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 1. 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 decresing 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

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

Output Format

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

Sample Input 0

```
4 5
1 0 1 2
2 0 2 1 2
2 1 2 2 1
1 1 2 3
2 4 3 1 2 3
```

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

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

Sample Input 1

```
3 6
1 0 1 2
1 0 2 3
1 0 1 3
2 1 2 1 2
2 2 2 1 2
2 3 2 1 2
```

Sample Output 1

```
2
4
4
```