ABBA

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	256 mebibytes

In this problem, we operate with tables of fixed size $h \times w$ consisting of real values. Let's define an addition operation on two tables as their component-wise sum.

A *multiplication table* for two real vectors $\alpha = (\alpha_1, \alpha_2, \ldots, \alpha_h)$ and $\beta = (\beta_1, \beta_2 \ldots, \beta_w)$ is the table $T_{\alpha,\beta}$ where the element at the intersection of i-th row and j-th column is $\alpha_i \cdot \beta_j$.

You start with a table of size $h \times w$ consisting of zeroes. In one turn, you are allowed to add a multiplication table for two arbitrary real vectors α of length h and β of length w to the current table. Your task is to make the current table equal to a goal table G in the minimum number of turns. What is the minimum number of turns you have to perform?

Input

The first line of input contains two integers h and w ($1 \le h, w \le 200$).

The i-th of the following h lines contain w space-separated **integers** $a_{i,1}, a_{i,2}, \ldots, a_{i,w}$ ($-10^6 \le a_{i,j} \le 10^6$), where $a_{i,j}$ is the value on the intersection of i-th row and j-th column of the goal table G.

Output

If it's impossible to obtain the goal table G, print "`-1`" (without the quotes). Otherwise, output the minimum number of turns you have to perform in order to achieve it.

Examples

standard input	standard output

`3 5`
`1 2 3 4 5`
`2 4 6 8 10`
`3 6 9 12 15`
	`1`

`3 3`
`2 0 2`
`0 2 0`
`2 0 2`
	`2`

Note

In the first sample, the table T can be obtained using $\alpha = \begin{pmatrix} 1 & 2 & 3 \end{pmatrix}$, $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \end{pmatrix}$.

In the second sample, the table T can be obtained as sum of $T_{\alpha_1,\beta_1} = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}$ for vectors $\alpha_1 = \begin{pmatrix} 1 & 1 & 1 \end{pmatrix}$, $\beta_1 = \begin{pmatrix} 1 & 1 & 1 \end{pmatrix}$ and $T_{\alpha_2,\beta_2} = \begin{pmatrix} 1 & -1 & 1 \\ -1 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$ for vectors $\alpha_2 = \begin{pmatrix} -1 & 1 & -1 \end{pmatrix}$, $\beta_2 = \begin{pmatrix} -1 & 1 & -1 \end{pmatrix}$.