Coin Sliding

This problem is about a simple game. The game is played on a simple undirected graph with n vertices. In order to play the game, you need n coins.

In each turn of the game you should do the following:

1. Place a coin onto an empty vertex.
2. Slide the coin you just placed along an edge onto another empty vertex. If you cannot do this, the game is over.

Note that you are not allowed to move the coins you placed in earlier turns.

Task

The goal of the game is to maximize the number of coins placed onto the graph. Find one possible optimal way to play the game.

Input

The first line of input contains the integers n and m: the number of vertices and the number of edges. The vertices are numbered 0 through $n-1$.

Each of the following m lines describes an edge by giving the numbers of the vertices it connects. All edges are bidirectional. There are no self-loops and each pair of vertices is connected by at most one edge.

Output

In the first line, output a single positive integer: the largest number c of coins that can be placed onto the graph.

In the remaining c lines, output one possible way of reaching that number of coins. Each of the first $c-1$ lines should contain an instruction of the form "a_i b_i", meaning "place a coin onto a_i and then slide it onto b_i". The last of these c lines should just be of the form "a_c", meaning "place a coin onto a_c and the game ends".

If there are multiple optimal solutions, you may output any of them.

Limits

There are five test groups, each worth 20 points. In all test cases we have $n \geq 1$ and $m \geq 0$.

- In test group 1, $n \leq 3$, $m \leq 3$.
- In test group 2, $n \leq 9$, $m \leq 36$.
- In test group 3, $n \leq 100$, $m \leq 1000$.
- In test group 4, $n \leq 1000$, $m \leq 10\,000$.
- In test group 5, $n \leq 100\,000$, $m \leq 300\,000$.

Examples

Input	Output
4 6 0 1 0 2 0 3 1 2 1 3 2 3	4 2 3 1 2 0 1 0

This is a complete graph on 4 vertices. As shown above, we can reach a state in which each vertex has a coin, which is clearly optimal.

Input	Output
4 0	1 2

There are four isolated vertices. You pick one, place a coin there, and the game is over. Kinda boring, if you ask me.