S.No: 4	Exp. Name: ***Merge Sort***	Date:2025-07-10

Aim:

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

Source Code:

mergeSortAlgo.c

```
#include<stdio.h>
void displayPass(int arr[20], int l, int n)
{
   printf("Pass: ");
   for(int i = l ; i <= n; i++)
      {
         printf("%d ",arr[i]);
      }
   printf("\n");
}
void merge(int arr[20], int l, int m, int r)
{
   int n1 = m-l+1;
   int n2 = r - m;

   int left[n1], right[n2];
   for(int i = 0; i< n1; i++)
      left[i]= arr[l+i];
   for(int j = 0 ; j < n2; j++)
      {
         right[j] = arr[m+1+j];
      }
   int i = 0, j = 0, k=l;
   while(i < n1&& j < n2){
      if(left[i] <= right[j])
         arr[k++] = left[i++];
      else
         arr[k++] = right[j++];
   }
   while(i < n1)
      arr[k++] = left[i++];
   while(j < n2)
      arr[k++] = right[j++];
   displayPass(arr,l,r);
}
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);
   }
}
int main()
```

```
{
   int n;
   printf("no of elements: ");
   scanf("%d",&n);

   int arr[n];
   printf("elements: ");
   for(int i = 0; i< n ;i++)
      {
         scanf("%d", &arr[i]);
      }
   printf("Given array:\n");
   for(int i= 0; i< n; i++)
      {
         printf("%d ",arr[i]);
      }
   printf("\n");
   mergeSort(arr,0,n-1);
   printf("Sorted array:\n");
   for(int i = 0; i< n; i++)
      {
         printf("%d ",arr[i]);
      }
   printf("\n");
   return 0;
}
```

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
```