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

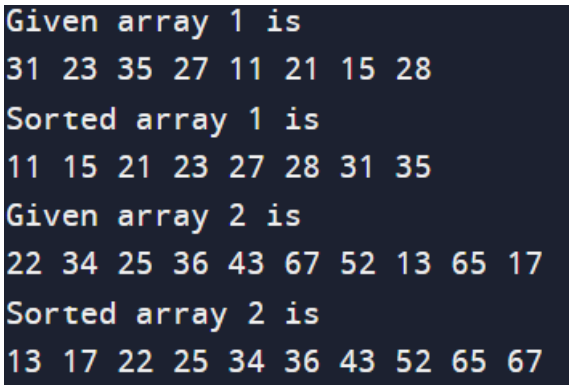
AIM: Write a program for Merge Sort and implement using any programming language of your choice.

PROGRAM :

```
def merge_sort(arr):
    if len(arr) > 1:
        mid = len(arr) // 2  # Finding the mid of the array
        L = arr[:mid]        # Dividing the elements into 2 halves
        R = arr[mid:]

        merge_sort(L)        # Sorting the first half
        merge_sort(R)        # Sorting the second half

        i = j = k = 0

        # Copy data to temp arrays L[] and R[]
        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

        # Checking if any element was left
        while i < len(L):
            arr[k] = L[i]
            i += 1
            k += 1

        while j < len(R):
            arr[k] = R[j]
            j += 1
            k += 1

# Function to print the array
def print_list(arr):
    for i in range(len(arr)):
        print(arr[i], end=" ")
    print()

if __name__ == "__main__":
```

```
arr1 = [31, 23, 35, 27, 11, 21, 15, 28]
arr2 = [22, 34, 25, 36, 43, 67, 52, 13, 65, 17]

print("Given array 1 is", end="\n")
print_list(arr1)
merge_sort(arr1)
print("Sorted array 1 is", end="\n")
print_list(arr1)

print("Given array 2 is", end="\n")
print_list(arr2)
merge_sort(arr2)
print("Sorted array 2 is", end="\n")
print_list(arr2)
```

OUTPUT:



TIME COMPLEXITY : O(n logn)