Problem 1:

Sam is an eligible bachelor. He decides to settle down in life and start a family. He goes bride hunting.

He wants to marry a girl who has at least one of the 8 qualities mentioned below:-

1) The girl should be rich.

2) The girl should be an Engineer/Doctor.

3) The girl should be beautiful.

4) The girl should be of height 5.3".

5) The girl should be working in an MNC.

6) The girl should be an extrovert.

7) The girl should not have spectacles.

8) The girl should be kind and honest.

He is in search of a bride who has some or all of the 8 qualities mentioned above. On bride hunting, he may find more than one contenders to be his wife.

In that case, he wants to choose a girl whose house is closest to his house. Find a bride for Sam who has maximum qualities. If in case, there are more than one contenders who are at equal distance from Sam"s house; then

print ""“Polygamy not allowed”"".

In case there is no suitable girl who fits the criteria then print “"**No suitable girl found**"”

Given a Matrix N*M, Sam's house is at (1, 1). It is denoted by 1. In the same matrix, the location of a marriageable Girl is also denoted by 1. Hence 1 at location (1, 1) should not be considered as the location of a marriageable Girl’s location.

The qualities of that girl, as per Sam”s criteria, have to be decoded from the number of non-zero neighbors (max 8-way) she has. Similar to the condition above, 1 at location (1, 1) should not be considered as the quality of a Girl. See Example section to get a better understanding.

Find Sam, a suitable Bride and print the row and column of the bride, and find out the number of qualities that the Bride possesses.

NOTE: - Distance is calculated in number of hops in any direction i.e. (Left, Right, Up, Down and Diagonal)

Constraints

2 <= N,M <= 10^2

Input Format

First Line contains the row (N) and column (M) of the houses.

Next N lines contain the data about girls and their qualities.

Output

It will contain the row and column of the bride, and the number of qualities that Bride possess separated by a colon (i.e. :).

Explanation

Input:

2 9

1 0 1 1 0 1 1 1 1

0 0 0 1 0 1 0 0 1

Output:

1:7:3

Explanation:

The girl and qualities are present at (1,3),(1,4),(1,6),(1,7),(1,8),(1,9),(2,4),(2,6),(2,9).

The girl present at (1,3) has 2 qualities (i.e. (1,4)and (2,4)).

The girl present at (1,4) has 2 qualities.

The Bride present at (1,6) has 2 qualities.

The Bride present at (1,7) has 3 qualities.

The Bride present at (1,8) has 3 qualities.

The Bride present at (1,9) has 2 qualities.

The Bride present at (2,4) has 2 qualities.

The Bride present at (2,6) has 2 qualities.

The Bride present at (2,9) has 2 qualities.

As we see, there are two contenders who have maximum qualities, one is at (1,7) and another at (1,8).

The girl who is closest to Sam's house is at (1,7). Hence, she is the bride.

Hence, the output will be 1:7:3.

Example 2

Input:

6 6

1 0 0 0 0 0

0 0 0 0 0 0

0 0 1 1 1 0

0 0 1 1 1 0

0 0 1 1 1 0

0 0 0 0 0 0

Output:

4:4:8

Explanation:

The bride and qualities are present at (3,3),(3,4),(3,5),(4,3),(4,4),(4,5),(5,3),(5,4),(5,5)

The Bride present at (3,3) has 3 qualities (i.e. (3,4),(4,3) and (4,4)).

The Bride present at (3,4) has 5 qualities.

The Bride present at (3,5) has 3 qualities.

The Bride present at (4,3) has 5 qualities.

The Bride present at (4,4) has 8 qualities.

The Bride present at (4,5) has 5 qualities.

The Bride present at (5,3) has 3 qualities.

The Bride present at (5,4) has 5 qualities.

The Bride present at (5,5) has 3 qualities.

As we see, the girl present in (4,4) has maximum number of Qualities. Hence, she is the bride.

Hence, the output will be 4:4:8.

Problem 2:

We called it as Jumping Beetle

A beetle on a board of size M X M squares. Each square has coordinates, a pair of integers (i,j), where i is the row number and j is the column number. Associated with each square is the coordinates of the square it jumps to when it lands there. as an example , in the 6 X 6 board below, the beetle jumps to (2,3) from (1,1), and jumps to (5,2) from (6,4) .

If the starting location is given, the target is to see the position of the beetle after a large NO. of jumps.

Input Format

1st Line

Input has 3 comma separated positive integers M,A,B. M is the length of a side of the board (the board is of size M X M). The NO.of jumps the beetle makes is AB (A multiplied by B)

The next M lines

consist of M pairs of comma separated positive integers, each pair separated by a semicolon(;). The Mth pair in each line i.e k shows the coordinates of the square it jumps to if and only if it lands on square (k,m).

Finally, there is one line with a comma separated pair of no. giving the initial position of the Jumping Beetle

Output Format

The output is the coordinates of the beetle's position after A,B moves

Constraints

- 6<= M <=20
- 1<=A,B<109

Input

6,2,3

2,3;2,4;2,1;3,5;3,4;4,2

4,2;4,1;3,1;3,6;4,4;1,4

1,2;1,3;4,5;5,5;2,1;1,5

6,2;6,1;2,2;5,6;2,6;2,5

3,2;3,3;6,5;6,6;6,3;6,4

5,3;5,4;5,1;5,2;4,6;1,6

1,2

Output

6,3

Explanation

M is 6, A is 2 and B is 3. The size of the board is 6 X 6. The next SIX lines give the "jump to" coordinates if the beetle is on the corresponding square. The starting position of the beetle is (1,2)

The board is the same as pictured above. The O/P should be the position of the beetle after (2)(3)=6 moves. The position after each of the moves is (2,4);(3,6);(1,5);(3,4);(5,5);(6,3). Hence the output is 6,3

Example 2

Input

6,12,2

2,3;2,4;2,1;3,5;3,4;4,2

4,2;4,1;3,1;3,6;4,4;1,4

1,2;1,3;4,5;5,5;2,1;1,5

6,2;6,1;2,2;5,6;2,6;2,5

3,2;3,3;6,5;6,6;6,3;6,4

5 ,3;5,4;5,1;5,2;4,6;1,6

4 ,3

Output

6,1