Convoluted Drawing (drawing)

Carlo is designing a logo for his new metal band. His design consists of two rows of points connected by E straight line segments. The N points in the first row are numbered from 0 to $N-1$, and the M points in the second row are numbered from 0 to $M-1$.

The segments connect points from the first row to points in the second row – there are no edges between points in the same row.

Figure 1: A draft of Carlo's logo.

Carlo is dissatisfied with his design, as it is almost unintelligible, and has asked you to help make it clearer without making radical changes.

You are allowed to rearrange the points in each row, but you cannot change which pairs of points are connected by each segment. That is, after rearranging the points, the same pairs of points must remain connected by straight line segments. A logo is considered **clear** if no line segments intersect.

Can you help Carlo create a clear logo, or determine if it is impossible?

> ☞ Among the attachments of this task you may find a template file `drawing.*` with a sample incomplete implementation.

Input

The input file consists of:

- a line containing integers N, M, E.

- E lines, the i-th of which consisting of integers A_i, B_i, meaning that there is a segment connecting point A_i in the first row and point B_i in the second row.

Output

If it is impossible to create a clear logo, output a single line containing the integer -1.

Otherwise, output two lines:

- The first line should contain a permutation of the integers from 0 to $N-1$.
- The second line should contain a permutation of the integers from 0 to $M-1$.

These permutations should reorder the points in such a way that no segments intersect. If multiple solutions exist, you can output any of them.

Constraints

- $1 \leq N \leq 100\,000$.
- $1 \leq M \leq 100\,000$.
- $1 \leq E \leq 300\,000$.
- $0 \leq A_i < N$ and $0 \leq B_i < M$ for each $i = 0 \ldots E-1$.
- The segments (that is, the pairs (A_i, B_i)) are pairwise distinct.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

– **Subtask 1** (0 points) Examples.

– **Subtask 2** (12 points) $N, M \leq 6$, $E \leq 20$.

– **Subtask 3** (30 points) $N, M \leq 1000$, $E \leq 3000$.

– **Subtask 4** (33 points) A solution always exists.

– **Subtask 5** (25 points) No additional limitations.

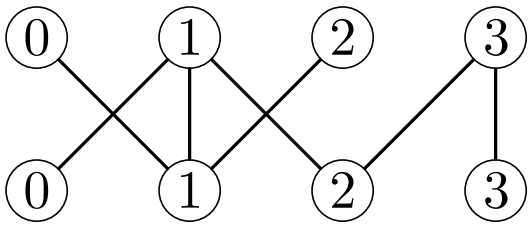
Examples

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

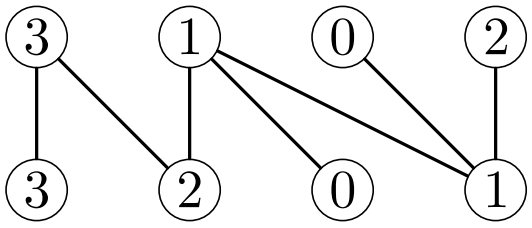
input	output
3 3 5 0 1 0 2 1 1 1 2 2 1	-1

Explanation

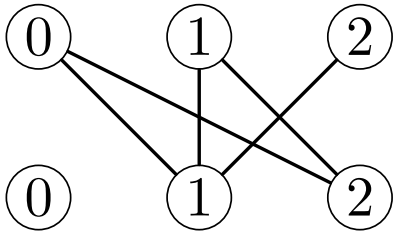
In the **first sample case**, the initial logo is as follows:



It is possible to reorder the points in the first row as $3, 1, 0, 2$ and those in the second row as $3, 2, 0, 1$, resulting in the following clear logo:



In the **second sample case**, the initial logo is as follows:



However, in this case, it is impossible to find a suitable rearrangement that makes the logo clear.