Precise Average 2 (avg2)

Your friend John still works at the same shop and it still sells N products, numbered from 0 to $N-1$. Product i has a price of P_i bytedollars, where P_i is a positive integer.

A recent Byteland law stated that the average of those prices must be exactly K, a positive integer. John has already tried to change the prices to comply with the law, but the boss was not satisfied with the result, since some prices changed too much. So he asked John for another way to change the prices!

Figure 1: John's angry boss.

John is still busy, so he asked for your help: what is the minimum value of C for which it is possible to change each price P_i by *at most* C such that the average of the new prices is K?

More formally, find the minimum value of C such that for the array of positive integers $P = [P_0, P_1, \ldots, P_{N-1}]$ there exists an array of positive integers $P' = [P'_0, P'_1, \ldots, P'_{N-1}]$ such that:

- the average of the elements of P' is K, and
- $|P'_i - P_i| \leq C$ for each $0 \leq i < N$.

It can be proven that such a C always exists.

☞ Among the attachments of this task you may find a template file `avg2.*` with a sample incomplete implementation.

Input

The first line contains the integers N and K. The second line contains N integers P_i.

Output

You need to write a single line with the integer C.

Constraints

- $1 \le N \le 200\,000$.
- $1 \le K \le 1\,000\,000\,000$.
- $1 \le P_i \le 1\,000\,000\,000$ for each $i = 0 \ldots N-1$.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

– **Subtask 1** (0 points) Examples.

– **Subtask 2** (10 points) $N \le 2$.

– **Subtask 3** (25 points) $K \le 10$ and $P_i \le 10$ for each $i = 0 \ldots N-1$.

– **Subtask 4** (24 points) $N \le 1000$.

– **Subtask 5** (41 points) No additional limitations.

Examples

input	output
`2 5` `13 3`	`4`
`7 4` `3 6 5 6 6 3 9`	`2`

Explanation

In the **first sample case** the answer is 4. One possible array P' is $[9, 1]$. Note that its average is $\frac{9+1}{2} = 5$, $|P'_0 - P_0| = |9 - 13| = 4 \le 4$ and $|P'_1 - P_1| = |1 - 3| = 2 \le 4$. It can be proven that for each $C < 4$ no suitable P' exists.

In the **second sample case**, the answer is 2. One possible array P' is $[3, 4, 4, 4, 4, 2, 7]$.