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Counting Sort 1

by HackerRank

Problem

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Comparison Sorting

Quicksort usually has a running time of $n \times \log(n)$, but is there an algorithm that can sort even faster? In general, this is not possible. Most sorting algorithms are *comparison sorts*, i.e. they sort a list just by comparing the elements to one another. A comparison sort algorithm cannot beat $n \times \log(n)$ (worst-case) running time, since $n \times \log(n)$ represents the minimum number of comparisons needed to know where to place each element. For more details, you can see [these notes](#) (PDF).

Alternative Sorting

However, for certain types of input, it is more efficient to use a non-comparison sorting algorithm. This will make it possible to sort lists even in linear time. These challenges will cover *Counting Sort*, a fast way to sort lists where the elements have a small number of possible values, such as integers within a certain range. We will start with an easy task - counting.

Challenge

Given a list of integers, can you count and output the number of times each value appears?

Hint: There is no need to sort the data, you just need to count it.

Input Format

There will be two lines of input:

- n - the size of the list
- ar - n space-separated numbers that make up the list

Output Format

Output the number of times every number from 0 to 99 (inclusive) appears on the list.

Constraints

$$100 \leq n \leq 10^6$$

$$0 \leq x < 100, x \in ar$$

Sample Input

```
100
63 25 73 1 98 73 56 84 86 57 16 83 8 25 81 56 9 53 98 67 99 12 83 89 80 91 39 86 76 85 74 39 25 90 59 10 94 32 44 3 89 30 27 79 46 96
27 32 18 21 92 69 81 40 40 34 68 78 24 87 42 69 23 41 78 22 6 90 99 89 50 30 20 1 43 3 70 95 33 46 44 9 69 48 33 60 65 16 82 67 61 32
21 79 75 75 13 87 70 33
```

Sample Output

```
0 2 0 2 0 0 1 0 1 2 1 0 1 1 0 0 2 0 1 0 1 2 1 1 1 3 0 2 0 0 2 0 3 3 1 0 0 0 0 2 2 1 1 1 2 0 2 0 1 0 1 0 0 1 0 0 2 1 0 1 1 1 0 1 0 1 0
2 1 3 2 0 0 2 1 2 1 0 2 2 1 2 1 2 1 1 2 2 0 3 2 1 1 0 1 1 1 0 2 2
```

Explanation

The output states that 0 appears 0 times, 1 appears 2 times, 2 appears 0 times, and so on in the given input array.



Submissions: 24537

Max Score: 30

Difficulty: Easy

Rate This Challenge:

★★★★★ Thanks!

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C#



```
1 using System;
2 using System.Collections.Generic;
3 using System.IO;
4 class Solution {
5     static void Main(String[] args) {
6         /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution
7         */
8         int n = int.Parse(Console.ReadLine());
9         int[] a = Array.ConvertAll(Console.ReadLine().Split(' '), e => int.Parse(e));
10
11         int[] cont = new int[100];
12
13         for (int i = 0; i < a.Length; i++)
14         {
15             cont[a[i]]++;
16         }
17
18         for (int i = 0; i < cont.Length; i++)
19         {
20             Console.Write(cont[i] + " ");
21         }
22     }
23 }
24
25
26
27 }
```

Line: 13 Col: 1

 [Upload Code as File](#)☐ Test against custom input[Run Code](#)[Submit Code](#)

Congrats, you solved this challenge!

✓ Test Case #0

✓ Test Case #1

✓ Test Case #2

✓ Test Case #3

✓ Test Case #4

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