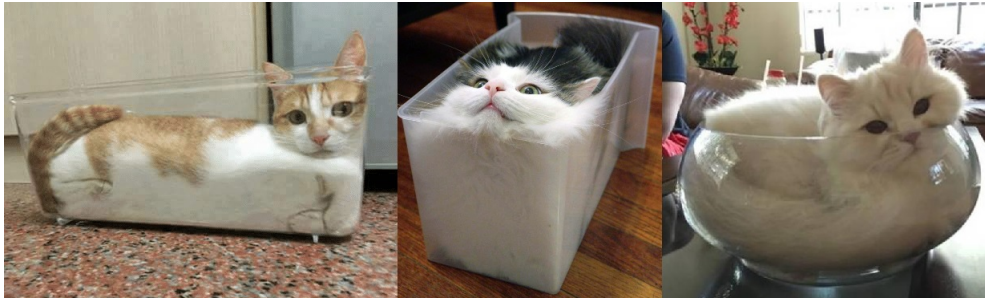


Problem L. Liquid Cats

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 64 mebibytes

It is well known that when cats get into a hollow vessels they demonstrate properties of a liquid.



Mathematician Petrov often observed this phenomena by example of his cats and even conducted a series of experiments constructing different kinds of vessels and putting cats into them. It turned out that cats always choose their position to be as low as possible, more precisely — to minimize level of highest point of their body. In case of several pits in the vessel, cats choose the lowest one but only from those in which they would fit.

A brilliant thought came into Petrov's head: in fact, cats can be used as an analog computers for solving some problems of quantum optimization! To check his hypothesis, mathematician Petrov developed the following mathematical model:

Let's imagine a vessel as a table T of size $n \times m$. Some cells are walls, the rest of the cells are empty. A placement of a cat in the vessel is *optimal* if the following conditions met:

1. The cat occupies several empty cells. And all of the cells occupied by the cat form a *connected* shape of k cells. A shape is connected if each of its cells can be reached from any other cell by moving through adjacent by-side cells (and all the transitional cells are also occupied by the cat).
2. Level of the highest cell h occupied by the cat should be as low as possible. Rows of the table are numbered from 1 to n and a row is higher if its number is less.

Unfortunately, mathematician Petrov is not skilled in programming. He asks you to determine the height of the highest cell h occupied by a cat for a given table T and a cat's volume k .

Input

The first line contains integers n , m , and k ($1 \leq n, m \leq 1000$, $1 \leq k \leq 10^6$).

The following n lines contain m symbols each — a description of table T . The j -th symbol of the i -th row corresponds to a cell on intersection of the i -th row and the j -th column of T . “#” means that this cell is a wall, and “.” means that this cell is empty.

Output

Output the number of a row which contains the highest occupied cell for any optimal placement of a cat. If a cat cannot be placed in vessel, output “-1” (without quotes).

Examples

standard input	standard output
<pre>6 11 7#...#... #.....#... #####... #####.##</pre>	4
<pre>6 11 15#...#... #.....#... #####... #####.##</pre>	2
<pre>5 11 30 ..#.....###...#...#...</pre>	2

Note

An optimal placement of a cat for each sample can be the following:

