DMOPC '20 Contest 1 P4 - Victor Makes Bank

Time limit: 2.0s   **Memory limit:** 64M

> Forget school, I wanna farm horseshoe crabs ~ Victor, 2019

Victor, deciding that school is dumb and boring, decides to farm horseshoe crabs. After he has bred enough crabs, he sells them to the highest bidder—babies at **one thousand** dollars each, and adults at **two thousand** dollars each.

At the end of every month, each adult crab in Victor's care gives birth to K babies (this crab species is capable of [parthenogenesis](#), so all the crabs are female and can give birth without mating). A baby crab takes T months to grow to adulthood.

If Victor starts with C adult crabs at the beginning of the first month, and sells all his crabs (babies **and** adults) in the middle of the N-th month, how many **thousands of dollars** will he make? Since this number may be very large, please output it modulo $10^9 + 7$.

Constraints

$1 \leq K, C \leq 10^9$
$1 \leq T \leq 100$

Subtask 1 [15%]

$1 \leq N \leq 10^6$

Subtask 2 [85%]

$1 \leq N \leq 10^{18}$

Input Specification

4 space-separated integers, N, K, T, and C.

Output Specification

The amount of money (in thousands of dollars) made from selling all the crabs in the middle of the N-th month, mod $10^9 + 7$.

Sample Input 1

```
4 2 1 1
```

Sample Output 1

```
16
```

Explanation of Sample 1

The number of crabs in Victor's tank at the beginning of every month is as follows:

Month	# of Adults	# of Babies
1	1	0
2	1	2
3	3	2
4	5	6

Victor can then sell the adult crabs for 10 thousand dollars and the baby crabs for 6 thousand dollars, for a total of 16 thousand dollars.

Sample Input 2

```
8 1 3 2
```

Sample Output 2

```
38
```