Task 3: `School Photo`

Zane is the principal of NOI school. NOI school has n classes, and each class has s students. Student j in class i has height $h[i][j]$.

Zane wants to select 1 student from each class to take a school photo. To make the photo look nicer, Zane wants to select students such that the height difference between the tallest student and shortest student selected is as small as possible.

Input format

Your program must read from standard input.

The first line of input contains exactly 2 integers, n, the number of classes, and s, the number of students in each class.

The next n lines contain information about the classes. Line $i + 1$ contains s integers $h[i][j]$, representing the height of the students in class i.

Output format

Your program must print to standard output.

The output should contain 1 integer, the minimum height difference possible.

Subtasks

For all testcases, the input will satisfy the following bounds:

- $2 \leq n \leq 1\,000$
- $1 \leq s \leq 1\,000$
- $1 \leq h[i][j] \leq 10^9$

Your program will be tested on input instances that satisfy the following restrictions:

Subtask	Marks	Additional Constraints
0	0	Sample Testcases
1	11	$n = 2$
2	22	$n, s \leq 100$
3	9	$n, s \leq 250$
4	33	$n, s \leq 500$
5	25	No additional restrictions

Sample Testcase 1

This testcase is valid for all subtasks.

Input	Output
2 3 2 1 8 5 4 7	1

Sample Testcase 1 Explanation

There are 2 classes in NOI school with 3 students each. Class 1 has students with height 2, 1 and 8 respectively, while class 2 has students with height 5, 4 and 7 respectively.

To minimise the height difference, Zane can choose the student with height 8 from class 1, and the student with height 7 from class 2. This makes the height difference equal to $8 - 7 = 1$, which is the minimum possible.

Sample Testcase 2

This testcase is valid for subtasks 2 to 5.

Input	Output
3 3 3 1 4 2 7 18 9 8 10	4

Sample Testcase 2 Explanation

Zane can choose the student with height 4 from class 1, the student with height 7 from class 2 and the student with height 8 from class 3. This makes the height difference equal to $8 - 4 = 4$, which is the minimum possible.