#include <bits/stdc++.h>

using namespace std;

void input(vector<int> &arr)

{

for (int i = 0; i < arr.size(); i++)

{

cin >> arr[i];

}

}

void print(vector<int> &arr)

{

for (int i = 0; i < arr.size(); i++)

{

cout << arr[i] << " ";

}

cout << endl;

}

vector<int> mergeTwoSortedArrays(vector<int> &A, vector<int> &B)

{

// if (A.size() == 0 || B.size() == 0)

// return A.size() == 0 ? B : A;

int n = A.size();

int m = B.size();

vector<int> ans(n + m);

cout << ("Merging these two arrays ") << endl;

cout << ("left array -> ");

print(A);

cout << ("right array -> ");

print(B);

int i = 0, j = 0, k = 0;

while (i < n && j < m)

{

if (A[i] < B[j])

ans[k++] = A[i++];

else

ans[k++] = B[j++];

}

while (i < n)

ans[k++] = A[i++];

while (j < m)

ans[k++] = B[j++];

return ans;

}

vector<int> mergeSort(vector<int> &arr, int low, int high)

{

//base case

if(low==high){

vector<int> base;

base.push\_back(arr[low]);

return base;

}

int mid = (low+high)/2;

vector<int> firsthalf = mergeSort(arr,low,mid);

vector<int> secondhalf = mergeSort(arr,mid+1,high);

vector<int> full = mergeTwoSortedArrays(firsthalf,secondhalf);

return full;

}

int main()

{

int n, m;

cin >> n;

vector<int> A(n, 0);

input(A);

vector<int> ans = mergeSort(A,0,n-1);

cout << "Sorted Array -> ";

print(ans);

return 0;

}