



Romanian Master of Informatics

4th Edition, Bucharest, 20th -23rd October 2016

Tower Defense

You are playing a tower defense game on a grid. Some cells on the grid contain impassable rocks, some contain enemy attackers and some are empty. You may place a single laser tower in an empty cell. When placed, the tower fires laser beams north, south, east and west. The beams travel until they hit a rock or to the end of the grid, destroying all the enemies in their paths. Every enemy you destroy earns you a number of points. Your final score is the total number of points from all the destroyed enemies.

Task

Find the highest possible final score.

Input data

The file **tower.in** contains two integer numbers on the first line, **M** and **N**, representing the numbers of lines and columns in the grid. The second line contains two integers, **R** and **E**, representing the number of rocks and the number of enemies. The following **R** lines contain pairs of integers **l c** denoting the line and column coordinates of a cell containing a rock. The following **E** lines contain triplets of integers **l c s** denoting the coordinates of a cell containing an enemy and the number of points earned for destroying that enemy.

Output data

The file **tower.out** must contain a single number, the highest possible final score.

Limits and constraints

- $1 \leq M, N \leq 1,000,000,000$
- $1 \leq R, E \leq 100,000$
- $1 \leq l \leq M$ and $1 \leq c \leq N$ for all coordinates
- $1 \leq s \leq 10,000$ for all enemy points
- There cannot be multiple objects (rocks or enemies) at the same coordinates.
- Time limit: 0.5 seconds
- Memory limit: 128 MB



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Subtasks

Test cases will be scored **individually**.

Subtask	Percentage of test cases	Additional input constraints
1	10	$M, N \leq 1,000$ $R, E \leq 1,000$
2	20	$R, E \leq 1,000$
3	30	$R, E \leq 30,000$
4	40	none

Example

tower.in	tower.out	Explanation
10 10 3 6 2 3 1 5 6 3 5 2 40 5 5 10 5 6 30 1 3 20 2 5 50 3 3 10	90	Placing the tower at (5, 3) earns 90 points (40 + 10 + 10 + 30). Note that placing the tower at (5, 5) would earn more points; however, the tower must be placed in an empty cell.