

Bases

SEASON 8 – FOURTH ROUND



Thanks to your help two months ago, the ant Ranycom managed to efficiently cross the room. After looking through your solutions, she got really interested in mathematics and started studying it. Now she is learning about different numeral systems and their bases. She knows that, if a number $\dots a_3 a_2 a_1 a_0$ is written in base N , it is equal to:

$$a_0 + a_1 \times N + a_2 \times N^2 + a_3 \times N^3 + \dots$$

She also knows that in base N the possible values of the digits are from 0 to $N - 1$, but is wondering what would happen, if she ignores this second rule. For example, if we use binary but with the digits 0, 1 and 2. Then the number 2 can be written both like 10 and like 2 (You can use the formula above to make sure that this truly is the case). So, Ranycom wondered for a given number A in how many ways it can be written with no leading zeroes (if there is even such a digit).

Help Ranycom by writing a program that by a given base and a set of values of digits (with no repeats) answers a set of queries.

Input

From the first line of the file `bases.in` two numbers N and K are inputted – the base and the number of digits. From the next line K numbers $D_1, D_2, \dots, D_K$ are inputted – the values of the digits. From the next line one number Q is inputted – the number of queries. From the next line Q numbers $A_1, A_2, \dots, A_Q$ are inputted – the queries.

Output

In the output file `bases.out` print Q numbers on a single line – the answers to the queries one after another. Because the answers can be very large, print their remainder when dividing by $10^9 + 7$.

Constraints

$$\begin{aligned} 2 &\leq N \leq 20 \\ 1 &\leq K \leq 25 \times N \\ 1 &\leq Q \leq 10^4 \\ 0 &\leq D_i \leq 10^6 \\ 1 &\leq A_i \leq 10^6 \end{aligned}$$

Time limit: 1.5 sec

Memory limit: 256 MB

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Sample test

Input (bases.in)	Output (bases.out)	Input (bases.in)	Output (bases.out)
2 3 0 1 2 5 3 4 5 6 7	1 3 2 3 1	3 3 1 3 4 5 1 2 3 4 7	1 0 1 2 1

Explanation of sample test 1

3 – 11
4 – 100, 20, 12
5 – 101, 21
6 – 110, 102, 22
7 – 111

Explanation of sample test 2

1 – 1
2 has no way of being written
3 – 3
4 – 11, 4
7 – 14