

Problem: Jack-o'-lantern



It's Halloween and Jack hates Halloween; the city is dark, streets are not well-lit and strange creatures linger in every shadow. For that reason, when he goes home at night, he never walks through streets without street lamps.

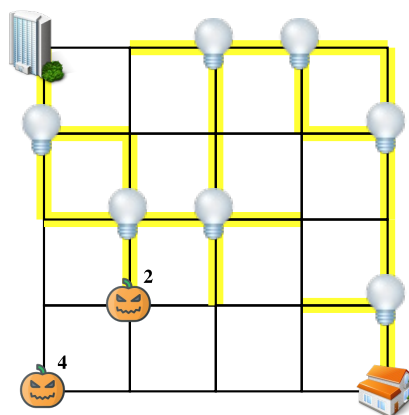
On the other hand, city planners have done a terrific job organizing the city. Every block is a perfect square, all have the same size and all roads are laid out in a grid.

Yet, it is dark, so really dark! Street lamps are only placed at intersections and are often non-functional making the city even scarier.

Jack wants to get home as quickly as possible, but only using well-lit streets. A street is a piece of road that connects two intersections and Jack considers it to be well-lit if at least one of the intersections has a working street lamp.

Luckily, as it is Halloween, lanterns are often found throughout the city, but never near street lamps. Each lantern has a candle that Jack can use to go through a certain number of streets. Jack can put the candle out when not needed and light it up again to go through a dark street.

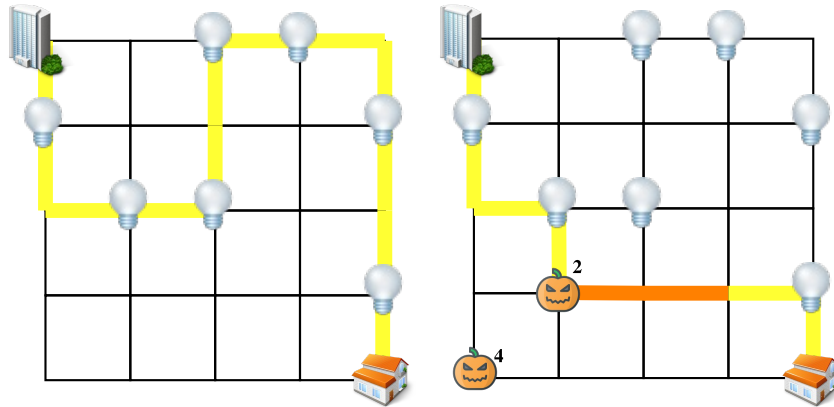
Given the bulkiness of the lanterns, Jack can only carry one with him at any given time. He can, of course, drop it and pick another one. Lanterns are often scary, but not as scary as a gloomy autumn night.



Task

Knowing where working street lamps are placed throughout the city, and the position and the duration of each lantern, find the fastest route that Jack can take from his work to his house.

Considerer that Jack's work is always in the top-left corner of the map, his house is in the bottom-right corner, and there is always a possible solution. The next figure shows possible shortest paths with and without lanterns in the city.



Input

The first line contains two integers (w and h) that represent the width and height of the city.

The next h lines, each contains w characters that each represents an intersection. These characters can be: a star (*) representing an intersection with a street lamp, a zero (0) representing an empty intersection, or an integer (d) representing a lantern that can be used to go through d dark streets.

Constraints

- $1 < w \leq 100$ Width of the city.
- $1 < h \leq 100$ Height of the city.
- $1 \leq d \leq 8$ Duration of a lantern.

Output

A single line containing a single integer representing the length of a shortest path that Jack can take to get home.

Sample Input 1

```
5 5
0 0 * * 0
```

```
* 0 0 0 *
0 * * 0 0
0 0 0 0 *
0 0 0 0 0
```

Sample Output 1

12

Sample Input 2

```
5 5
0 0 * * 0
* 0 0 0 *
0 * * 0 0
0 2 0 0 *
4 0 0 0 0
```

Sample Output 2

8