Merge Sort:

```
#include <stdio.h>
#include <conio.h>

void merge(int a[], int low, int mid, int high)
{
    int len1 = mid - low + 1;    //size of left array
    int len2 = high - mid;       //size of right array
    int left[len1], right[len2]; //declare two arrays left and right

    for (int i = 0; i < len1; i++)
        left[i] = a[low + i]; //put elements from l to m in left
    for (int j = 0; j < len2; j++)
        right[j] = a[mid + 1 + j]; //put elements from m+1 to h in right

    int i = 0, j = 0, k = low; // Initial index of left,right and initial index of merged
subarray
    while (i < len1 && j < len2)
    {
        if (left[i] <= right[j])
            a[k++] = left[i++];

        else
            a[k++] = right[j++];
    }

    // Copy the remaining elements of left
    while (i < len1)
        a[k++] = left[i++];

    // Copy the remaining elements of right
    while (j < len2)
        a[k++] = right[j++];
}

void mergeSort(int a[], int low, int high)
{
    int mid;
    if (low < high)
    {
        mid = low + (high - low) / 2;
        mergeSort(a, low, mid);
        mergeSort(a, mid + 1, high);
```

```
        merge(a, low, mid, high);
    }
    return;
}
int main()
{
    int n, a[20];
    printf("Enter number of elements: ");
    scanf("%d", &n);
    printf("Enter the elements: ");
    for (int j = 0; j < n; j++)
        scanf("%d", &a[j]);
    mergeSort(a, 0, n - 1);
    printf("After sorting :");
    for (int j = 0; j < n; j++)
        printf("%d  ", a[j]);
}
```

OUTPUT:

```
User@PRATHIKSHA /c/ada lab
$ cd "/c/ada lab/" && gcc mergesort.c -o mergesort && "/c/ada lab/"mergesort
Enter number of elements: 7
Enter the elements: 10 0 -5 9 2 1 0
After sorting :-5  0  0  1  2  9  10
```