Problem F. Fast Value Changes

Time limit: 1 second
Memory limit: 1024 mebibytes

Fast Forward has been involved in high-frequency trading for many years. The company's team includes strong developers, Olympiad winners, and past participants of the Moscow Regional Contest. Fast Forward's systems monitor the latest changes in the markets of currencies, cryptocurrencies, precious metals, and various other assets. Therefore, the company's quant researchers actively search for various statistical relationships between various assets: after all, if copper is being actively purchased somewhere, the price of aluminum is likely to rise soon as well.

Recently, quants noticed a pattern between n assets. At time zero, each of these assets has its own price of a_i rubles. The pattern is that the price of asset i approaches the price of asset $(i \bmod n) + 1$ at a rate of 1 ruble per second (on exchanges, the price changes continuously, not every second). When the price of asset i reaches the price of asset $(i \bmod n) + 1$, the price of this asset changes in tandem with the price of asset $(i \bmod n) + 1$ (they always remain equal). If all n assets have the same price, their values will stop changing.

When the prices of all assets are equal, it will be easier for developers to store information about the prices of these assets: they will only need to store a single number. You need to help the Fast Forward developers determine how many seconds it will take for the prices of all n assets to become equal.

Input

The first line contains one integer n — the number of assets ($1 \le n \le 5 \cdot 10^5$).

The second line contains n integers a_1, a_2, ..., a_n — the starting prices of the assets in rubles ($0 \le a_i \le 10^9$).

Output

Output a single real number — the time that will pass before prices equalize. Your output will be considered correct if the absolute or relative error between your output p and the answer q does not exceed 10^{-9}, i.e. $\frac{|p-q|}{\max(q,1)} \le 10^{-9}$.

Examples

standard input	standard output
3 5 8 1	3.5
1 0	0

Note

In the first example, initially, the prices of assets 1 and 3 are rising and the price of asset 2 is falling. At time 1.5, the prices of assets 1 and 2 become equal (with price 6.5) and both begin to fall. The price of asset 3 is 2.5 and still rising. At time 3.5, all prices become equal, and they all stop changing.

In the second example, all the prices are already equal.