S.No: 4	Exp. Name: ***Merge Sort***	Date:2025-07-24

Aim:

Write a C program to perform Merge sort. Display the partial pass-wise sorting done.

Source Code:

mergeSortAlgo.c

```
#include <stdio.h>
void display (int arr[],int n);
void mergesort(int arr[],int low, int high);
void merge(int arr[],int low, int mid,int high);

void display(int arr[], int n){
   int i;
   for(i=0;i<n;i++){
      printf("%d ",arr[i]);
   }
   printf("\n");
}

void mergesort(int arr[],int low,int high){
   if(low<high){
      int mid=(low+high)/2;
      mergesort(arr,low,mid);
      mergesort(arr,mid+1,high);
      merge(arr,low,mid,high);
   }
}

void merge(int arr[],int low,int mid,int high){
   int i=low,h=low,j=mid+1,k,temp[20];
   while(h<=mid &&j<=high){
      if(arr[h]<=arr[j]){
         temp[i++]=arr[h++];
      }else{
         temp[i++]=arr[j++];
      }
   }
   while(h<=mid){
      temp[i++]=arr[h++];
   }
   while(j<=high){
      temp[i++]=arr[j++];
   }
   for(k=low;k<=high;k++){
      arr[k]=temp[k];
   }
   printf("Pass: ");
   for(k=low;k<=high;k++){
      printf("%d ",arr[k]);
   }
   printf("\n");
}
```


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```
void main(){
   int arr[20],i,n;
   printf("no of elements: ");
   scanf("%d",&n);
   printf("elements: ");
   for(i=0;i<n;i++){
      scanf("%d",&arr[i]);
   }
   printf("Given array:\n");
   display(arr,n);
   mergesort(arr,0,n-1);
   printf("Sorted array:\n");
   display(arr,n);
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
no of elements: 5
elements: 5 3 7 1 9
Given array:
5 3 7 1 9
Pass: 3 5
Pass: 3 5 7
Pass: 1 9
Pass: 1 3 5 7 9
Sorted array:
1 3 5 7 9

Test Case - 2
User Output
no of elements: 8
elements: 8 4 2 7 1 5 3 6
Given array:
8 4 2 7 1 5 3 6
Pass: 4 8
Pass: 2 7
Pass: 2 4 7 8
Pass: 1 5
Pass: 3 6
Pass: 1 3 5 6
Pass: 1 2 3 4 5 6 7 8
Sorted array:
1 2 3 4 5 6 7 8

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