Day 0: Mean, Median, and Mode

HackerRank

Objective

In this challenge, we practice calculating the *mean*, *median*, and *mode*. Check out the Tutorial tab for learning materials and an instructional video!

Task

Given an array, X, of N integers, calculate and print the respective *mean*, *median*, and *mode* on separate lines. If your array contains more than one *modal value*, choose the numerically smallest one.

Note: Other than the modal value (which will always be an integer), your answers should be in decimal form, rounded to a scale of 1 decimal place (i.e., 12.3, 7.0 format).

Example

$N = 6$
$X = [1, 2, 3, 4, 5, 5]$

The mean is $\frac{20}{6} = 3.3$.
The median is $\frac{3+4}{2} = 3.5$.
The mode is 5 because 5 occurs most frequently.

Input Format

The first line contains an integer, N, the number of elements in the array.
The second line contains N space-separated integers that describe the array's elements.

Constraints

- $10 \leq N \leq 2500$
- $0 < x[i] \leq 10^5$, where $x[i]$ is the ith element of the array.

Output Format

Print 3 lines of output in the following order:

1. Print the *mean* on the first line to a scale of 1 decimal place (i.e., 12.3, 7.0).
2. Print the *median* on a new line, to a scale of 1 decimal place (i.e., 12.3, 7.0).
3. Print the *mode* on a new line. If more than one such value exists, print the numerically smallest one.

Sample Input

```
10
64630 11735 14216 99233 14470 4978 73429 38120 51135 67060
```

Sample Output

```
43900.6
44627.5
4978
```

Explanation

Mean:
We sum all N elements in the array, divide the sum by N, and print our result on a new line.

$$\mu = \frac{x_0 + x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9}{10} = \frac{439006}{10} = 43900.6$$

Median:
To calculate the median, we need the elements of the array to be sorted in either non-increasing or non-decreasing order. The sorted array $X = \{4978, 11735, 14216, 14470, 38120, 51135, 64630, 67060, 73429, 99233\}$. We then average the two middle elements:

$$median = \frac{x_4 + x_5}{2} = \frac{89255}{2} = 44627.5$$

and print our result on a new line.

Mode:
We can find the number of occurrences of all the elements in the array:

```
 4978 : 1
11735 : 1
14216 : 1
14470 : 1
38120 : 1
51135 : 1
64630 : 1
67060 : 1
73429 : 1
99233 : 1
```

Every number occurs once, making 1 the maximum number of occurrences for any number in X. Because we have multiple values to choose from, we want to select the smallest one, 4978, and print it on a new line.