
Fractals

P67430_en

Vint-i-dosè Concurs de Programació de la UPC - Semifinal (2024-06-27)

Consider an $n \times m$ matrix of chars M , which may include '.', 'x', 'p' and 'n'. Define the "negative" of M as the matrix result of replacing each '.' by 'x', each 'x' by '.', each 'p' by 'n', and each 'n' by 'p'. For instance, the negative of

```
XpX   .n.
.n.  is  XpX
```

We can use M to create some kind of fractals, by repeatedly replacing each character c of the current matrix by an $n \times m$ matrix, with these rules:

- If $c = '.'$, replace c by an $n \times m$ matrix with all '.'.
- If $c = 'x'$, replace c by an $n \times m$ matrix with all 'x'.
- If $c = 'p'$, replace c by M .
- If $c = 'n'$, replace c by the negative of M .

With the example above, after one step we get

```
XXXXXpXXXX
XXX.n.XXX
....n....
...XpX...
```

and after two steps we get

```
XXXXXXXXXXXXXXXXXpXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXX.n.XXXXXXXXXXXXXXXXXX
XXXXXXXXXX....n....XXXXXXXXXX
XXXXXXXXXX...XpX...XXXXXXXXXX
.....n.....
.....XpX.....
.....XXXXpXXXX.....
.....XXX.n.XXX.....
```

Can you simulate this process k times?

Input

Input consists of several cases. Every case begins with n , m and k , followed by an $n \times m$ matrix M as explained above. Assume that n and m are between 1 and 100, and $k \geq 1$.

Output

Print k matrices for each case: the result after one step, two steps, etc. Separate these matrices by blank lines. End each case with 10 asterisks. When printing the results, replace each 'p' by 'n', and each 'n' by 'p'. With the given cases, no result will have more than 10^6 chars.

Sample input

```
2 3 2
XpX
.n.

1 1 1
n

1 2 4
pn

2 3 2
p.p
ppp
```

Sample output

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

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXX...XXXXXXXXXXXXXXXX
XXXXXXXXXXXX.....XXXXXXXXXXXX
XXXXXXXXXXXX...XXX...XXXXXXXXXXXX
.....
.....XXX.....
.....XXXXXXXX.....
.....XXX...XXX.....
*****
X
*****
X..X

X..X.XX.

X..X.XX..XX.X..X

X..X.XX..XX.X..X.XX.X..XX..X.XX.
*****
X.X...X.X
XXX...XXX
X.XX.XX.X
XXXXXXXXXX

X.X...X.X.....X.X...X.X
XXX...XXX.....XXX...XXX
X.XX.XX.X.....X.XX.XX.X
XXXXXXXXXX.....XXXXXXXXXX
X.X...X.XX.X...X.XX.X...X.X
XXX...XXXXXXXX...XXXXXX...XXX
X.XX.XX.XX.XX.XX.XX.XX.XX.X
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
*****
```

Problem information

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