Graph Queries

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✔ **Points:** 100 (partial)
🕐 **Time limit:** 1.0s
☰ **Memory limit:** 128M

⌄ **Allowed languages**
  C, C++

Introduction:

In this problem, you are tasked with implementing a program to manipulate a **undirected** graph based on a series of queries. The queries involve inserting and deleting edges between vertices of the graph, as well as determining whether an edge exists between specified vertices.

Formal Statement:

You are given two integers n and q, denoting the number of vertices in the **undirected** graph and the total number of queries, respectively. The graph initially contains n vertices with no edges.

The queries are of the following types:

1. `INSERT`i j: Insert an edge between vertex i and vertex j if it does not exist.
2. `DELETE`i j: Delete the edge between vertex i and vertex j, if it exists. Print -1 if there is no such edge.
3. `EXIST_{P}ATH`i j: Print 1 if there exists a **path of length 2 or lesser** between vertex i and vertex j, otherwise print 0.

Input Format:

- The first line contains two space-separated integers n and q.
- Following are q lines, each containing a query of one of the aforementioned types.

Output Format:

- For each query of type `DELETE`i j, print -1 if there is no edge between vertex i and vertex j. For queries of type `EXIST_{P}ATH`i j, print 1 if there is a path of length 2 or lower, otherwise print 0.

Example:

Input:

```
INSERT 0 1
INSERT 1 2
EXIST_PATH 0 2
EXIST_PATH 0 1
DELETE 1 2
DELETE 3 2
EXIST_PATH 0 2
```

Output:

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```
1
1
-1
0
```

Explanation

1. We first insert an edge between 0 and 1. (No output.)
2. We insert an edge between 1 and 2. (No output.)
3. EXIST_PATH query is true, so print 1. (There is a path from 0 to 2 of length 2. (the vertex 1 connects them.))
4. EXIST_PATH query is again true. so print 1. (There is a path from 0 to 1 of length 1. (Just the edge.))
5. We delete the edge between 1 and 2. (No output.)
6. There is no edge between 3 and 2. So, we print -1.
7. There is no longer a path between 0 and 2. So, we print 0.

Constraints:

- $1 \le n \le 5 \times 10^2$
- $1 \le q \le 5 \times 10^5$

Note:

- The vertices are 0 indexed.
- The graph is undirected.
- The INSERT query requires **no output**.
- The DELETE query requires an output (-1) if and only if it is asked to **delete a non-existent edge**.

❓ Clarifications

Request clarification

No clarifications have been made at this time.