# Problem F. Flip

| | |
|---|---|
| Input file: | *standard input* |
| Output file: | *standard output* |
| Time limit: | 10 seconds |
| Memory limit: | 512 mebibytes |

Assuming people numbered from 1 to $2n$ are assigned to two teams of size $n$ using the following non-deterministic procedure, find the probability that all people from the set $A^i = \{a^i_1, a^i_2, \ldots, a^i_{k_i}\}$ end up on the same team, for each of the given sets $A^1, A^2, \ldots, A^m$, and display it modulo 998 244 353:

- in order from 1 to $2n$, each person flips a fair coin;
- if the coin lands heads up, the person joins the first team unless that team already has $n$ people, in which case the person joins the second team;
- similarly, if the coin lands tails up, the person joins the second team unless that team already has $n$ people, in which case the person joins the first team.

## Input

The first line contains two integers $n$ and $m$ ($2 \le n \le 10^5$; $1 \le m \le 10^5$).

The $i$-th of the next $m$ lines describes set $A^i$ and contains an integer $k_i$ ($2 \le k_i \le n$), followed by $k_i$ integers $a^i_1, a^i_2, \ldots, a^i_{k_i}$ ($1 \le a^i_1 < a^i_2 < \ldots < a^i_{k_i} \le 2n$).

The sum of $k_i$ does not exceed $2 \cdot 10^5$.

## Output

For each $i$ from 1 to $m$, display the probability that all people from the set $A^i$ end up on the same team.

It can be shown that any sought probability can be represented as an irreducible fraction $\frac{p}{q}$ such that $q \not\equiv 0 \pmod{998\,244\,353}$. Then, there exists a unique integer $r$ such that $r \cdot q \equiv p \pmod{998\,244\,353}$ and $0 \le r < 998\,244\,353$, so display this $r$.

## Examples

| standard input | standard output |
|---|---|
| 2 6<br>2 1 2<br>2 1 3<br>2 1 4<br>2 2 3<br>2 2 4<br>2 3 4 | 499122177<br>748683265<br>748683265<br>748683265<br>748683265<br>499122177 |
| 3 5<br>3 2 3 5<br>2 2 4<br>2 5 6<br>3 1 4 6<br>2 2 5 | 935854081<br>623902721<br>374341633<br>935854081<br>686292993 |

## Note

In the first test case, people 1 and 2 (and people 3 and 4) end up on the same team with probability $\frac{1}{2}$. For any other pair the probability is $\frac{1}{4}$.