

1. 157. 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

Code:

```
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

def print_array(arr):
    for i in range(len(arr)):
        print(arr[i], end=" ")
    print()

N = 8
a = [31, 23, 35, 27, 11, 21, 15, 28]

print("Given array is:")
print_array(a)

merge_sort(a)

print("Sorted array is:")
print_array(a)
```

output:

```
PS C:\Users\karth>
PS C:\Users\karth> & C:/Users/karth/AppData/Local/Programs/Python/Python312/python.exe c:/Users/karth/OneDrive/Desktop/csa0863_karthik/PROBLEM.py
Given array is:
31 23 35 27 11 21 15 28
Sorted array is:
11 15 21 23 27 28 31 35
PS C:\Users\karth> █
```

Time complexity: $f(n)=o(n*n)$