Trees

SEASON 8 – FOURTH ROUND

The task of writing the statement of this problem was given to Fermat, but he decided that this page is to narrow to contain the fabula, so you will be given the mathematical version.

We have a complete undirected graph with N vertices. We want to know how many spanning trees it has (modulo $10^9 + 7$), but we have fixed some of the edges to necessarily be part of the covering trees we are counting. In fact, we have Q queries, each of which is either fixing a new edge to be necessarily included or removing (from the list of mandatory edges) some already included edge.

Input

From the first line of the file `trees.in` two numbers N and Q are inputted – the number of vertices and the number of queries. From the next Q lines three numbers per line are inputted – the type of the query (1 – adding, 2 – removing) and the two vertices that the given edge connects.

Output

In the output file `trees.out` print Q numbers – the number of spanning trees, which include all of the added mandatory edges after the given query.

Constraints

$1 \leq N, Q \leq 5 \times 10^4$

The list of added edges will never contain cycles.

Time limit: 2.5 sec

Memory limit: 256 MB

Sample tests

Input (trees.in)	Output (trees.out)	Input (trees.in)	Output (trees.out)
3 4 1 1 2 1 2 3 2 2 1 1 1 3	2 1 2 1	4 4 1 1 2 1 3 4 1 2 3 2 1 2	8 4 1 3