Problem E – Optimal Move

VKU organized a Team building event on the occasion of National Day 20/11/2024 for all VKU staff. The most popular game is the game “Optimal Move” which is described as follows:

- On a large field, draw a matrix of m rows and n columns, with m and n changing according to each level of play, $1 \leq m, n \leq 100$. Each cell (i,j) contains a score which is a positive integer k not exceeding 10^6. In which, i is the row number, j is the column number of that cell.

- Each player will receive 2 pairs of numbers: (x1,y1) are the coordinates of the starting cell and (x2, y2) are the coordinates of the destination cell. The player is required to move from cell (x1,y1) to cell (x2,y2) with the rule that he/she can only move to the adjacent cell to the right (go to the larger adjacent column) or the adjacent cell below (go down to the larger adjacent row) of the cell he/she is standing on. After reaching the destination, the player's score is the total score recorded on the cells along the player's path, not counting the starting cell (x1,y1) but including the destination cell (x2,y2).

- According to each level of play, each team will send out q members to participate. The team with the lowest total score of all q members will be the winning team. Because they are "IT professionals", the teams start playing the trick by writing a program to calculate the moving route so that the total score for each player is the lowest so that their team's total score will be the lowest.

Input

- The first line contains 2 positive integers m and n, which are the number of rows and columns of the game matrix, $1 \leq m, n \leq 100$.
- The next m lines: the i^{th} line ($1 \leq i \leq m$) contains n positive integers, which are the numbers of cells in the i^{th} row and j^{th} column ($1 \leq j \leq n$).
- The next line contains a positive integer q, which is the number of members of each team participating in the game.
- The next q lines, each containing 4 positive integers x1, y1, x2, y2 with (x1, y1) being the coordinates of the starting cell and (x2, y2) being the coordinates of the destination cell of the corresponding q players.

Output

- Consists of q lines, each line contains a positive integer which is the total lowest score of each player of the team in order corresponding of starting and finishing cells.

Example

Input

4 5

1 2 3 4 5

5 4 3 2 1

2 4 6 8 10

11 9 5 3 7

2

1 1 3 3

1 2 4 5

Output

14

26