**Day-37 of the #101 days of coding challenge**

**Merge Sort:--**

**Code:-**

#include <iostream>

using namespace std;

void merge(int \*arr, int start, int end)

{

int i;

// here each time also need to find the mis elements

int mid = (start + end)/2;

// finding the length of the both array

int len1 = mid - start + 1;

int len2 = end - mid;

//creating two index for traversing the array's elements

int index1 = 0;

int index2 = 0;

// creating the two array to compy the left and right data

int \*firstArray = new int[len1];

int \*secondArray = new int[len2];

// coping the elements into the array based on size of elements

int mainArrayIndex = start; // starting from the first index

for(i= 0; i< len1; i++)

{

firstArray[i] = arr[mainArrayIndex++];

}

mainArrayIndex = mid+1;

for(i= 0; i< len2; i++)

{

secondArray[i] = arr[mainArrayIndex++];

}

mainArrayIndex = start;

// sorting and adding the array's data into the one single main Array

while(index1 < len1 && index2 < len2)

{

if(firstArray[index1]<secondArray[index2])

{

arr[mainArrayIndex++] = firstArray[index1++];

}

else{

arr[mainArrayIndex++] = secondArray[index2++];

}

}

// checking the condition wheather data is successfully added into main array

while(index1<len1)

{

arr[mainArrayIndex++] = firstArray[index1++];

}

while(index2<len2)

{

arr[mainArrayIndex++] = secondArray[index2++];

}

// free the memory allocated

delete[] firstArray;

delete[] secondArray;

}

void mergeSort(int \*arr, int start, int end)

{

if(start>=end)

{

return;

}

// finding mid value

int mid = (start + end)/2;

// sorting left elements

mergeSort(arr, start, mid);

// sorting right side array

mergeSort(arr, mid+1, end);

// merging both array after sorting

merge(arr, start, end);

}

int main() {

int n;

cout<<"Enter the size of the array"<<endl;

cin>>n;

int arr[n];

cout<<"Enter the Elements"<<endl;

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

{

cin>>arr[i];

}

// calling the function

mergeSort(arr, 0, n-1);

cout<<"Sorted Elements"<<endl;

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

{

cout<<arr[i]<<" ";

}

return 0;

}

Output:-

