Problem Name: Vacation

Problem Code: ZCO22001

Chefland can be represented as a N by M grid. The rows of the grid are numbered from 1 to N, and the columns of the grid are numbered from 1 to M. The square in row X and column Y of the grid can be uniquely identified as square (X, Y). Each grid square has a cost of either 0 or 1.
Chef is going on a vacation to Chefland for the next Q days. On the i^{th} of these days, Chef would like to travel from square (A_i, B_i) to square (C_i, D_i). Here, it is guaranteed that both $A_i \leq C_i$ and $B_i \leq D_i$. Due to restrictions on movement in Chefland, it is only possible to travel downwards or to the right. In other words, if Chef is in a square (X, Y), he is only able to move to square $(X, Y + 1)$ or $(X + 1, Y)$ in one move. The cost of Chef's trip is defined as the product of the costs of the grid squares he passes through on his journey from the starting square to the ending square. Note that this product also includes the costs of the starting square and the ending square.
For each of the Q days, find the minimum cost Chef would need to pay to travel between the starting and the ending squares.

Input Format

The first line of input contains two space-separated integers, N and M. N represents the number of rows in Chefland, while M represents the number of columns.
The following N lines each contain M space-separated integers, each of which is 0 or 1. On the i^{th} line, the j^{th} integer represents the cost of the grid square numbered (i, j) in the grid.
The following line contains Q, the number of days Chef will travel.
The i^{th} of the following Q lines each contains four space-separated integers, A_i, B_i, C_i and D_i, in order.

Output Format

For each of the Q trips, output the minimum possible cost of the trip on a new line.

Constraints

The input is divided into multiple subtasks. You will get the points allocated for a subtask if and only if you solve every testcase in the subtask correctly, within the time limit.
Please remember that when you make a submission to a problem, we will automatically consider your submission for every single subtask, and also the full problem. After the contest, your scores will be 'stitched'. This means that if you solve a subtask in any of your submissions, you will get the points for the subtask in your final score. There is no need to combine your solutions for different subtasks into the same submission.
For all subtasks:

- $1 \leq N \times M \leq 2 \times 10^5$
- $1 \leq Q \leq 2 \times 10^5$
- And for all $1 \leq i \leq Q$,
  - $1 \leq A_i \leq C_i \leq N$
  - $1 \leq B_i \leq D_i \leq M$

Subtasks

These are the subtasks for the problem:

- Subtask 1 [5 points]: All the cells in the grid have a cost of 1.
- Subtask 2 [6 points]: For all trips, $A_i = C_i$ and $B_i = D_i$.
- Subtask 3 [23 points]: $N \leq 8$, $M \leq 8$ and $Q \leq 5$.
- Subtask 4 [20 points]: $Q \leq 5$
- Subtask 5 [19 points]: At most 10 cells in the grid have a cost of 0.
- Subtask 6 [10 points]: $N = 1$
- Subtask 7 [8 points]: $N \leq 5$
- Subtask 8 [9 points]: No additional constraints.

Sample Input 1:

```
5 4
1 0 1 1
1 1 1 1
0 1 1 1
1 1 1 1
1 1 1 0
10
2 2 5 3
1 4 5 4
1 1 5 4
1 1 5 1
2 2 4 4
3 1 5 3
4 1 4 4
```

```
3 1 5 4
4 1 5 3
1 3 4 4
```

Sample Output 1:

```
1
0
0
0
1
0
1
0
1
1
```

Explanation:

For the first trip, it can be shown that the minimum possible cost is 1. One way to achieve this minimum cost is to travel via $(2,2) \Rightarrow (2,3) \Rightarrow (3,3) \Rightarrow (4,3) \Rightarrow (5,3)$. Then, the cost will be $1 \times 1 \times 1 \times 1 \times 1 = 1$.
For the second trip, it can be shown that the minimum possible cost is 0. One way to achieve this minimum cost is to travel via $(1,4) \Rightarrow (2,4) \Rightarrow (3,4) \Rightarrow (4,4) \Rightarrow (5,4)$. Then, the cost will be $1 \times 1 \times 1 \times 1 \times 0 = 0$.