Problem F
Fibonacci Power

Time Limit: 2 seconds
Memory Limit: 512 megabytes

In the heart of an ancient forest, adventurer **Minh the Sorcerer** embarked on a quest of solving enigmatic puzzles. A family heirloom journal unveiled a cryptic message: a hidden treasure guarded by mathematical riddles tied to the Fibonacci sequence.

To recap, Fibonacci numbers are defined as follows:

- $F(0) = 0$
- $F(1) = 1$
- $F(i) = F(i-2) + F(i-1)$ for all $i \geq 2$.

To unlock the treasure, Minh should quickly calculate the sum S of the first n Fibonacci numbers raised to the power of k.

Formally:

$$S = \sum_{i=1}^{n} F(i)^k$$

Given n and k ($1 \leq n \leq 10^{18}, 1 \leq k \leq 10^6$), help Minh calculate S modulo 998244353.

Input

The input contains two integers n and k ($1 \leq n \leq 10^{18}, 1 \leq k \leq 10^6$).

Output

You should print the value S modulo 998244353.

Sample Input	Sample Output	Explanation
3 2	6	$F(1)^2 + F(2)^2 + F(3)^2$ $= 1^2 + 1^2 + 2^2$ $= 6$
5 1	12	$F(1)^1 + F(2)^1 + F(3)^1 + F(4)^1 + F(5)^1$ $= 1^1 + 1^1 + 2^1 + 3^1 + 5^1$ $= 12$
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