Minimum rolls of special Die

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

You must have played the game Snakes and Ladders. It is a 10 x 10 board which has cells numbered from 1 to 100 in order starting from bottom left. Now on the board there are some snakes and ladders.

If a player lands at the mouth of a snake, the player must go down the snake and come out through the tail. Also If a player lands at the base of a ladder, the player must climb the ladder. Ladders go up only.

However you have a special die and can roll any number you want between 1 and 4 (die only contains numbers between 1-4).

Your task is to find the minimum number of rolls required to reach the square 100 starting from square 1.

Neither square 1 nor square 100 will be the starting point of a ladder or snake.

A square will have at most one endpoint from either a snake or a ladder.

Input

The first line contains 2 integers n and m - denoting the number of ladders and snakes respectively.

The next n lines contains 2 integers each denoting the base and end of the ladder.

The next m lines contains 2 integers each denoting the mouth and tail of the snake respectively.

Output

A single integer denoting the minimum number of rolls needed to reach to square 100 given the conditions. If there is no solution return -1.

Examples

standard input	standard output
1 4 6 95 96 2 97 3 98 5 99 4	-1
3 2 5 66 9 88 10 92 67 8 76 4	5

Note

For first Example: After reaching 95 there is no way for you to reach 100.

For Second Example: You reach 92 in 3 steps. Now you roll 4 to reach 96 and again one more 4. So total 5 rolls.