HOME   TOP   CONTESTS   GYM   **PROBLEMSET**   GROUPS   RATING   API   CALENDAR   HELP   **10 YEARS!** 🎁

PROBLEMS   SUBMIT   STATUS   STANDINGS   CUSTOM TEST

B. Counting Rectangles is Fun

time limit per test: 4 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

There is an $n \times m$ rectangular grid, each cell of the grid contains a single integer: zero or one. Let's call the cell on the i-th row and the j-th column as (i, j).

Let's define a "rectangle" as four integers a, b, c, d ($1 \le a \le c \le n$; $1 \le b \le d \le m$). Rectangle denotes a set of cells of the grid $\{(x, y) : a \le x \le c, b \le y \le d\}$. Let's define a "good rectangle" as a rectangle that includes only the cells with zeros.

You should answer the following q queries: calculate the number of good rectangles all of which cells are in the given rectangle.

Input

There are three integers in the first line: n, m and q ($1 \le n, m \le 40$, $1 \le q \le 3 \cdot 10^5$). Each of the next n lines contains m characters — the grid. Consider grid rows are numbered from top to bottom, and grid columns are numbered from left to right. Both columns and rows are numbered starting from 1.

Each of the next q lines contains a query — four integers that describe the current rectangle, a, b, c, d ($1 \le a \le c \le n$; $1 \le b \le d \le m$).

Output

For each query output an answer — a single integer in a separate line.

Examples

input	Copy

```
5 5 5
00101
00000
00001
01000
00001
1 2 2 4
4 5 4 5
1 2 5 2
2 2 4 5
4 2 5 3
```

output	Copy

```
10
1
7
34
5
```

input	Copy

Codeforces Round #219 (Div. 1)

Finished

→ 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 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.

Start virtual contest

→ Problem tags

brute force   divide and conquer   dp

*1900

No tag edit access

→ Contest materials

- Announcement   ✕
- Tutorial (en)   ✕

```
4 7 5
0000100
0000010
0011000
0000000
1 7 2 7
3 1 3 1
2 3 4 5
1 2 2 7
2 2 4 7
```

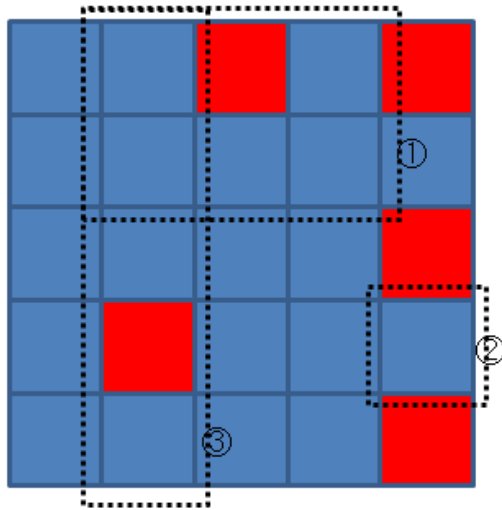**output**   Copy

```
3
1
16
27
52
```

Note

For the first example, there is a 5×5 rectangular grid, and the first, the second, and the third queries are represented in the following image.

- For the first query, there are 10 good rectangles, five 1×1, two 2×1, two 1×2, and one 1×3.
- For the second query, there is only one 1×1 good rectangle.
- For the third query, there are 7 good rectangles, four 1×1, two 2×1, and one 3×1.