NOI '19 P5 - Landlords

Time limit: 1.0s **Memory limit:** 512M

Kevin is playing cards and now he needs to shuffle cards m times. Now let's describe the rule of the i^{th} shuffle.

For the i^{th} shuffle:

1. Kevin will take out A_i cards from the top and make it a new pile. Now there are two piles of cards. One is the original top A_i cards and the other is the remaining $n - A_i$ cards. The relative order in these two piles remains unchanged. Note that when A_i is n or 0, there is one pile which has no card at all.
2. Now let's merge those two piles of cards into a new pile. Suppose the first pile has X cards and the second pile has Y cards. With probability $\frac{X}{X+Y}$, we select the bottom card of the first pile and put the selected card to the top of the new pile. Then, with probability $\frac{Y}{X+Y}$, we select the bottom card of the second pile and then put the selected card to the top of the new pile.
3. Repeat 2 until both piles are empty.

Now we have Q questions for you. You have to tell us after m times of shuffles, what's the expected score of some specific positions' card. Note that for card i, let's denote its score as $f(i)$. In this problem, $f(i)$ equals either i or i^2.

Input Specification

The first line contains three integers $n, m, type$. When $type = 1$, $f(i) = i$. When $type = 2$, $f(i) = i^2$.

The following line contains m integers $A_1, \ldots, A_m$.

The following line contains an integer Q.

In the following Q lines, each line contains an integer c_i $(1 \leq c_i \leq n)$, indicating that Kevin wants to know the expected score of the c_i position from the top.

Constraints

For all test cases, $3 \leq n \leq 10^7$, $1 \leq m, Q \leq 5 \times 10^5$, $0 \leq A_i \leq n$, $type \in \{1, 2\}$.

Test Case	n	m	Type	Additional Constraints
1	≤ 10	≤ 1	1	None
2	≤ 80	≤ 80		
3			2	

4	≤ 100	$\leq 5 \times 10^5$		All A_i are equal
5	$\leq 10^7$		1	None
6				
7				
8			2	
9				
10				

Output Specification

For each query, output a single integer on a single line as the answer. If the answer is $\frac{A}{B}$, please print C $(0 \leq C < 998\,244\,353)$ where $A \equiv C \times B \pmod{998\,244\,353}$.

Sample Input 1

```
4 1 1
3
1
1
```

Sample Output 1

```
249561090
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