Fibonacci Power Sum

The fibonacci series is defined as below:

fib(0) = 0, fib(1) = 1

fib(n) = fib(n-1) + fib(n-2) for n > 1

Given three integers **N**, **C** and **K**, find the summation of the following series:

fib(0*C)^K + fib(1*C)^K + fib(2*C)^K + fib(3*C)^K + … + fib(N*C)^K

Since the answer can be huge, output it modulo **1000000007**

Input

The first line contains an integer **T**, denoting the number of test cases. Each test case contains three space separated integers in the order: **N**, **C** and **K**.

Constraints

- $1 \le T \le 100$
- $0 \le N \le 10^{15}$
- $1 \le C, K \le 10$

Output

For each test case, output a single line in the format *"Case X: Y"* without the quotes. Here, **X** is the case number and **Y** is the desired answer denoting the sum of the series.

Example

Input:

```
5
10 1 1
5 2 2
3 3 4
1000000007 7 9
996969696969696 9 6
```

Output:

```
Case 1: 143
Case 2: 3540
Case 3: 1340448
Case 4: 880410497
Case 5: 689328397
```

Challenge

Try the harder version here:

liouzhou_101 - FIBPSUM2