
Farmers and knight

P56143_en

Examen final d'Algorismia, FME (2017-01-17)

Given an $n \times m$ board that contains farmers, a knight and some obstacles, you have to find a shortest path from the knight to any farmer. Assume that farmers do not move, and that the knight can move to any of its eight adjacent cells which do not have an obstacle.

Input

Input consists of several cases, each starting with n and m , followed by n rows, each with m characters. A 'K' represents a knight, an 'F' is a farmer, an 'X' is an obstacle, and a '.' is an empty cell. You can assume $3 \leq n \leq 1000$, $3 \leq m \leq 1000$, that the board has exactly one knight and at least one farmer, and that the first row, the last row, the first column, and the last column only have obstacles.

Output

For each board, print the minimum number of cells to go from the knight to any farmer, followed by the coordinates (numbered from 0) of the path. If there is more than one solution, print any of them. If there is no solution, print 0. Please have a look at the format.

Sample input

```
3 5
XXXXX
XK.FX
XXXXX

3 5
XXXXX
XKXFX
XXXXX

8 9
XXXXXXXXXX
XF.....FX
X.XX.X.X
X...K...X
X.....X
X.....X
X...F...X
XXXXXXXXXX
```

Sample output

```
3 1 1 1 2 1 3
0
4 3 4 3 5 2 6 1 7
```

Problem information

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