Codeforces Beta Round #14 (Div. 2)

A. Letter

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

A boy Bob likes to draw. Not long ago he bought a rectangular graph (checked) sheet with n rows and m columns. Bob shaded some of the squares on the sheet. Having seen his masterpiece, he decided to share it with his elder brother, who lives in Flatland. Now Bob has to send his picture by post, but because of the world economic crisis and high oil prices, he wants to send his creation, but to spend as little money as possible. For each sent square of paper (no matter whether it is shaded or not) Bob has to pay 3.14 burles. Please, help Bob cut out of his masterpiece a rectangle of the minimum cost, that will contain all the shaded squares. The rectangle's sides should be parallel to the sheet's sides.

Input

The first line of the input data contains numbers n and m ($1 \le n, m \le 50$), n — amount of lines, and m — amount of columns on Bob's sheet. The following n lines contain m characters each. Character «.» stands for a non-shaded square on the sheet, and «*» — for a shaded square. It is guaranteed that Bob has shaded at least one square.

Output

Output the required rectangle of the minimum cost. Study the output data in the sample tests to understand the output format better.

Examples

input
6 7 ....***.. ..*.... ..***.. ..*.... ..***..
output
*** *.. *** *.. ***

input
3 3 *** *.* ***
output
*** *.* ***

B. Young Photographer

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

Among other things, Bob is keen on photography. Especially he likes to take pictures of sportsmen. That was the reason why he placed himself in position x_0 of a long straight racetrack and got ready to take pictures. But the problem was that not all the runners passed him. The total amount of sportsmen, training at that racetrack, equals n. And each of them regularly runs distances within a particular segment of the racetrack, which is the same for each sportsman. For example, the first sportsman runs from position a_1 to position b_1, the second — from a_2 to b_2

What is the minimum distance that Bob should move to have a chance to take pictures of each sportsman? Bob can take a picture of a sportsman, if he stands within the segment that this sportsman covers on the racetrack.

Input

The first line of the input file contains integers n and x_0 ($1 \le n \le 100$; $0 \le x_0 \le 1000$). The following n lines contain pairs of integers a_i, b_i ($0 \le a_i, b_i \le 1000$; $a_i \ne b_i$).

Output

Output the required minimum distance in the same units as the positions on the racetrack. If there is no such a position, output -1.

Examples

input
3 3 0 7 14 2 4 6

output
1

C. Four Segments

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

Several months later Alex finally got his brother Bob's creation by post. And now, in his turn, Alex wants to boast about something to his brother. He thought for a while, and came to the conclusion that he has no ready creations, and decided to write a program for rectangles detection. According to his plan, the program detects if the four given segments form a rectangle of a positive area and with sides parallel to coordinate axes. As Alex does badly at school and can't write this program by himself, he asks you to help him.

Input

The input data contain four lines. Each of these lines contains four integers x_1, y_1, x_2, y_2 ($-10^9 \le x_1, y_1, x_2, y_2 \le 10^9$) — coordinates of segment's beginning and end positions. The given segments can degenerate into points.

Output

Output the word «YES», if the given four segments form the required rectangle, otherwise output «NO».

Examples

input
1 1 6 1 1 0 6 0 6 0 6 1 1 1 1 0
output
YES

input
0 0 0 3 2 0 0 0 2 2 2 0 0 2 2 2
output
NO

D. Two Paths

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

As you know, Bob's brother lives in Flatland. In Flatland there are n cities, connected by $n - 1$ two-way roads. The cities are numbered from 1 to n. You can get from one city to another moving along the roads.

The «Two Paths» company, where Bob's brother works, has won a tender to repair two paths in Flatland. A path is a sequence of different cities, connected sequentially by roads. The company is allowed to choose by itself the paths to repair. The only condition they have to meet is that the two paths shouldn't cross (i.e. shouldn't have common cities).

It is known that the profit, the «Two Paths» company will get, equals the product of the lengths of the two paths. Let's consider the length of each road equals 1, and the length of a path equals the amount of roads in it. Find the maximum possible profit for the company.

Input

The first line contains an integer n ($2 \le n \le 200$), where n is the amount of cities in the country. The following $n - 1$ lines contain the information about the roads. Each line contains a pair of numbers of the cities, connected by the road a_i, b_i ($1 \le a_i, b_i \le n$).

Output

Output the maximum possible profit.

Examples

input
4 1 2 2 3 3 4
output
1

input
7 1 2 1 3 1 4 1 5 1 6 1 7
output
0

input
6 1 2 2 3 2 4 5 4 6 4
output
4

E. Camels

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

Bob likes to draw camels: with a single hump, two humps, three humps, etc. He draws a camel by connecting points on a coordinate plane. Now he's drawing camels with t humps, representing them as polylines in the plane. Each polyline consists of n vertices with coordinates (x_1, y_1), (x_2, y_2), ..., (x_n, y_n). The first vertex has a coordinate $x_1 = 1$, the second — $x_2 = 2$, etc. Coordinates y_i might be any, but should satisfy the following conditions:

- there should be t humps precisely, i.e. such indexes j ($2 \le j \le n - 1$), so that $y_{j-1} < y_j > y_{j+1}$,
- there should be precisely $t - 1$ such indexes j ($2 \le j \le n - 1$), so that $y_{j-1} > y_j < y_{j+1}$,
- no segment of a polyline should be parallel to the Ox-axis,
- all y_i are integers between 1 and 4.

For a series of his drawings of camels with t humps Bob wants to buy a notebook, but he doesn't know how many pages he will need. Output the amount of different polylines that can be drawn to represent camels with t humps for a given number n.

Input

The first line contains a pair of integers n and t ($3 \le n \le 20$, $1 \le t \le 10$).

Output

Output the required amount of camels with t humps.

Examples

input
6 1
output
6

input
4 2
output
0

Note

In the first sample test sequences of y-coordinates for six camels are: 123421, 123431, 123432, 124321, 134321 и 234321 (each digit corresponds to one value of y_i).