Wiring Engineering

Input file:	`standard input`
Output file:	`standard output`
Time limit:	8 seconds
Memory limit:	512 megabytes

On the north side of Bytestreet, there are n buildings standing sequentially one next to the other, labeled by $1, 2, \ldots, n$ from east to west. The coordinate of the i-th building is $(i, 1)$.

On the south side of Bytestreet, there are n communication towers standing sequentially one next to the other, labeled by $1, 2, \ldots, n$ from east to west. The coordinate of the i-th tower is $(i, -1)$.

You are an electrical engineer in Byteland, your job is to design a wiring scheme. A wire can be used to connect a building and a tower. Each connection runs along a straight line. For each pair of building and tower, you can connect at most one wire between them. When you use a wire to connect the i-th building with the j-th tower, you will get $w_{i,j}$ dollars from the owner of the building, and the wire can be regarded as a segment connecting $(i, 1)$ and $(j, -1)$.

Each building can be connected with multiple wires, but you need to pay u_i dollars if you want to connect at least one wire to the i-th building, because you should first install equipment in that place. For the same reason, each tower can be connected with multiple wires, but you also need to pay v_i dollars if you want to connect at least one wire to the i-th tower. What is more, two wires can only intersect at their endpoints, in order to prevent short-circuit.

Unfortunately, it is impossible to install equipment in some places, so they can not be connected with any wire. You will be given q queries, in the i-th query, you will be given four integers a_i, b_i, c_i and d_i, which means you can only install equipment in buildings whose label is in $[a_i, b_i]$, and you can only install equipment in towers whose label is in $[c_i, d_i]$. Your task is to find a wiring scheme to make money optimally. Note that the answer can't be negative because you can choose to do nothing.

Input

The input contains only a single case.

The first line of the input contains two integers n and q ($1 \le n \le 500$, $1 \le q \le 300\,000$), denoting the number of buildings (or towers) and the number of queries.

The second line contains n integers $u_1, u_2, \ldots, u_n$ ($1 \le u_i \le 10\,000$), denoting the cost to install equipment in each building.

The third line contains n integers $v_1, v_2, \ldots, v_n$ ($1 \le v_i \le 10\,000$), denoting the cost to install equipment in each tower.

In the next n lines, the i-th line ($1 \le i \le n$) contains n integers $w_{i,1}, w_{i,2}, \ldots, w_{i,n}$ ($1 \le w_{i,j} \le 10\,000$), describing how much money you can get if you connect the i-th building with the j-th tower.

In the next q lines, the i-th line ($1 \le i \le q$) contains four integers a_i, b_i, c_i and d_i ($1 \le a_i \le b_i \le n$, $1 \le c_i \le d_i \le n$), describing the i-th query.

Output

For each query, print a single line containing an integer, denoting the maximum amount of dollars you can earn.

Example

standard input	standard output
3 4 1 2 1 2 1 2 1 2 3 4 5 6 3 2 1 1 3 1 3 2 3 1 2 1 1 2 3 1 2 2 3	8 5 1 7