

A. Diverse Game

time limit per test: 1 second

memory limit per test: 256 megabytes

Petr, watching Sergey's stream, came up with a matrix a , consisting of n rows and m columns (the number in the i -th row and j -th column is denoted as $a_{i,j}$), which contains all integers from 1 to $n \cdot m$. But he didn't like the arrangement of the numbers, and now he wants to come up with a new matrix b , consisting of n rows and m columns, which will also contain all integers from 1 to $n \cdot m$, such that for any $1 \leq i \leq n, 1 \leq j \leq m$ it holds that $a_{i,j} \neq b_{i,j}$.

You are given the matrix a , construct **any** matrix b that meets Petr's requirements, or determine that it is impossible.

Hurry up! Otherwise, he will donate all his money to the stream in search of an answer to his question.

Input

Each test consists of multiple test cases. The first line contains an integer t ($1 \leq t \leq 10^3$) — the number of test cases. Then follows the description of the test cases.

The first line of each test case contains two integers n and m ($1 \leq n, m \leq 10$) — the number of rows and columns of matrix a .

The next n lines contain m integers each, describing matrix a . The i -th of these lines contains the elements of matrix $a_{i,1}, a_{i,2}, \dots, a_{i,m}$.

It is guaranteed that all numbers in matrix a are distinct and $1 \leq a_{i,j} \leq n \cdot m$.

It is guaranteed that the sum of $n \cdot m$ over all test cases does not exceed $5 \cdot 10^4$.

Output

For each test case, output $n \cdot m$ integers — any suitable matrix b , or -1 if such a matrix does not exist.

Example

input	Copy
5 1 1 1 2 1 2 1 1 5 2 4 5 3 1 2 4 1 2 3 4 5 6 7 8 3 3 4 2 1 9 8 3 6 7 5	
output	Copy
-1 1 2 4 5 3 1 2 6 7 8 5 2 3 4 1 8 3 9 7 5 6 2 1 4	

Note

In the first test case, there is only one element in the matrix, so matrix b is the only matrix and it does not fit.

In the second test case $a_{1,1} = 2 \neq 1 = b_{1,1}$, $a_{2,1} = 1 \neq 2 = b_{2,1}$.

Codeforces Round 959 sponsored by NEAR (Div. 1 + Div. 2)

Finished

→ Practice?

Want to solve the contest problems after the official contest ends? Just register for practice and you will be able to submit solutions.

Register for practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Problem tags

constructive algorithms

greedy

implementation

*800

No tag edit access

→ Contest materials

- Announcement

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- Video Tutorial (en)

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- Editorial (en)

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