Problem M : Stabbing Number

A histogram is a simple rectilinear polygon H (i.e. the interior angle at each vertex is either 90° or 270°) that has a horizontal edge seeing every point q inside (i.e. the interior or the boundary of) H. Here, we say that an edge sees a point $q \in H$ if there is a vertical segment s connecting e to q that is lying inside H.

Let H be a histogram with n vertices, and consider a decomposition R of H into rectangles whose sides are vertical or horizontal. The vertices of the rectangles need not all be vertices of H: it is allowed to introduce additional vertices, on the boundary of H and/or in its interior. The stabbing number of a horizontal or vertical segment s inside H with respect to such a decomposition R is the number of rectangles from R whose interior (not just their boundaries) are intersected by s. The stabbing number of R is the maximum stabbing number of any horizontal or vertical segment s that lies inside H. The goal is to compute a decomposition R with the minimum stabbing number.

Input

The first line of the input contains two positive integers m and n ($1 \leqslant m, n \leqslant 50$) denoting the number of rows and the number of columns of the table illustrating the histogram, respectively. The next m lines, each contains exactly n characters. "*"s denote the boundary of the histogram. The rest is filled with dots ("."). Each edge of the histogram contains at least three "*"s. You can assume the given histogram has at least four and at most 16 edges, and edges do not overlap, intersect or touch each other; i.e. each "*" is adjacent to exactly two other "*" characters.

Output

Print the stabbing number of the given histogram in one line.

Example

Standard Input	Standard Output
10 13 .....****.... .....*..*.... .....*..***.. .....*....*.. .....*....*** ...***......* ...*.........* ****.........* *............* ************	2

Standard Input	Standard Output
8 15 ....*****. ....***..*...*. ....*.*..*...*. .****.****...*. .*...........*. .***********.	2