S.No: 16	Exp. Name: *Write the C Program for sorting the Array using Merge Sort ?*	Date: 2022-08-22

Aim:

Write the C Program for sorting the Array using MergeSort?

Source Code:

mergeSort.c

```c
#include<stdio.h>
void read(int [],int);
void display(int [],int);
int l=1;
void sort(int [],int,int,int);
void merge(int [],int,int,int,int);
void main()
{
    int n,i,a[50];
    printf("Enter no of elements : ");
    scanf("%d",&n);
    printf("Enter array elements : ");
    read(a,n);
    sort(a,0,n-1,n);
    printf("Sorted array is :");
    display(a,n);
}
void read(int a[], int n)
{
    int i;
    for(i=0;i<n;i++) {
        scanf("%d",&a[i]);
    }
}
void display(int a[],int n)
{
    int i;
    for(i=0;i<n;i++) {
        printf("%d ",a[i]);
    }
    printf("\n");
}
void sort(int a[],int lb,int ub,int n)
{
    int mid;
    if(lb<ub)
    {
        mid=(lb+ub)/2;
        sort(a,lb,mid,n);
        sort(a,mid+1,ub,n);
        merge(a,lb,mid,ub,n);
    }
}
void merge(int a[],int lb,int mid,int ub,int n)
{
    int b[50],i,j,k;
```

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```
        i=lb,j=mid+1,k=lb;
        while(i<=mid&&j<=ub)
        {
            if(a[i]<a[j])
            {
                b[k++]=a[i++];
            }
            else
            {
                b[k++]=a[j++];
            }
        }
        while(j<=ub)
        {
            b[k++]=a[j++];
        }
        while(i<=mid)
        {
            b[k++]=a[i++];
        }
        for(i=lb;i<=ub;i++) {
            a[i]=b[i];
        }
        printf("Step  %d : ",l++);
        for(i=0;i<n;i++)
        {
            printf("%d ",a[i]);
        }
        printf("\n");
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter no of elements : 5
Enter array elements : 5 4 3 2 1
Step 1 : 4 5 3 2 1
Step 2 : 3 4 5 2 1
Step 3 : 3 4 5 1 2
Step 4 : 1 2 3 4 5
Sorted array is :1 2 3 4 5