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E. Vus the Cossack and a Field

time limit per test: 2 seconds
 memory limit per test: 256 megabytes
 input: standard input
 output: standard output

Vus the Cossack has a field with dimensions $n \times m$, which consists of "0" and "1". He is building an infinite field from this field. He is doing this in this way:

1. He takes the current field and finds a new inverted field. In other words, the new field will contain "1" only there, where "0" was in the current field, and "0" there, where "1" was.
2. To the current field, he adds the inverted field to the right.
3. To the current field, he adds the inverted field to the bottom.
4. To the current field, he adds the current field to the bottom right.
5. He repeats it.

For example, if the initial field was:

```
1 0
1 1
```

After the first iteration, the field will be like this:

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

After the second iteration, the field will be like this:

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

And so on...

Let's numerate lines from top to bottom from 1 to infinity, and columns from left to right from 1 to infinity. We call the submatrix (x_1, y_1, x_2, y_2) all numbers that have coordinates (x, y) such that $x_1 \leq x \leq x_2$ and $y_1 \leq y \leq y_2$.

The Cossack needs sometimes to find the sum of all the numbers in submatrices. Since he is pretty busy right now, he is asking you to find the answers!

Input

The first line contains three integers n, m, q ($1 \leq n, m \leq 1\,000$, $1 \leq q \leq 10^5$) — the dimensions of the initial matrix and the number of queries.

Each of the next n lines contains m characters c_{ij} ($0 \leq c_{ij} \leq 1$) — the characters in the matrix.

Codeforces Round #571 (Div. 2)

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→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

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→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Clone Contest to Mashup

You can clone this contest to a mashup.

[Clone Contest](#)

→ Submit?

Language: [GNU G++17 7.3.0](#)

Choose file: [Choose File](#) No file chosen

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

[Submit](#)

→ Problem tags

[divide and conquer](#) [implementation](#)
[math](#) [*2500](#)
[No tag edit access](#)

Each of the next q lines contains four integers x_1, y_1, x_2, y_2 ($1 \leq x_1 \leq x_2 \leq 10^9$, $1 \leq y_1 \leq y_2 \leq 10^9$) — the coordinates of the upper left cell and bottom right cell, between which you need to find the sum of all numbers.

Output

For each query, print the answer.

Examples

input	Copy
<pre>2 2 5 10 11 1 1 8 8 2 4 5 6 1 2 7 8 3 3 6 8 5 6 7 8</pre>	
output	Copy
<pre>32 5 25 14 4</pre>	

input	Copy
<pre>2 3 7 100 101 4 12 5 17 5 4 9 4 1 4 13 18 12 1 14 9 3 10 7 18 3 15 12 17 8 6 8 12</pre>	
output	Copy
<pre>6 3 98 13 22 15 3</pre>	

Note

The first example is explained in the legend.

→ Contest materials

- Announcement #1 (en) ☐
- Announcement #2 (ru) ☐
- Tutorial #1 (en) ☐
- Tutorial #2 (en) ☐

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