//EXP 2 MADF

//21co24 merge sort

#include<stdio.h>

void mergesort(int [],int,int);

void merge(int [],int [],int,int,int,int);

void copy(int [],int [],int ,int);

void display(int [],int);

int main()

{

int n,arr[50],dumy[100];

printf("Enter the size of the array\n");

scanf("%d",&n);

printf("Enter the elements in the array\n");

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

{

scanf("%d",&arr[i]);

dumy[i]=arr[i];

}

mergesort(arr,0,n-1);

printf("The entered array is:\n");

display(dumy,n);

printf("\nThe sorted array is:\n");

display(arr,n);

return 0;

}

void merge(int a[],int temp[],int l1,int h1,int l2,int h2) //merges two halfs of array into a temp array

{

int i=l1;

int j=l2;

int k=l1;

while((i<=h1)&&(j<=h2))

{

if(a[i]<=a[j])

{

temp[k++]=a[i++];

}

else

{

temp[k++]=a[j++];

}

}

while(i<=h1)

{

temp[k++]=a[i++];

}

while(j<=h2)

{

temp[k++]=a[j++];

}

}

void mergesort(int a[],int low,int high) //applies merge sort recursively

{

int temp[50];

int mid;

if(low<high)

{

mid=(low+high)/2;

mergesort(a,low,mid);

mergesort(a,mid+1,high);

merge(a,temp,low,mid,mid+1,high);

copy(a,temp,low,high);

}

}

void copy(int a[],int temp[],int low,int high) //copies temp array to original array

{

for(int i=low;i<=high;i++)

{

a[i]=temp[i];

}

}

void display(int arr[],int n)

{

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

{

printf("%d\t",arr[i]);

}

}

OUTPUT:

