Objective

You and your friends want to exchange video games. The easiest way would be to group people by pair. If A owns a game that B would like to have and B has a game that A would like to have, the can simply swap their games. Now, this might not be the best solution as if C is also interested by the game that B owns and C has a game that A would like to have, you can create a circle where A gives a game to B, B gives a game to C and C gives a game to A and they are all happy.

Some people may not be able to get into any circle: that's life! The objective is to create one or multiple circles where each member receives and gives one game while minimizing the number of people that are excluded from all circles. One person can participate in no more than one circle.

Data

Input

Row *1*: an integer **N** comprised between *2* and *500*, representing the number of people that would like to exchange games.
Row *2*: an integer **M** comprised between *2* and *1600* indicating the number of rows that follow.
Row *3 to* **M**+*2*: two integers **i** and **j** indicating that person **i** owns a game that **j** would like to receive. **i** and **j** are comprised between *1* and **N**. Some people may not appear in this list neither as owner nor as receiver. Also, some people may appear multiple times as owners and/or as receivers.

Output

A series of **N** integer numbers separated by spaces representing the optimal transactions. The **i**th number is:

- 0 if person **i** does not belong to any circle.
- An integer **j** comprised between *1* and **N** meaning that person **i** is giving a game to person **j**.

The optimal transaction must satisfy the following criteria:

- Within a circle, a person receives one game and gives one game
- A person may belong to at most one circle
- The number of person that do not belong to any circle is minimum.

If no exchange is possible at all, the output would be a series of **N** zeros.

You can download sample input and output data files to work locally by clicking on the link at the bottom of the French version of the question