, 27, 28, 31, 35]
```

```
=== Code Execution Successful ===
```

TIME COMPLEXITY:- $O(N \log N)$