Project Euler #172: Investigating numbers with few repeated digits

This problem is a programming version of Problem 172 from projecteuler.net

How many k-digit numbers n (without leading zeroes) are there such that no digit occurs more than m times in n? Output the answer modulo $10^9 + 7$.

Input Format

The first line of input contains two integers m and t. Here, t is the number of queries. The following t lines contain an integer k each.
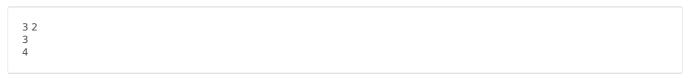
Constraints

- $1 \le m \le 10^5$
- $1 \le t \le 10^5$
- $1 \le k \le \min(10 \times m, 10^5)$

Output Format

For each query, print the integer which is the answer to the problem modulo $10^9 + 7$.

Sample Input 0

```
3 2
3
4
```

Sample Output 0

```
900
8991
```

Explanation 0

For the first query, each 3-digit number is valid. For the second query, each 4-digit number except for 1111, 2222, 3333, 4444, 5555, 6666, 7777, 8888, and 9999 is valid.