Teleport

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

You are now piloting a UFO in an $n \times n$ grid formed by points (x, y) where $1 \leq x, y \leq n$. Some points are impassable (*) and others are passable (.).

Initially, you are at point $(1, 1)$, and you aim to reach (n, n) as quickly as possible. When you are at point (x, y), you can teleport to $(x+1, y)$, $(x, y+1)$, $(x-1, y)$, $(x, y-1)$, or $f^i(x, y)$ for any non-negative integer $i \leq k$ in one second. The function $f^i(x, y)$ is defined as:

$$f^i(x,y) = \begin{cases} (x,y) & (i=0) \\ f^{i-1}(y+1,x) & (i>0) \end{cases}$$

You cannot teleport if the target location is outside the grid or if the target location is impassable.

Find the minimum time required to reach (n, n). If you can never reach (n, n), print `-1`.

Input

The first line of the input contains two integers n and k ($1 \leq n, k \leq 5000$).

Each of the next n lines contains n characters, representing the grid.

It is guranteed that points $(1, 1)$ and (n, n) are passable.

Output

One integer in a line representing the minimum time to reach (n, n), or `-1` if it is unreachable.

Examples

standard input	standard output
3 2 .*. .*. ...	3
3 3 .*. .*. ...	2