

C. New Year and Domino

time limit per test: 3 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

They say "*years are like dominoes, tumbling one after the other*". But would a year fit into a grid? I don't think so.

Limak is a little polar bear who loves to play. He has recently got a rectangular grid with h rows and w columns. Each cell is a square, either empty (denoted by '.') or forbidden (denoted by '#'). Rows are numbered 1 through h from top to bottom. Columns are numbered 1 through w from left to right.

Also, Limak has a single domino. He wants to put it somewhere in a grid. A domino will occupy exactly two adjacent cells, located either in one row or in one column. Both adjacent cells must be empty and must be inside a grid.

Limak needs more fun and thus he is going to consider some queries. In each query he chooses some rectangle and wonders, how many way are there to put a single domino inside of the chosen rectangle?

Input

The first line of the input contains two integers h and w ($1 \leq h, w \leq 500$) – the number of rows and the number of columns, respectively.

The next h lines describe a grid. Each line contains a string of the length w . Each character is either '.' or '#' — denoting an empty or forbidden cell, respectively.

The next line contains a single integer q ($1 \leq q \leq 100\,000$) — the number of queries.

Each of the next q lines contains four integers $r1_i, c1_i, r2_i, c2_i$ ($1 \leq r1_i \leq r2_i \leq h, 1 \leq c1_i \leq c2_i \leq w$) — the i -th query. Numbers $r1_i$ and $c1_i$ denote the row and the column (respectively) of the upper left cell of the rectangle. Numbers $r2_i$ and $c2_i$ denote the row and the column (respectively) of the bottom right cell of the rectangle.

Output

Print q integers, i -th should be equal to the number of ways to put a single domino inside the i -th rectangle.

Examples

input
<pre> 5 8 ...#.# .#..... ##.### ##.### 4 1 1 2 3 4 1 4 1 1 2 4 5 2 5 5 8 </pre>
output
<pre> 4 0 10 15 </pre>

input
<pre> 7 39 </pre>

Good Bye 2015

Finished

→ Virtual participation

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→ Problem tags

[dp](#) [implementation](#)

No tag edit access

→ Contest materials

- Announcement 
- Tutorial 

<pre> ###.###.#.###...###.###.#.###. ...###.#.###.#.###. ###.###.#.###...###.###.#.###. #...###.#.###.#.###.#.###. ###.###.#.###...###.###.#.###. 6 1 1 3 20 2 10 6 30 2 10 7 30 2 2 7 7 1 7 7 7 1 8 7 8 </pre>
output
<pre> 53 89 120 23 0 2 </pre>

Note

A red frame below corresponds to the first query of the first sample. A domino can be placed in 4 possible ways.