Powerbank

Task

A group of n friends went to Troodos mountains for hiking. Each friend has a phone, and the i-th phone initially has a charge of a_i units. All phones are of the same model, and the maximum battery capacity for each phone is M units.

They also have a single power bank with a total charge capacity of exactly $n \cdot M$ units, which is sufficient to fully charge all n phones to their maximum.

However, the power bank can only be connected to one phone at a time. It can be reconnected to different phones as needed.

Friends are a bit tired, so they can't switch the power bank from one phone to another too often. The maximum number of switches is some given integer S.

For risk management, friends also came up with a rule that at any point in time during the charging process, the difference in charge between any two phones should not exceed D units.

Your task is to find the **minimum possible value** of D such that it is possible to fully charge all phones while satisfying both rules. Note that the answer may be non-integer and also in some cases such D doesn't exist. See output section for more details.

You can assume that phones do not lose charge while unplugged.

Input format

- The first line contains three integers: n, M, and S ($2 \leq n \leq 2 \cdot 10^5$, $1 \leq M \leq 10^{18}$, $0 \leq S \leq 10^{18}$).
- The second line contains n integers: $a_1, a_2, \ldots, a_n$ ($0 \leq a_i \leq M$), where a_i is the initial charge of the i-th phone.

Output format

If it is not possible to meet the above conditions for any value of D, output -1, otherwise output one real number D. Your answer is considered correct if its absolute or relative error does not exceed 10^{-6}. Formally, let your answer be a, and the jury's answer be b. Your answer is accepted if and only if $\frac{|a-b|}{\max(1,|b|)} \leq 10^{-6}$

Examples

Input 1	Output 1
2 7 2 0 0	3.5

Input 2	Output 2
4 10 1 7 8 9 10	-1

Input 3	Output 3
3 5 5 1 2 3	2

Explanation

In the first example, we should charge the first phone to 3.5 units, then fully charge the second phone, then fully charge the first phone.

In the second example you need to charge 3 different phones, so you need at least 2 changes for any value of D. Therefore, the answer for $S = 1$ is -1.

In the third example the difference in charge between the first and the third phones initially is equal to 2. We can charge the phones so that this difference is always no more than 2.

- Charge the second phone to 3 units
- Charge the first phone to 3 units
- Charge the third phone to 5 units
- Charge the second phone to 5 units
- Charge the first phone to 5 units

This algorithm makes 4 changes, which is not greater than 5.

Subtasks

This task contains six subtasks. To get the points for the subtask, your solution should pass all the tests in the corresponding subtask.

Group	Score	Constraints
1	10	$a_i = 0$
2	25	$S \leq 10^6$
3	9	$n \leq 2$
4	12	$n \leq 3$
5	8	$n \geq 10$, $S = 10^9$, $M = 10^{18}$, a_i are randomly generated
6	36	No additional constraints