// Program 2: Write and execute a program to sort a given set of elements using the **Merge sort** method.

#include<stdio.h>

// Merge Function

void merge(int a[100], int low, int mid, int high) {

int b[100], i, j, k;

i = low;

j = mid + 1;

k = low;

while(i <= mid && j <= high) {

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

b[k] = a[i];

k += 1;

i += 1;

}

else {

b[k] = a[j];

k += 1;

j += 1;;

}

}

while(i <= mid) {

b[k] = a[i];

k += 1;

i += 1;

}

while(j <= high) {

b[k] = a[j];

j += 1;

k += 1;

}

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

a[i] = b[i];

}

// Mergesort Function

void mergesort(int a[100], int low, int high) {

int mid;

if(low < high) {

mid = (low + high)/2;

mergesort(a, low, mid);

mergesort(a, mid + 1, high);

merge(a, low, mid, high);

}

}

// Main Program

int main() {

int n, a[100], i;

printf("Enter the number of elements:\n");

scanf("%d", &n);

printf("Enter the %d elements:\n", n);

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

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

mergesort(a, 0, n - 1);

printf("The sorted elements are:\n");

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

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

}