Ant Supercolonies (sprei)

Giorgio's house has a huge bugs problem: N colonies of ants are infesting the place, and he must kill them once and for all! Since he is a very abstract person, Giorgio lives in a M-dimensional cube of side B, so that the position of every ant colony can be represented as an array of coordinates $(A_1, A_2, \ldots, A_M)$ with integer values ranging from 0 to $B - 1$.

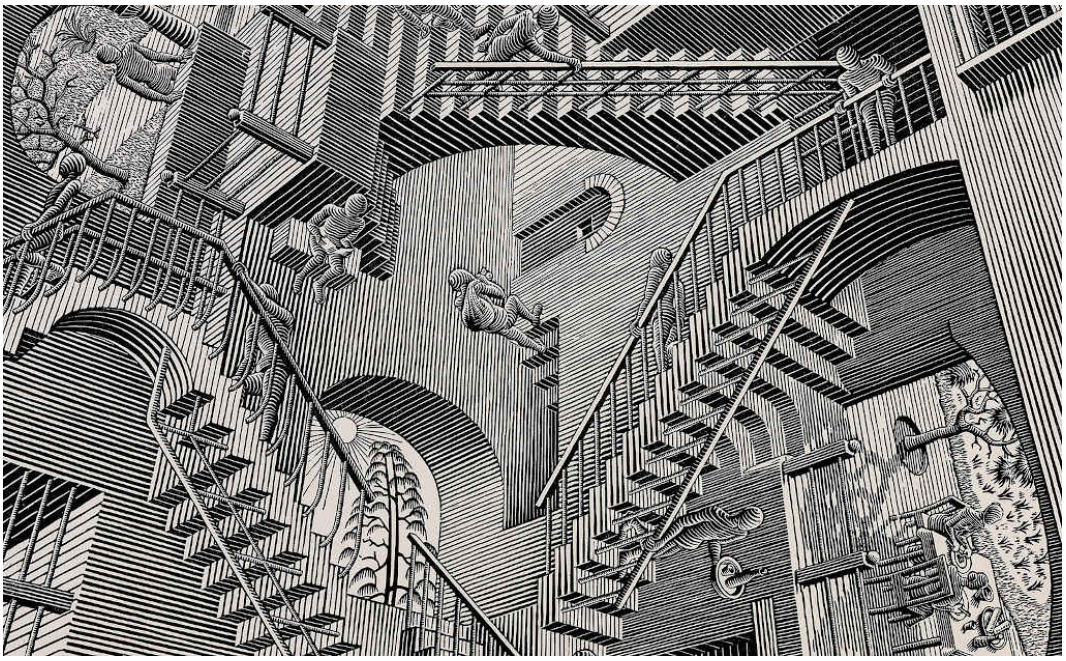

Figure 1: Panoramic painting of Giorgio's house: such corners, much bugs!

Since ants are social entities, they always try to unify the colonies. Thereby, if two colonies are adjacent in the house (the position of one is obtained by adding or subtracting 1 from a single coordinate of the position of the other), they build a tunnel among them, creating a supercolony unifying the two smaller colonies and exacerbating the infestation power by orders of magnitude.

Giorgio knows the positions of the N colonies, and can use pest control for destroying any one of them. However, the pest control process is tedious and expensive, so Giorgio would like to destroy the *smallest* number of colonies that guarantees no super-colony can be created among the remaining ones. How many does he need to destroy at least?

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

Input

The first line contains integers N, M and B. The following N lines contain M integers A_i, representing the position of a colony.

Output

You need to write a single line with an integer: the minimum number of colonies to be destroyed in order to prevent supercolonies.

Constraints

- $1 \leq N \leq 10\,000$.
- $1 \leq M \leq 100$.
- $1 \leq B \leq 10^9$.
- It is guaranteed that any two colonies have distinct positions.

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) $N = B^M$ (the house is full of bugs).

– **Subtask 3** (20 points) $M = 1$ (the house is a line).

– **Subtask 4** (30 points) $N \leq 10$.

– **Subtask 5** (40 points) No additional limitations.

Examples

input	output
5 3 4 1 1 1 1 1 2 1 1 3 1 2 1 1 2 3	2
6 2 4 1 0 0 1 1 1 2 1 3 1 2 2	2

Explanation

In the **first sample case**, it suffices to destroy two colonies: the first and the third ones. Destroying a

single colony is not enough: in order to prevent the last colony from forming a supercolony, we need to destroy the third one, and that is not preventing the first two colony to gather into a supercolony.

In the **second sample case**, the optimal strategy is to destroy colonies $(1, 1)$ and $(2, 1)$.