Problem A
Storing Eggs

You have an egg carton that can be represented as a $3 \times N$ grid. The grid consists of 3 rows, numbered from 1 to 3, and N columns, numbered from 1 to N. The cell at row r and column c is denoted as (r, c). Each cell can be either usable or unusable; each usable cell can only hold at most 1 egg while unusable cells, as the name implies, cannot be used.

You want to put exactly K eggs into usable cells of your carton such that the distance between any two closest eggs is maximized. The distance between an egg in cell (r_1, c_1) and another egg in cell (r_2, c_2) can be calculated using Euclidean distance, i.e. $\sqrt{(r_1 - r_2)^2 + (c_1 - c_2)^2}$.

Determine the maximum possible distance between any two closest eggs, or determine if it is impossible to put K eggs into your carton.

Input

Input begins with two integers N K ($1 \leq N \leq 100$; $2 \leq K \leq 3N$) representing the number of columns of your egg carton and the number of eggs. Each of the next 3 lines contains a string S_r of length N that consists of either character '.' or '#'. The c^{th} character of string S_r represents the condition of cell (r, c) of the carton. Cell (r, c) is usable if $S_{r,c} =$ '.' and unusable if $S_{r,c} =$ '#'.

Output

If K eggs can be put into your carton, then output a real number in a single line representing the maximum possible distance between any two closest eggs. Your answer is considered correct if its absolute or relative error does not exceed 10^{-6}.

If K eggs cannot be put into your carton, then output `-1` in a single line.

Sample Input #1

```
5 2
#....
.....
....#
```

Sample Output #1

```
4.472136
```

Explanation for the sample input/output #1

The maximum distance between any two closest eggs can only be achieved by putting the eggs in cells $(3, 1)$ and $(1, 5)$, where the distance between the two (closest) eggs is $\sqrt{20}$.

Sample Input #2

```
5 6
##.##
#####
.....
```

Sample Output #2

```
1.000000
```

Explanation for the sample input/output #2

There is only one way to put 6 eggs into the carton; the distance between the two closest eggs is 1.

Sample Input #3

```
3 4
..#
...
...
```

Sample Output #3

```
1.414214
```

Explanation for the sample input/output #3

The maximum distance between any two closest eggs can be achieved by putting the eggs in cells $(1, 1)$, $(3, 1)$, $(3, 3)$, and $(2, 2)$. In this arrangement, the distance of the two closest eggs is $\sqrt{2}$, e.g., between eggs in cells $(1, 1)$ and $(2, 2)$.

Another way to put the eggs while getting the same answer is by putting the eggs in cells $(1, 2)$, $(2, 1)$, $(2, 3)$, and $(3, 2)$.

Sample Input #4

```
2 6
..
.#
..
```

Sample Output #4

```
-1
```

Explanation for the sample input/output #4

There are only 5 usable cells, thus, it is impossible to put 6 eggs into the carton.