

City Lights Queries

time limit per test: 1 second (2 seconds for Python)
memory limit per test: 976.6 megabytes
input: standard input
output: standard output
points: 100 · problem code: citylights

You are looking at a square nighttime skyline represented as an $n \times n$ grid. Each cell is one window: a lit window is marked with `*`, and a dark window is marked with `.`.

You must answer q queries. Each query gives the top-left corner (r_1, c_1) and the bottom-right corner (r_2, c_2) of a rectangle, and asks how many lit windows are inside that rectangle.

Input

The first line contains two integers n and q .

The next n lines each contain a string of length n describing the grid.

Each of the next q lines contains four integers r_1, c_1, r_2, c_2 describing an inclusive query rectangle.

Here, r stands for row and c stands for column, so each query is given as `row column row column`.

Rows and columns are numbered from 1 to n , and the first pair (r_1, c_1) is the top-left corner while the second pair (r_2, c_2) is the bottom-right corner.

Output

For each query, output a single integer: the number of lit windows inside the requested rectangle.

Constraints

- $1 \leq n \leq 1000$
- $1 \leq q \leq 2 \cdot 10^5$
- $1 \leq r_1 \leq r_2 \leq n$
- $1 \leq c_1 \leq c_2 \leq n$

Example 1

Input

```
4 3
.*..
**..
..*.
***.
1 1 2 2
2 2 4 4
3 3 3 3
```

Output

```
3
4
1
```

Example 2

Input

```
5 3
* . . . .
. * . . .
. . * . .
. . . * .
. . . . *
1 1 5 5
2 1 4 3
1 5 5 5
```

Output

```
5
2
1
```