

Problem

Alternative Accounts 2

Time limit: 3 seconds

Everybody knows that zh0ukangyang = orzdevinwang.

In the year 6202, when nobody wants to do Universal Cup anymore, Little Cyan Fish decided to host the International Olympiad in Fishing. There are n people interested in joining this event, but... well, they are not following the single-account rule: each contestant has registered two different accounts!

This is terrible, but fortunately they are all very nice people and would never use multiple accounts to cheat. Each contestant follows this strategy: at any moment, they will always participate using the worse-ranked one of their two accounts. That is, if a contestant has two accounts ranked x and y , they will use the account ranked $\max(x, y)$ in the next contest.

Let p_i denote the account currently ranked i , and label the accounts from 1 to $2n$ according to their initial ranks (so $p_i = i$ at the beginning). Then, in each of the next m contests, exactly one contestant participates. Specifically, in contest i ($1 \leq i \leq m$), the account currently ranked k_i ($k_i \geq 2$) participates and moves up by exactly one rank (that is, p_{k_i} and p_{k_i-1} are swapped after the contest).

Little Cyan Fish wants to figure out which accounts belong to the same player. He notices that the contestants' strategy reveals some information about the account holders. Help him compute the number of possible ways to pair the $2n$ accounts into n contestants, consistent with the contest history. Since the answer can be huge, output it modulo 998 244 353.

Input

The first line of the input contains two integers n and m ($1 \leq n, m \leq 5\,000$), indicating the number of players and the number of events.

The next m lines each contain an integer k_i ($2 \leq k_i \leq 2n$), denoting that in the i -th event, the account currently ranked k_i played a game.

Output

Output a single line contains a single integer, indicating the number of possible account matchings modulo 998 244 353.

Sample Input 1

1 1
2

Sample Output 1

1

Sample Input 2

2 2
2
3

Sample Output 2

0

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