Terrain Forming

Time Limit: 2 s | Memory Limit: 512 MiB

Long ago, the Natural Zenith Preservation Council (NZPC) was entrusted with shaping a mountain ridge stretching from east to west. To ensure water flowed naturally across the landscape, the council constructed the ridge so that the elevations never decreased going from west to east. NZPC has placed various checkpoints along the ridge, and the recorded elevations at the checkpoints therefore satisfy

$$1 \le a_1 \le a_2 \le \cdots \le a_n.$$

Land forming

The council employed a peculiar terrain-forming technique. Rather than freely changing the height of a checkpoint, they could only reshape an *interior* checkpoint by reflecting its elevation about the average of its two neighbouring checkpoints. Specifically, for any $2 \le i \le n-1$, they could replace

$$a_i$$

with

$$a_{i-1} + a_{i+1} - a_i.$$

The first and last checkpoints are anchored to solid bedrock and cannot be modified.

NZPC wants to measure the smoothness of a terrain profile which is based on the variance of its elevations,

$$D = \frac{1}{n}\sum_{i=1}^{n}(a_i - \bar{a})^2,$$

where

$$\bar{a} = \frac{1}{n}\sum_{i=1}^{n} a_i$$

is the average elevation.

Since the variance may be small and difficult to compare, NZPC defines the smoothness as the variance D multiplied by n^2, where n is the number of checkpoints. You are tasked by NZPC to find the minimum smoothness after performing the terrain-forming operation any number of times.

Input

The first line contains a single integer n ($3 \le n \le 10^4$).

The second line contains n monotonically increasing integers $a_1, a_2, \ldots, a_n$, satisfying $1 \le a_1 \le a_2 \le \cdots \le a_n \le 10^3$.

Output

Output a single integer: the minimum possible smoothness ($D \times n^2$) after performing the terrain-forming operation any number of times.

Explanation

For $(a_1, a_2, a_3, a_4) = (1, 2, 4, 6)$ (Sample 1), There are two additional sequences that can be obtained by performing the operation any number of times:

For $(a_1, a_2, a_3, a_4) = (1, 3, 5, 6)$, the mean is

$$\frac{15}{4},$$

and the variance is

$$\frac{1}{4}\left(\left(1-\frac{15}{4}\right)^2+\left(3-\frac{15}{4}\right)^2+\left(5-\frac{15}{4}\right)^2+\left(6-\frac{15}{4}\right)^2\right)=\frac{59}{16}.$$

The minimum variance is $\frac{13}{4}$, and the minimum smoothness is $n^2 \times D = 16 \times \frac{13}{4} = 52$.

Sample Input 1	**Sample Output 1**
4 1 2 4 6	52