Problem J. Diameter Pair Sum

Input file:	*standard input*
Output file:	*standard output*
Time limit:	5 seconds
Memory limit:	1024 mebibytes

For an unweighted tree T, a simple path P is a *diameter* if there is no simple path longer than it. Two paths are different if some vertex is in one path but not the other.

Consider a set of paths D_T where $P \in D_T$ if and only if P is a diameter. Given two paths D and E, let $f(D, E)$ be the number of vertices that belong to both D and E.

You are given an undirected forest (a graph with no cycles) with N vertices and M edges. Process Q queries of the following form:

- "`1` x y": Connect two vertices x and y with an edge ($1 \le x, y \le N$). It is guaranteed that there is no path between x and y at the time of the query.
- "`2` x y": Remove an edge between two vertices x and y ($1 \le x, y \le N$). It is guaranteed that such an edge exists at the time of the query.
- "`3` x": Let F be the connected component containing the vertex x. Output the value $\sum_{D \in D_F} \sum_{E \in D_F} f(D, E)$ modulo $10^9 + 7$ ($1 \le x \le N$).

Input

The first line of the input consists of three integers N, M, and Q ($2 \le N \le 100\,000$, $0 \le M \le N - 1$, $1 \le Q \le 100\,000$).

Each of the next M lines consists of two integers x and y denoting an edge connecting vertices x and y ($1 \le x, y \le N$, $x \ne y$). It is guaranteed that there are no cycles in the given graph.

Each of the next Q lines contains a query in the form described above.

Output

For each query of type 3, output the answer modulo $10^9 + 7$.

Example

standard input	*standard output*
7 5 5 1 2 1 3 2 4 2 5 3 6 3 1 1 3 7 3 1 2 2 1 3 1	18 64 21