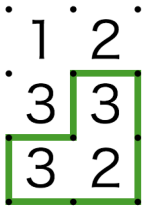
Problem E. Tube Master III

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

Prof. Pang is playing "Tube Master". The game field is divided into $n \times m$ cells by $(n+1) \times m$ horizontal tubes and $n \times (m+1)$ vertical tubes. The product nm is an **even** number. There are $(n+1)(m+1)$ crossings of the tubes. The 2D coordinate of the crossings are (i, j) $(1 \le i \le n+1, 1 \le j \le m+1)$. We name the crossing with coordinate (i, j) as "crossing (i, j)". We name the cell whose corners are crossings $(i, j), (i+1, j), (i, j+1), (i+1, j+1)$ as "cell (i, j)" for all $1 \le i \le n$, $1 \le j \le m$. Additionally, each cell (i, j) contains an integer $count_{i,j}$.



The above figure shows a game field with $n = 3, m = 2$ (the third sample).

Prof. Pang decides to use some of the tubes. However, the game poses several weird restrictions.

1. Either 0 or 2 tubes connected to each crossing are used.
2. There are exactly $count_{i,j}$ turning points adjacent to cell (i, j). A turning point is a crossing such that exactly 1 horizontal tube and exactly 1 vertical tube connected to it are used. A turning point (x, y) is adjacent to cell (i, j) if crossing (x, y) is a corner of cell (i, j).

It costs $a_{i,j}$ to use the tube connecting crossings (i, j) and $(i, j+1)$. It costs $b_{i,j}$ to use the tube connecting crossings (i, j) and $(i+1, j)$. Please help Prof. Pang to find out which tubes he should use such that the restrictions are satisfied and the total cost is minimized.

Input

The first line contains a single positive integer T denoting the number of test cases.

For each test case, the first line contains two integers n, m $(1 \le n, m \le 100)$ separated by a single space.

The i-th of the following n lines contains m integers $count_{i,1}, count_{i,2}, \ldots, count_{i,m}$ $(0 \le count_{i,j} \le 4)$ separated by single spaces.

The i-th of the following $n+1$ lines contains m integers $a_{i,1}, a_{i,2}, \ldots, a_{i,m}$ $(1 \le a_{i,j} \le 10^9)$ separated by single spaces.

The i-th of the following n lines contains $m+1$ integers $b_{i,1}, b_{i,2}, \ldots, b_{i,m+1}$ $(1 \le b_{i,j} \le 10^9)$ separated by single spaces.

It is guaranteed that nm is an **even** number and that the total sum of nm over all test cases does not exceed 10^4.

Output

For each test case, output an integer that denotes the minimum cost. If there is no valid configuration, output "`-1`" instead.

Example

standard input	standard output
4 2 3 4 3 2 2 3 4 2 1 1 2 1 2 1 2 1 1 2 1 2 1 1 1 2 2 2 2 1 2 1 1 2 2 2 1 2 1 2 1 2 1 1 3 2 1 2 3 3 3 2 1 1 1 1 2 2 1 1 1 1 1 1 1 1 2 2 2 2 2 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	13 8 11 -1