

4. Filling a Swimming Pool (bass)

1 sec / 2 sec

60 points

You are at a swimming pool. The pool is a rectangle N meters long and M meters wide. We can view it as an $N \times M$ grid. The depth of the pool floor at the square in the i -th row and j -th column (measured from the pool's edge) is $D_{i,j}$ millimeters. The pool's depth is known to be non-decreasing in both directions. This means that for any i, j , the conditions $D_{i,j} \leq D_{i+1,j}$ and $D_{i,j} \leq D_{i,j+1}$ hold.

The pool is currently empty. Water starts getting pumped into the pool from the bottom of square (N, M) at a rate of 1 liter per second. Filling stops when the pool is full.

You have Q friends who want to jump into the pool at different times and locations, and they want to know if the water is deep enough to do so safely. Thus, you receive Q queries of the form: "How deep is the water in square (X, Y) of the pool T seconds after pumping begins?"

Input. The first line of the input contains three integers N , M , and Q ($1 \leq N \cdot M \leq 10^5$, $1 \leq Q \leq 10^5$).

This is followed by N lines, each containing M integers. The j -th number in the i -th line is $D_{i,j}$ ($1 \leq D_{i,j} \leq 10^5$): the depth of the square (i, j) of the pool floor.

This is followed by Q lines, each consisting of three integers X , Y , and T ($1 \leq X \leq N$, $1 \leq Y \leq M$, $1 \leq T \leq 10^{15}$). The value T does not exceed the time in seconds required to fill the pool completely.

Output. Output Q lines, with the answer to one query on each line. Note that the answers are not necessarily integers.

An answer to a query is considered correct if its absolute error does not exceed 10^{-4} . This means that if the exact answer is a and your program outputs b , it is considered correct if $|a - b| \leq 10^{-4}$.

Example.	Input	Output
	2 4 8	1
	1 1 3 4	0
	1 2 4 7	3.33333
	2 4 1	0.33333
	2 1 1	0
	2 4 4	0.875
	2 3 4	1
	1 3 4	7
	1 2 22	
	1 1 23	
	2 4 23	

One second after filling begins, there is water only in the deepest square, $(2, 4)$. Since the area of the square is 1 square meter and there is 1 liter of water in the pool, the water depth there is 1 millimeter.

Four seconds after filling begins, in addition to square $(2, 4)$, there is some water also in squares $(2, 3)$ and $(1, 4)$ with the depth of 4. Since square $(2, 4)$ is 3 millimeters deeper than these, the water depth there is 3 millimeters greater.

Example.	Input	Output
	3 4 4	0.08333
	7 7 7 7	0.08333
	7 7 7 7	1.25
	7 7 7 7	1.25
	2 2 1	
	3 3 1	
	1 1 15	
	3 2 15	

In this example, the pool has the same depth throughout, so the water level rises uniformly at a rate of $\frac{1}{12} \approx 0.08333$ millimeters per second.

Example.	Input	Output
	1 7 3	0
	10304 19702 26523 54831 68898 78820 85458	85300.571428
	1 1 123457	48645.142857
	1 7 343434	
	1 4 301235	

Grading. In this task, tests are divided into groups. Only the solutions that solve **all** the tests in a group correctly will get points for that group. In the test groups, the following additional conditions hold:

0. (0 points) The examples from the task statement.
1. (10 points) $N \cdot M \leq 100$ and the total volume of the pool does not exceed 600.
2. (15 points) $N \cdot M \leq 100$.
3. (15 points) The total volume of the pool does not exceed $3 \cdot 10^5$.
4. (20 points) No additional constraints.

You may submit several solutions. Each solution you submit may target one or more test groups (possibly all of them).