

hivalric Blossom

Input file: standard input
Output file: standard output
Time limit: 1 second
Memory limit: 512 megabytes

My name is Noelle, maid of the Knights of Favonius, and it's my pleasure to be joining you on your adventure today. Should you encounter any problems at any point throughout your journey, please do not hesitate to call me and I will be delighted to provide you with my full assistance. Yes, starting right now — what do you need?

—Noelle



Noelle is a polite young woman and professional maid, helping those in need without hesitation. Although Noelle is not an official knight of the Knights of Favonius, people in Mondstadt often come to her for help.

As busily as usual, Noelle receives n commissions, indexed from 1 to n . Because different commissions have different levels of importance, Noelle needs to assign a priority to each commission. After that, she will complete the commission successively in **increasing** order of priority. If some commissions share the same priority, Noelle will firstly complete the commission with smaller index.

Some of the commissions are highly relevant, so Noelle wants to complete them continuously without a break. Formally, such constraints are represented by m pairs $(l_1, r_1), (l_2, r_2), \dots, (l_m, r_m)$ — If the index of Noelle's k -th commission is l_x , then the index of her $k + 1$ -th commission should be r_x . Noelle doesn't want to remember many different level of priorities, so she wants to minimize the number of different level of priorities while the above constraints are satisfied.

Input

The first line contains two integers n, m ($1 \leq n \leq 10^5, 0 \leq m \leq n - 1$) — the number of commissions and the number of constraints.

The i -th line in following m lines contains two integers l_i, r_i ($1 \leq l_i < r_i \leq n$), which describes the i -th constraint.

It is guaranteed that Noelle's constraints always can be satisfied with reasonable priority distribution. Namely, all of l_i will be distinct and all of r_i will be distinct.

Output

Output n integers, the i -th integer is w_i ($1 \leq w_i \leq 10^9$) — the priority of the i -th commission, such that the constraints are satisfied.

If there are multiple solutions, output any one of them.

Examples

standard input	standard output
6 2 1 3 2 6	1 2 1 1 1 2
6 2 1 4 2 6	1 2 3 1 1 2
10 6 1 3 3 7 2 10 4 6 6 9 5 8	3 4 3 1 2 1 3 2 1 4
3 0	1 1 1

Note

In the first example, Noelle’s execution order is [2,6,1,3,4,5], so (1,3), (2,6) can be continuous pairs. The number of different priorities is 2.

In the second example, Noelle’s execution order is [1,4,5,2,6,3], so (1,4), (2,6) can be continuous pairs. The number of different priorities is 3.

In the third example, Noelle’s execution order is [4,6,9,5,8,1,3,7,2,10], so all pairs are satisfied. The number of different priorities is 4.

Noelle has much greater dreams and ambitions than other maids in the Knights of Favonius. Like anyone else in this city protected by the Knights of Favonius, she too dreams of donning the honored armor. Even if her skills are not enough to pass the rigorous selection trials, she still wishes to observe and learn from them every chance she gets. Aside from her training, she enjoys her current life, helping everyone in need. “You can leave absolutely anything to me!” That’s her signature line. If there’s anything that you need, Noelle is glad to be of help.