Problem L
Trace of Product of Sparse Square Matrices

Alice was bored in her linear algebra class. She asked her teacher why they were learning any of this. Does linear algebra have *any* real world use whatsoever?

The teacher thought for a few minutes, and eventually came up with this scenario.

Suppose that a genie appears to you and says he will grant you *three wishes* if you can compute the trace of the product of two sparse square matrices A and B with integer entries (modulo 1006903069).

First, you will say, "I wish I remembered how matrix notation works!" and the genie will say that A and B are $n \times n$ grids of numbers. In A, we let $a_{i,j}$ denote the element in the ith row from the top and jth column from the left. The elements of B are similarly indexed $b_{i,j}$. The matrices are sparse, meaning (informally) that they only have a few nonzero entries, relative to their size.

Next, you will say, "That is great, but now I wish I remembered how to do matrix multiplication!" and the genie will remind you that the product AB is another $n \times n$ matrix C, whose elements $c_{i,j}$ are computed using the following formula:

$$c_{i,j} = \sum_{k=1}^{n} a_{i,k} b_{k,j}.$$

Finally, you will say, "Okay, but now I really wish I remembered what the trace was!" and the genie will remind you that the trace of a matrix C is equal to the sum of the elements along its main diagonal, i.e.

$$\mathrm{tr}(C) = \sum_{t=1}^{n} c_{t,t}.$$

Note that if all the entries of A and B are integers, then $\mathrm{tr}(AB)$ is an integer as well.

The genie points out that he now owes you -3 wishes, since he granted you three wishes which have yet to be paid for. Each wish was valued at PHP 6,264,067.84 at time of granting, with an additional 30% interest for each day it is not paid.

You dummy! You landed yourself in debt with a genie all because you didn't pay attention in linear algebra class! Your only way out of this mess is to compute $\mathrm{tr}(AB) \pmod{1006903069}$ and collect the original three wishes promised by the genie.

Alice's teacher apologized and said that he tried really hard, but this was truly the *only* real world application of linear algebra that he could come up with.

But it's good enough for Alice, who now desperately wants to solve this problem!

Input Format

The matrices are sparse, so they will be encoded by specifying the locations and values of their nonzero entries. Formally, the matrix A is encoded as follows:

- You are given k_a triples (i, j, x), meaning $a_{i,j} := x$.
- All given (i, j) index pairs are distinct, and all other elements of A not explicitly mentioned in the input are implicitly equal to 0.

The matrix B is encoded similarly, with its k_b nonzero entries explicitly enumerated.

The first line of input contains a single integer n, the size of the matrices.

This is followed by a line containing an integer k_a. Then, k_a lines follow, each describing a nonzero entry in A. Each line contains three space-separated integers i and j and x, meaning $a_{i,j} := x$. If some (i, j) is **not** mentioned in the input, then $a_{i,j} := 0$.

This is followed by a line containing an integer k_b. Then, k_b lines follow, each describing a nonzero entry in B. Each line contains three space-separated integers i and j and x, meaning $b_{i,j} := x$. If some (i, j) is **not** mentioned in the input, then $b_{i,j} := 0$.

Output Format

Output a single line, containing the value of $\operatorname{tr}(AB) \pmod{1006903069}$.

Constraints

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$3 \le n \le 10^5$ $1 \le k_a, k_b \le 1.5 \times n$ $1 \le i, j \le n$ and $1 \le x \le 10^9$ in each description. The (i, j) pairs are distinct across all descriptions for A, and similarly for B.

Sample I/O

Input	Output
3 4 2 1 6 2 3 6 3 1 4 3 2 3 4 1 1 2 1 3 3 2 3 3 3 2 1	27

Explanation

You can verify from the definitions that

$$\operatorname{tr}\left(\begin{bmatrix}0 & 0 & 0\\ 6 & 0 & 6\\ 4 & 3 & 0\end{bmatrix}\begin{bmatrix}2 & 0 & 3\\ 0 & 0 & 3\\ 0 & 1 & 0\end{bmatrix}\right) = \operatorname{tr}\left(\begin{bmatrix}0 & 0 & 0\\ 12 & 6 & 18\\ 8 & 0 & 21\end{bmatrix}\right) = 0 + 6 + 21 = 27.$$