# IOITC 2015 Finals, Day 3

## Graph Coloring

You are given a bipartite graph $G = (V, E)$. $V = \{1, 2, .., N\}$.

A subset $S \subseteq V$ is initially colored with two colors, $A$ and $B$. Updates are of the form "0 $u$ $A$", "0 $u$ $B$" or "0 $u$ $U$", which refer to "Color the vertex $u$ with $A$", "Color the vertex $u$ with $B$" and "Un-color vertex $u$" respectively. You also get updates of the form "1 $u$ $v$" which means that you should add the bidirectional edge $(u, v)$ to the graph. You are guaranteed that even after adding the edges, the graph remains bipartite. You get queries of the form "2" for which you have to report the number of ways in which you can color all the currently uncolored vertices such that no edge in $G$ has both end points with the same color. Output '0' if the current partial coloring cannot be extended fully to satisfy the condition. Output the answer modulo $10^9 + 7$.

There will be no self-loops, and no multiple edges between any pair of vertices. $u$ will be colored when a "0 $u$ $U$" update is made.

Note: A graph is called bipartite, if it's vertex set can be partitioned into two subsets $S_1$, $S_2$ such that $S_1 \cup S_2 = V$, $S_1 \cap S_2$ is empty, and there are no edges with both end points in the same subset. ie. all edges go between $S_1$ and $S_2$.

### Input

First line contains $N, M, Q, k_1$ and $k_2$. These are the number of vertices, number of initial edges, number of queries, number of vertices colored $A$ initially and number of vertices colored $B$ initially respectively.
The second line contains $k_1$ space separated vertices, denoting the vertices colored $A$ initially.
The third line contains $k_2$ space separated vertices, denoting the vertices colored $B$ initially.
$M$ lines follow, each line having 2 space separated integers "$u$ $v$" denoting that there is an edge between $u$ and $v$.
$Q$ lines follow, each line in the format as described above. ("0 $u$ $A$", "0 $u$ $B$", "0 $u$ $U$", "1 $u$ $v$" or "2")

### Output

For each query of the form "2", output a single integer answering the query.

### Test Data

For all test cases, $2 \leq N$, $0 \leq M$ and $1 \leq Q$

**Subtask 1 (10 Points)**: $N, M, Q \leq 10^3$

**Subtask 2 (90 Points)**: $N, M, Q \leq 10^5$.

#### Sample Input

```
6 3 6 2 1
1 3
5
1 5
5 3
3 6
2
0 5 A
```

2
0 5 U
1 4 5
2

**Sample Output**

4
0
2

## Limits

Time: 1 second

Memory: 256 MB