

Problem J. Forest Queries

Time limit 1000 ms
Mem limit 524288 kB

You are given an $n \times n$ grid representing the map of a forest. Each square is either empty or contains a tree. The upper-left square has coordinates $(1, 1)$, and the lower-right square has coordinates (n, n) .

Your task is to process q queries of the form: how many trees are inside a given rectangle in the forest?

Input

The first input line has two integers n and q : the size of the forest and the number of queries.

Then, there are n lines describing the forest. Each line has n characters: `.` is an empty square and `*` is a tree.

Finally, there are q lines describing the queries. Each line has four integers y_1, x_1, y_2, x_2 corresponding to the corners of a rectangle.

Output

Print the number of trees inside each rectangle.

Constraints

- $1 \leq n \leq 1000$
- $1 \leq q \leq 2 \cdot 10^5$
- $1 \leq y_1 \leq y_2 \leq n$
- $1 \leq x_1 \leq x_2 \leq n$

Example

Input	Output
4 3 .*.. *.*. **.. **** 2 2 3 4 3 1 3 1 1 1 2 2	3 1 2