Problem B. Good Old Table

Input file:	`cross.in`
Output file:	`cross.out`
Time limit:	2 seconds
Memory limit:	256 mebibytes

You are given a rectangular table of size $n \times m$ with ones and twos in each cell; it is guaranteed that $n \cdot m$ is even. You can change the table in steps. On each step, you choose one cell and invert all cells in its row and its column (ones become twos, twos become ones). Thus, on each step you invert exactly $n + m - 1$ elements. You should find the minimal number of steps required to transform all elements of the table to ones.

Input

The first line of input contains two integers n and m ($1 \leqslant n, m \leqslant 3000$, $n \cdot m$ is even). Next n lines describe the rows of the table. Each of these lines contains m integers separated by spaces. It is guaranteed that the elements of the table are ones and twos.

Output

On the first line of output, print the minimal number of steps required to transform all elements of the table to ones. If it is impossible, print -1.

Examples

cross.in	cross.out
2 2 1 2 2 1	2
3 4 1 2 1 2 1 1 2 2 2 1 1 2	3
1 4 2 1 1 1	-1

Note

In the second example, one of possible sequences of cells is $\{(1, 2), (2, 3), (3, 1)\}$.