#include<iostream>

#include<algorithm>

using namespace std;

void display(int \*array, int size) {

   for(int i = 1; i<=size; i++)

      cout << array[i] << " ";

   cout << endl;

}

int getMax(int array[], int size) {

   int max = array[1];

   for(int i = 2; i<=size; i++) {

      if(array[i] > max)

         max = array[i];

   }

   return max; //the max element from the array

}

void countSort(int \*array, int size) {

   int output[size+1];

   int max = getMax(array, size);

   int count[max+1];     //create count array (max+1 number of elements)

   for(int i = 0; i<=max; i++)

      count[i] = 0;     //initialize count array to all zero

   for(int i = 1; i <=size; i++)

      count[array[i]]++;     //increase number count in count array.

   for(int i = 1; i<=max; i++)

      count[i] += count[i-1];     //find cumulative frequency

   for(int i = size; i>=1; i--) {

      output[count[array[i]]] = array[i];

      count[array[i]] -= 1; //decrease count for same numbers

   }

for(int i = 1; i<=size; i++) {

array[i] = output[i]; //store output array to main array

}

}

int main() {

int n;

cout << "Enter the number of elements: ";

cin >> n;

int arr[n+1]; //create an array with given number of elements

cout << "Enter elements:" << endl;

for(int i = 1; i<=n; i++) {

cin >> arr[i];

}

cout << "Array before Sorting: ";

display(arr, n);

countSort(arr, n);

cout << "Array after Sorting: ";

display(arr, n);

}