

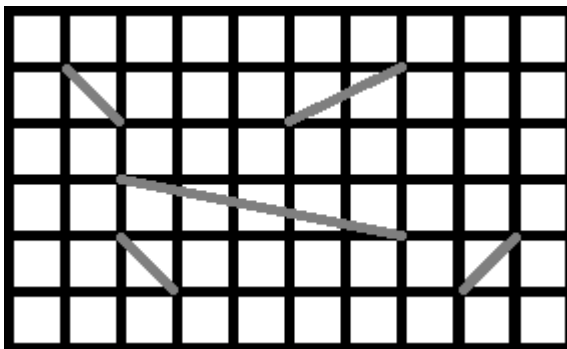
Machine

SEASON 7 – ROUND FOUR



After Lora got bored of her pinball machine, she has now found a completely different game as a replacement. The game on the new machine is as follows:

The inside of the machine is a grid with N rows and M columns (numbered from left to right and from top to bottom, starting the enumeration from 1). Balls are dropped from row 1 and they fall due to gravity. Row number N is the bottom of the machine and that's where each ball ends. In the inside of the machine there are some pieces of wood, which can change the direction of the ball. A sample machine is:



(the figure illustrates the sample test case)

Wooden piece number i is located on row X_i , between columns L_i and R_i inclusively. Furthermore, for each piece we have $right_i=1$ if it will push the ball rightwards (for example the top left piece on the figure) or $right_i=0$ if it will push the ball leftwards (for example the bottom right piece on the figure).

A ball starts in the first row and falls down due to gravity. When the ball reaches a cell that is part of piece i , the ball is then rolled to cell (X_i, L_i-1) if $right_i=0$, or to (X_i, R_i+1) if $right_i=1$, and from there its falling continues straight downwards until it reaches the bottommost row or another wooden piece. **After a ball finishes its movement, all pieces that changed its direction during its fall switch their orientation to the opposite one (i.e, they change their $right_i$ value from 0 to 1 or vice versa).**

It is guaranteed that between any two pieces that are in the same row, there is at least one empty cell, and that the first row, first column, last row and last column do not contain any pieces.

When the ball finishes its fall in cell (N, y) , the player receives W_y points.

In order to test different strategies, Lora needs a helpful program that can simulate the game. Since she is not interested in the internal states of the machine, you are given the starting state of the machine and the sequence of K balls that were dropped. Your program should calculate the final score after all balls are in the last row.

Note: Each ball is dropped only after all previous balls have finished their fall completely.

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Input

The first line of the input file `machine.in` contains the integers **N** and **M** – the amount of rows and the amount of columns in the machine, respectively.

The next row contains a single integer **P** – the amount of wooden pieces.

The next **P** lines each contain the four integers describing a single piece - X_i , L_i , R_i , $right_i$, separated by spaces.

The next line contains **M** space-separated integers – denoting the scores awarded depending on where the ball falls. The i -th value on this line corresponds to W_i .

The next line contains a single integer **K** – the total amount of balls that were dropped.

The last line contains **K** space-separated integers – the numbers of the columns from which the balls were dropped. The balls are listed in the order in which they were dropped.

Output

On a single line in the output file `machine.out` print a single integer – the total score after all balls have fallen in the last row.

Constraints

$$3 \leq N, M \leq 100\,000$$

$$0 \leq P \leq 100\,000$$

$$2 \leq X_i \leq N-1$$

$$2 \leq L_i \leq R_i \leq M-1$$

$$right_i = 1 \text{ or } right_i = 0$$

$$0 \leq W_i \leq 1\,000\,000\,000$$

$$0 \leq K \leq 100\,000$$

Time limit: 2 cek

Memory limit: 256 MB

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Sample test

Input (machine.in)	Output (machine.out)
6 10 5 2 2 2 1 2 6 7 0 4 3 7 1 5 3 3 1 5 9 9 0 1 2 3 4 5 5 4 3 2 1 4 2 6 1 3	9

Clarifications

The first ball finishes in column 8 and scores 3 points. The second ball finishes in column 2 (since the piece in row 4 has changed its orientation after the first ball) and scores 2 points. The third ball does not touch any pieces and falls directly in column 1 – scoring 1 point. The last ball falls in column 8 again, scoring 3 points, since the piece on row 4 has now changed its orientations twice in total (once after the first ball and once after the second). The total score is therefore $3+2+1+3=9$