Problem M. Godzilla

Time limit: 5 seconds
Memory limit: 1024 megabytes

Godzilla, the ancient Titan monster, is on the way to Bytetown!

Bytetown has $n \times m$ blocks, whose top view is a grid of n rows and m columns. The rows and columns of the grid are numbered from 1 to n and 1 to m, respectively.

Godzilla will visit each block exactly once. Assume Godzilla is at block (i, j) now, then he can choose to do nothing or consume $e(i, j)$ units of energy to make an attack in one of the following two ways. Either of them will cause $d(i, j)$ units damage to Bytetown:

- Cast "Horizontal Atomic Breath" to hit every block located at the i-th row.
- Cast "Vertical Atomic Breath" to hit every block located at the j-th column.

Note that Godzilla won't make multiple attacks in the same block.

Godzilla is cruel but fair. So each block will be hit by "Horizontal Atomic Breath" exactly once and will also be hit by "Vertical Atomic Breath" exactly once. Find the maximum possible total damage Godzilla can cause when the total energy consumed by Godzilla modulo 4 is k. You can safely assume that Godzilla always has enough energy.

Input

The first line of the input contains two integers n and m ($2 \le n, m \le 75$), denoting the number of rows and columns.

In the next n lines, the i-th line contains m integers $d(i, 1), d(i, 2), \ldots, d(i, m)$. ($1 \le d(i, j) \le 10^7$)

In the next n lines, the i-th line contains m integers $e(i, 1), e(i, 2), \ldots, e(i, m)$. ($0 \le e(i, j) \le 3$)

Output

Print four lines. In the i-th ($1 \le i \le 4$) line, print a single integer, denoting the maximum possible total units of damage that can be caused when the total units of energy consumed by Godzilla modulo 4 is $(i - 1)$. Note that when it is impossible, please print "`-1`" instead.

Examples

standard input	standard output
2 2 1 2 3 4 2 1 0 3	-1 -1 10 -1
3 3 1 2 3 4 5 6 7 8 9 2 1 0 0 3 2 1 2 1	35 38 37 36