Cute Matrix - Small

Assignment 4
Data Structures and Algorithms

Problem Statement: Cute matrices are such matrices which obey :

- A Cute matrix can only be of dimensions $N * M$, where $N, M \geq 2$.

- The xor of the of 4 corner cell elements equals 0.

- A matrix is Cute only if it's all sub-matrices of dimensions $p * q$ $(2 \leq p \leq N, 2 \leq q \leq M)$ are all Cute.

Given a matrix of dimensions $N * M$ with only K cells filled . You are required to fill rest of the cells . You know that matrix can take in values only in the range $(0, 2^{30} - 1)$. Figure out how many different ways can you fill in the matrix completely to make the matrix a Cute one.

Input
First line contains three integers N, M and K.
Next K lines contains description of cells.
$i - th$ of the next K lines contains 3 integers i, j, v. which means cell (i, j) contains value v.
Output
Print the number of ways can you fill in the matrix completely to make the matrix a Cute one. Answer modulo $1e9 + 7$.
Constraints
$2 \leq N, M \leq 10^3$
$1 \leq K < N * M$
$0 \leq v < 2^{30}$
$1 \leq i \leq N$
$1 \leq j \leq M$

Time Limit: 2 seconds
Memory Limit: 256 MB

Sample Test Case

Input	Output
2 2 3 1 2 4 2 2 7 2 1 3	1

Input	Output
3 3 2 1 3 4 2 3 4	560523804

Input	Output
3 3 4	73741817
1 1 5	
1 3 7	
2 2 4	
2 3 6	

Explanation

The 3 cells in the matrix in $1st$ sample above cause the only remaining cell $(1, 1)$ to be filled in one way to have a Cute matrix , i.e., value $3 \ xor \ 4 \ xor \ 7 = 0$.