

Problem E: Ball Passing

• Time Limit: 2 sec

Problem Statement

There are M balls of each color $1, 2, \dots, N$, and N students are sitting in a circle playing with these balls. The students are numbered from 1 to N in the order in which they are seated.

Initially, each student has exactly M balls. Specifically, the color of the j -th ball that i -th student has is color $a_{i,j}$. They will perform the following operation to achieve a state where each student holds balls of only one color:

Operation: Each of the N students simultaneously passes one ball they currently possess to their neighbor (the i -th student passes a ball to the $(i + 1)$ -th student, and the N -th student passes a ball to the 1st student, as the $(N + 1)$ -th student is considered to be the 1st student).

Your task is to determine whether, by repeating this operation at most NM times, it is possible to achieve the goal. If possible, output a sequence of operations.

Input

The input consists of a single test case of the following format.

```
N M
a1,1 a1,2 ... a1,M
a2,1 a2,2 ... a2,M
⋮
aN,1 aN,2 ... aN,M
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The first line contains two integers N and M , where N represents the number of students and M represents the number of balls of each color. Both N and M are between 2 and 100 (for N) and 2 and 100 (for M), inclusive.

Each of the following N lines consists of M positive integers $a_{i,1}, a_{i,2}, \dots, a_{i,M}$. The integer $a_{i,j}$ represents the color of the j -th ball that the i -th student initially has. It is guaranteed that $1 \leq a_{i,j} \leq N$ and that each integer $1, 2, \dots, N$ occurs M times among $a_{i,j}$ ($1 \leq i \leq N, 1 \leq j \leq M$).

It is also guaranteed that the initial state does not satisfy the goal condition.

Output

Print -1 if it is impossible to achieve the goal state by at most NM operations.

Otherwise, print K — the number of operations. In the following K lines, print N integers $c_{i,1}, c_{i,2}, \dots, c_{i,N}$. Here, $c_{i,j}$ represents the color of the ball passed from the j -th student to the $(j + 1)$ -th student at the i -th operation.

Sample Input 1	Sample Output 1
2 4 1 2 1 2 2 1 2 1	2 1 2 1 2

Sample Input 2	Sample Output 2
3 3 1 2 3 2 3 1 3 1 2	3 2 3 1 3 1 2 2 3 1