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Day 1: Standard Deviation ☆

2 more challenges to get your next star!

Points: 3/5

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10
Days of Statistics

Problem Submissions Leaderboard Editorial △ Tutorial

Objective

In this challenge, we practice calculating standard deviation. Check out the Tutorial tab for learning materials and an instructional video!

Task

Given an array, X, of N integers, calculate and print the standard deviation. Your answer should be in decimal form, rounded to a scale of 1 decimal place (i.e., 12.3 format). An error margin of ± 0.1 will be tolerated for the standard deviation.

Input Format

The first line contains an integer, N, denoting the number of elements in the array.

The second line contains N space-separated integers describing the respective elements of the array.

Constraints

- $5 \le N \le 100$
- $0 < x_i \le 10^5$, where x_i is the i^{th} element of array X.

Output Format

Print the standard deviation on a new line, rounded to a scale of 1 decimal place (i.e., 12.3 format).

Sample Input

5 10 40 30 50 20

Sample Output

14.1

Explanation

First, we find the mean:

$$\mu = \frac{\sum_{i=0}^{N-1} x_i}{N} = 30.0$$

Next, we calculate the squared distance from the mean, $(x_i - \mu)^2$, for each x_i :

1.
$$(x_0 - \mu)^2 = (10 - 30)^2 = 400$$

2.
$$(x_1 - \mu)^2 = (40 - 30)^2 = 100$$

3.
$$(x_2 - \mu)^2 = (30 - 30)^2 = 0$$

4.
$$(x_3 - \mu)^2 = (50 - 30)^2 = 400$$

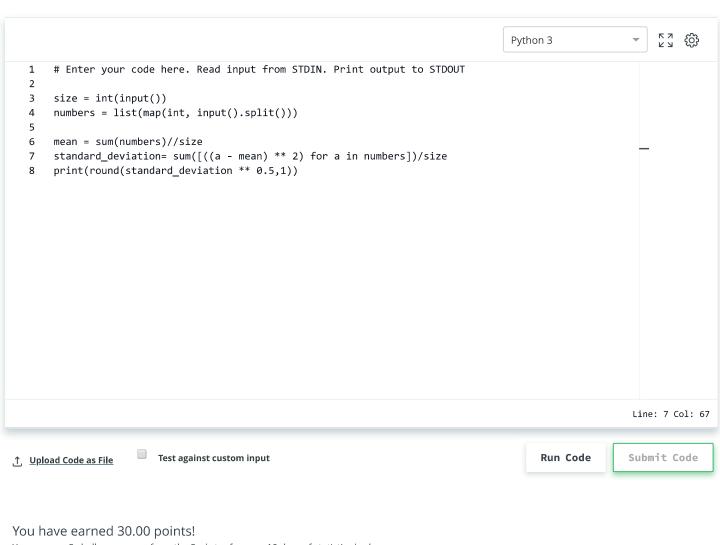
5.
$$(x_4 - \mu)^2 = (20 - 30)^2 = 100$$



Now we can compute $\sum_{i=0}^{N-1} \left(x_i - \mu
ight)^2 = 400 + 100 + 0 + 400 + 100 = 1000$, so:

$$\sigma = \sqrt{rac{\sum_{i=0}^{N-1} \left(x_i - \mu
ight)^2}{N}} = \sqrt{rac{1000}{5}} = \sqrt{200} = 14.1421356$$

Once rounded to a scale of **1** decimal place, our result is **14.1**.



You are now 2 challenges away from the 2nd star for your 10 days of statistics badge.





Test case 0 ♂ Compiler Message