# **Brokers' predictions**



There are n stocks on the market numbered from 1 to n. Initially, you don't know anything about these stocks, so initially the set of information you know about them is empty. This empty set is denoted by integer 0.

Sequentially, q events are going to happen. The t-th event happens at time t, and the first event happens at time t. Each event is either receiving a broker's prediction or a request asking for computing the number of possible market scenarios.

The event of type 1 is a broker's prediction. If it happens at time t, it is denoted by 3 variables:  $p_t, s_i, s_j$  and means that this broker predicts that stocks  $s_i$  and  $s_j$  have a positive correlation, and this prediction is added to the set  $p_t$ . Such an event creates a new set of preditions denoted with integer t. A positive correlation between  $s_i$  and  $s_j$  means that if price of one of them is increasing, then the price of the other one is also increasing. and similarly, if price of one of them is decreasing, then the price of the other one is also decreasing.

The event of type 2 is a request event. If it happens at time t, it contains a predictions' set identifier  $p_t$  and  $k_t$  stocks identifiers forming a set  $S = \{s_1, s_2, \ldots, s_k\}$ . Such a requests asks for the number of market scenarios involving stocks in S and not contradicting with predictions given in  $p_t$ . More specifically, each stock's price can be either increasing or decreasing. The requests asks for the number of ways to declare each stock from S as either increasing or decreasing in such a way that it's still possible to declare all remaining n-k stocks as increasing or decreasing and there is no contradiction with predictions given in  $p_t$ . A contradiction occurs if the correlation between two stocks is positive, but one stock is increasing while the other is decreasing. Since the number of different such scenarios can be large, calculate it modulo  $10^9+7$ .

## **Input Format**

In the first line, there are two space-separated integers n and q. After that, q lines follow. The t-th of them starts with a single integer  $event_t$  denotes the type of the event, and it's either 1 or 2, denoting respectively a prediction event and a request event. If the event type is prediction, then 3 space-separated values  $p_t$ ,  $s_i$ ,  $s_j$  follow. If the event type is request, then first two space-separated integers  $p_t$  and  $k_t$  follow. After that, there are  $k_t$  space-separated integers given in the same line, denoting the stocks identifiers connected to that request.

#### **Constraints**

- $1 < n < 4 \cdot 10^5$
- $1 \le q \le 4 \cdot 10^5$
- $1 < k_t$
- ullet sum over  $k_t$  over all events doesn't exceed  $4\cdot 10^5$
- $0 \le p_t < t$  and it's guaranteed that set  $p_t$  exists
- $1 \leq s_i, s_i \leq n$
- $event_t \in \{1, 2\}$

## **Output Format**

For each request event, print the answer for that request in a single line.

#### Sample Input 0

```
45
1012
20212
21221
1123
243123
```

## Sample Output 0

```
4
2
2
```

## **Explanation 0**

There are 4 stocks and 5 events.

At time 1 the first event happens. It adds a prediction that stocks 1 and 2 are positively correlated to the set of predictions denoted by 0, i.e. the empty initial set of predictions. This creates the new set of predictions denoted by 1 containing only a single prediction - the one just added.

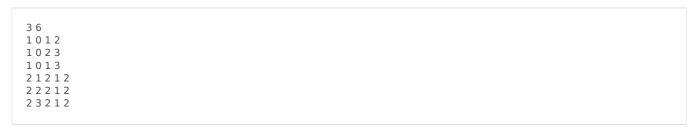
Next, at time 2 the request event comes. It asks how many different market scenarios are there for stocks 1 and 2 so that there is no contradiction with any prediction from the set denoted by 0. Since this set is empty, either of these two stocks can be either increasing or decreasing, so there are 4 market scenarios.

After that, at time 3, the next request comes. It asks for the number of market scenarios for stocks 2 and 1 without a contradiction with the set of predictions denoted by 1. This set contains a single prediction that stocks 1 and 2 are positively correlated. It means that either both of them have to be increasing or both have to be decreasing, thus there are 2 possible scenarios.

Then, at time  $\bf 4$  a prediction event comes. It adds a prediction that stocks  $\bf 2$  and  $\bf 3$  are positively correlated to the set of predictions denoted by  $\bf 1$ . This results in a new set of predictions, denoted by  $\bf 4$ , and containing two predictions: stock  $\bf 1$  and  $\bf 2$  are correlated, and stocks  $\bf 2$  and  $\bf 3$  are correlated.

Finally, at time  $\mathbf{5}$ , a request even comes. It asks for the number of market scenarios for stocks  $\mathbf{1}, \mathbf{2}$ , and  $\mathbf{3}$  not contradicting with the set of predictions denoted by  $\mathbf{4}$ , so the last one that was created. There are only two valid such market scenarios: either all  $\mathbf{3}$  of these stocks are increasing, or all of them are decreasing. Every other scenario is contradicting with this set, so the answer is  $\mathbf{2}$ .

# Sample Input 1



#### **Sample Output 1**

