# Day 7: Pearson Correlation Coefficient I

HackerRank

### Objective

In this challenge, we practice calculating the *Pearson correlation coefficient*. Check out the Tutorial tab for learning materials!

### Task

Given two $n$-element data sets, $X$ and $Y$, calculate the value of the Pearson correlation coefficient.

### Input Format

The first line contains an integer, $n$, denoting the size of data sets $X$ and $Y$.
The second line contains $n$ space-separated real numbers (scaled to *at most* one decimal place), defining data set $X$.
The third line contains $n$ space-separated real numbers (scaled to *at most* one decimal place), defining data set $Y$.

### Constraints

- $10 \leq n \leq 100$
- $1 \leq x_i \leq 500$, where $x_i$ is the $i^{th}$ value of data set $X$.
- $1 \leq y_i \leq 500$, where $y_i$ is the $i^{th}$ value of data set $Y$.
- Data set $X$ contains unique values.
- Data set $Y$ contains unique values.

### Output Format

Print the value of the Pearson correlation coefficient, rounded to a scale of $3$ decimal places.

### Sample Input

```
10
10 9.8 8 7.8 7.7 7 6 5 4 2
200 44 32 24 22 17 15 12 8 4
```

### Sample Output

```
0.612
```

### Explanation

The mean and standard deviation of data set $X$ are:

- $\mu_X = 6.73$
- $\sigma_X = 2.39251$

The mean and standard deviation of data set $Y$ are:

- $\mu_Y = 37.8$
- $\sigma_Y = 55.1993$

We use the following formula to calculate the Pearson correlation coefficient:

$$\rho_{X,Y} = \frac{\sum(x_i - \mu_X) \cdot (y_i - \mu_Y)}{n \cdot \sigma_X \cdot \sigma_Y}$$