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**Fractal pictures****P93774\_en**Quart Concurs de Programació de la UPC - Final (2006-10-04)

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Let  $P$  be a rectangular pattern with  $n$  rows and  $m$  columns, where each position is either empty or marked. We can use  $P$  to make nice fractal pictures as follows: Start with a  $1 \times 1$  picture, with its position marked. Then, do  $k$  times: Replace every marked position by  $P$ , and every empty position by an empty  $n \times m$  grid. At the end of this process we get an  $n^k \times m^k$  fractal picture. Here, you will have to print fractal pictures, and also answer some questions about them.

**Input**

Input consists of several cases separated with blank lines. Each case starts with a line with  $n$  and  $m$ . Then follows  $P$  in  $n$  lines, each with  $m$  characters: '.' for an empty position, 'x' for a marked position. Then follows a line with  $k$ , a line with an integer  $q \geq 1$ , and  $q$  lines, each with a query: every line  $1 \leq i \leq q$  contains three integers  $k_i, r_i$  and  $c_i$ . Assume  $2 \leq n \leq 20$ ,  $2 \leq m \leq 20$ ,  $n^k \leq 80$ ,  $m^k \leq 80$ ,  $1 \leq r_i \leq n^{k_i} \leq 10^{16}$ ,  $1 \leq c_i \leq m^{k_i} \leq 10^{16}$ .

**Output**

For every test case in the input, print first the  $n^k \times m^k$  fractal picture that results after applying  $k$  times the pattern  $P$ . Then print a blank line, followed by  $q$  lines, one for each query in the input. For every  $i$ , print the content of the  $(r_i, c_i)$  position after  $k_i$  steps, following the format of the sample output. Print a blank line after the output for every test case.

**Sample input**

```
3 3
.X.
XXX
.X.
3
2
3 1 14
3 1 15

2 3
..X
XXX
2
4
2 1 1
2 1 9
2 4 1
0 1 1

2 2
.X
XX
3
1
50 1125899906842624 1125899906842624
```

## Sample output

```
.....X.....
.....XXX.....
.....X.....
.....X..X..X.....
.....XXXXXXXXX.....
.....X..X..X.....
.....X.....
.....XXX.....
.....X.....
....X.....X.....X....
...XXX.....XXX.....XXX...
....X.....X.....X....
.X..X..X..X..X..X..X..X..X..
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
.X..X..X..X..X..X..X..X..X..
....X.....X.....X....
...XXX.....XXX.....XXX...
...X.....X.....X....
.....X.....
.....XXX.....
.....X.....
.....X..X..X.....
.....XXXXXXXXX.....
.....X..X..X.....
.....X.....
.....XXX.....
.....X.....
```

after 3 step(s), (1, 14) is marked  
after 3 step(s), (1, 15) is empty

```
.....X
.....XXX
..X..X..X
XXXXXXXXXX
```

after 2 step(s), (1, 1) is empty  
after 2 step(s), (1, 9) is marked  
after 2 step(s), (4, 1) is marked  
after 0 step(s), (1, 1) is marked

```
.....X
.....XX
.....X.X
....XXXX
...X...X
..XX..XX
.X.X.X.X
XXXXXXXXXX
```

after 50 step(s), (1125899906842624, 1125899906842624) is marked

## Problem information

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Generation : 2024-05-03 09:15:46

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