

B. Ancient Grid Scanner

Standard I/O | Time Limit: 1.0s | Memory Limit: 512MB

To unlock the core chamber of an alien ruin, the expedition must decode an ancient stone slab modeled as a 2D matrix of N rows and M columns of positive integers. Rows are numbered 1 to N (top to bottom) and columns 1 to M (left to right). A mapat is an axis-aligned square specified by its bottom-right corner cell (i, j) —termed the focal cell—and an integer side length L ($1 \leq L \leq \min(i, j)$). It covers all cells (x, y) where $i - L + 1 \leq x \leq i$ and $j - L + 1 \leq y \leq j$.

The energy value of a mapat is calculated as $S \times \text{cell}(i, j)$, where S is the sum of all elements in the $L \times L$ square. For a fixed row i and fixed side length L ($i \geq L$), let A_j be the energy value of the mapat with focal cell (i, j) for $j \geq L$. A contiguous sequence of mapats along row i is defined by boundaries $[st, dr]$ with $L \leq st \leq dr \leq M$, and its aggregate sum is $A_{st} + A_{st+1} + \dots + A_{dr}$.

You must process q queries of Type 1 and p queries of Type 2:

- Type 1 (L, i, maxVal): Find the maximum length $(dr - st + 1)$ of a contiguous sequence of mapats of length L on row i with aggregate sum $\leq \text{maxVal}$.
- Type 2 ($L, i, \text{minVal}, \text{maxVal}$): Count the number of pairs (st, dr) with $L \leq st \leq dr \leq M$ such that the aggregate sum lies in $[\text{minVal}, \text{maxVal}]$.

Input

The first line contains four integers: N, M, q, p ($1 \leq N, M \leq 1,000$; $1 \leq p + q \leq 8,000$).

The next N lines each contain M integers, describing the matrix (elements ≤ 400).

The next q lines each contain 3 integers: L, i, maxVal (Type 1 queries, $0 < \text{maxVal} < 10^{15}$).

The next p lines each contain 4 integers: $L, i, \text{minVal}, \text{maxVal}$ (Type 2 queries, $0 \leq \text{minVal} < \text{maxVal} < 10^{15}$).

Output

First print q lines: the answer to each Type 1 query in given order. Then print p lines: the answer to each Type 2 query in given order.

Standard Input	Standard Output
4 4 2 0	1
1 3 5 2	3
4 3 1 2	
7 8 1 1	
2 2 3 1	
2 4 20	
1 4 16	