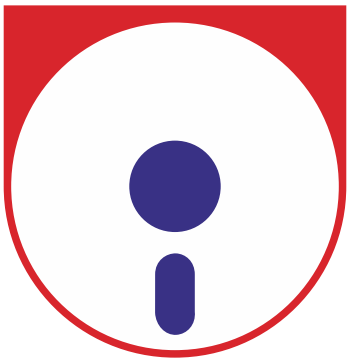

Croatian Open Competition in Informatics

Round 5, February 8th 2020

Tasks

Task	Time limit	Memory limit	Score
Emacs	1 second	512 MiB	50
Političari	1 second	512 MiB	70
Matching	? seconds	512 MiB	110
Total			230

Task Emacs

While playing in his favourite text editor, Daniel decided to draw a picture that was N characters high and M characters wide. The picture consists solely of characters `'.'` and `'*'` such that characters `'*'` form some non-overlapping rectangles. The rectangles don't even touch each other on their sides or corners.

Help Daniel count the number of rectangles drawn on the picture.

Input

The first line contains two integers N and M ($1 \leq N, M \leq 100$) from task description.
Each of The next N lines contains M characters `'.'` or `'*'` which represent the picture that Daniel drew.

Output

In a single line you should output the number of rectangles on the picture.

Scoring

In the test cases worth a total of 10 points, all rectangles will consist of a single `'*'` character.
In the test cases worth additional 15 points, it will hold $N = 1$.

Examples

input

```
6 7
***....
***..**
.....**
.***.**
.***...
.***...
```

output

```
3
```

input

```
3 3
*.*
...
*.*
```

output

```
4
```

input

```
1 10
.*.**.***.
```

output

```
3
```

Task Političari

All politicians of an unknown, completely invented and totally unrealistic country are spending their time accusing each other on national television instead of doing their jobs. It all started one Sunday afternoon when politician **number 1** was a guest in the first episode of a (now very popular) talk show. During the show, he accused the politician **number 2** for the poor state of the country. Naturally, in the second episode of the show the guest was politician number 2. The talk show host told his guest that politician number 1 accused him and politician number 2 then blamed some other politician. The newly blamed politician was the guest in the next show where the host told him that...

Even today, after almost 20 years, a new politician is a guest in each episode of the show where he is being told by whom he was accused for the poor state in the country. That politician then blames another politician and the vicious cycle continues. To make things more interesting, we have exclusively found out that each politician has a fixed strategy on how to behave during the show. More precisely, each politician knows who to blame based on the person who blamed him in previous show. We will provide you with this information and hope you will be able to write a program that calculates what politician will be the guest of the K-th show.

Input

The first line contains integers N ($2 \leq N \leq 500$) and K ($1 \leq K \leq 10^{18}$) from the task description.

The i-th of the next N lines contains N integers where j-th integer tells us who will be blamed by the i-th politician if he was blamed by politician number j in the last show.

You can assume that no politician will ever blame himself. Therefore, none of the numbers in i-th line of matrix will be equal to i. Similarly, note that the i-th number in the i-th matrix row will always be equal to 0 and can be disregarded.

Output

In a single line you should output the number of a politician that will be the guest of the K-th episode of the talk show.

Scoring

In the test cases worth a total of 35 points, it will hold $1 \leq K \leq 10^5$.

Examples

input

```
2 4
0 2
1 0
```

output

```
2
```

input

```
3 7
0 3 2
3 0 3
2 1 0
```

output

```
1
```

input

```
4 7
0 4 3 2
4 0 4 1
2 1 0 1
3 2 3 0
```

output

```
3
```

Task Matching

You are given N, where N is even, points on a plane that have integer coordinates. For each integer a, there are at most two points with coordinates (a, x). Analogously, for each integer b, there are at most two points with coordinates (x, b).

You are able to draw horizontal or vertical line segments between pairs of given points. Is it possible to draw $\frac{N}{2}$ lines such that each of the given points is an endpoint of exactly one line segment and that no two line segments intersect?

Input

The first line contains an even integer N ($2 \leq N \leq 100\,000$) from the task description.

The i-th of the next N lines contains two integers X_i, Y_i ($1 \leq X_i, Y_i \leq 100\,000$), coordinates of the i-th point.

Output

If it is not possible to draw the line segments as explained in the task statement, you should output `"NE"` (NO in Croatian) in a single line.

Otherwise, you should output `"DA"` (YES in Croatian) in the first line. In each of the next $\frac{N}{2}$ lines you should output two space-separated integers i and j ($1 \leq i, j \leq N$), which represent indices of the points that are connected with a drawn line segment.

Scoring

Subtask	Score	Constraints
1	5	$2 \leq N \leq 20$, for each integer a, there is an even number of points with coordinates (a, x) and an even number of points with coordinates (x, a).
2	6	$2 \leq N \leq 20$
3	7	$2 \leq N \leq 40$
4	40	$2 \leq N \leq 2000$
5	52	No additional constraints.

Examples

input

```
8
1 1
1 3
2 2
2 4
3 1
3 3
4 2
4 4
```

output

```
DA
1 5
3 7
2 6
4 8
```

input

```
6
1 2
1 3
2 1
2 4
3 2
3 3
```

output

```
DA
1 2
3 4
5 6
```

input

```
2
1 1
2 2
```

output

```
NE
```