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**ROLL NO. – 1906137**

**SUBJECT NAME – DESIGN AND ANALYSIS OF ALGORITHMS LAB**

**SUBJECT CODE – CSL4403**

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**BRANCH – CSE 2**

**ASSIGNMENT-4**

**Q4. WAP to sort the array using Merge Sort algorithm.**

**Source Code in C Language:**

#include <stdio.h>

#include <stdlib.h>

void merge(int arr[], int l, int m, int r)

{

int i, j, k;

int n1 = m - l + 1;

int n2 = r - m;

int L[n1], R[n2];

for (i = 0; i < n1; i++)

L[i] = arr[l + i];

for (j = 0; j < n2; j++)

R[j] = arr[m + 1 + j];

i = 0;

j = 0;

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];

i++;

k++;

}

while (j < n2) {

arr[k] = R[j];

j++;

k++;

}

}

void mergeSort(int arr[], int l, int r)

{

if (l < r) {

int m = l + (r - l) / 2;

mergeSort(arr, l, m);

mergeSort(arr, m + 1, r);

merge(arr, l, m, r);

}

}

void display(int arr[], int n)

{

int i;

for (i = 0; i < n; i++)

printf("%d ", arr[i]);

printf("\n");

}

int main()

{

int arr[100],n;

printf("Program to illustrate Merge Sorting!!\n");

printf("Enter the size of the array.\n");

scanf("%d",&n);

printf("Enter array elements.\n");

for(int i=0;i<n;i++)

scanf("%d",&arr[i]);

printf("Input array: \n");

display(arr,n);

mergeSort(arr, 0, n );

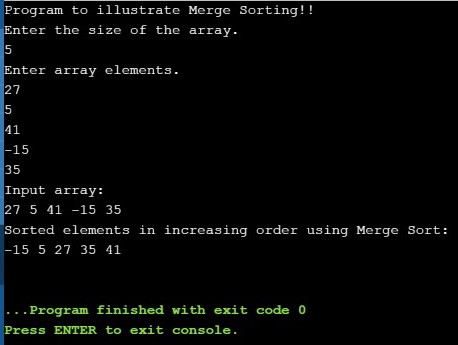
printf("Sorted elements in increasing order using Merge Sort:\n");

display(arr, n);

return 0;

}

**Output Screenshot:**

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