Problem K. City Balancer

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	1024 mebibytes

Every year, the Bubble Kingdom unveils its spectacular Bubble Matrix in the Grand Square, where each cell represents the *bubbliness* of a particular city within the kingdom. The bubbliness is quantified in Bubble Points (BP).

As the Royal Advisor of Bubble Metrics, you have identified an imbalance in the kingdom's Bubble Matrix. While some cities are overflowing with bubbliness, others lag far behind. Your task, bestowed upon you by the King, is to ensure that the sum of BP of all the cities in each row and each column becomes the same.

You have an $N \times M$ matrix of numbers $A_{i,j}$, each representing the Bubble Points for the corresponding city. To restore balance, you are permitted to perform a Bubble Operation at most $2 \cdot (N + M)$ times. The Bubble Operation is defined as follows:

- Pick a cell $A_{i,j}$ from the matrix and choose a value V.
- Subtract V from all the edge-connected neighbors of $A_{i,j}$.
- Add the subtracted values to $A_{i,j}$.

It is crucial to note that the total sum of Bubble Points across the entire matrix will always remain constant after each Bubble Operation. Your goal is to perform a sequence of Bubble Operations, of length at most $2 \cdot (N + M)$, to ensure that the sum of BP for all the cities in any given row is equal to the sum of BP for the cities in any other row, and the sum of BP for all the cities in any given column is equal to the sum of BP for the cities in any other column. If this is unattainable, please indicate so.

Input

The first line contains two integers N and M: the number of rows and columns in the Bubble Matrix ($1 \le N, M \le 10^3$).

Each of the next N lines contains M integers: the initial Bubble Points $A_{i,j}$ for each city ($-10^3 \le A_{i,j} \le 10^3$).

Output

If it is impossible to balance the matrix, output a single line containing -1.

Otherwise, first output a line with a single integer K, the number of Bubble Operations you performed ($0 \le K \le 2 \cdot (N + M)$, you don't have to minimize it). Then output K lines, each in the format "R_i C_i V_i", where the integers R_i and C_i represent the 1-based coordinates of A_{R_i,C_i} you picked for the i-th operation, and the integer V_i is the value V used in that operation ($1 \le R_i \le N$, $1 \le C_i \le M$, $-5 \cdot 10^{14} \le V_i \le 5 \cdot 10^{14}$).

Example

standard input	*standard output*
2 3 0 3 3 4 -1 3	2 1 3 -1 2 3 -1

Note

In the example, after the first operation, the matrix looks as follows: $\begin{pmatrix} 0 & 4 & 1 \\ 4 & -1 & 4 \end{pmatrix}$

After the second operation, the matrix looks as follows: $\begin{pmatrix} 0 & 4 & 2 \\ 4 & 0 & 2 \end{pmatrix}$

The column sum for every column is 4, while the row sum for every row is 6.