C. Yet Another Number Sequence

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Everyone knows what the Fibonacci sequence is. This sequence can be defined by the recurrence relation:

$$F_1 = 1, F_2 = 2, F_i = F_{i-1} + F_{i-2} \ (i > 2).$$

We'll define a new number sequence $A_i(k)$ by the formula:

$$A_i(k) = F_i \times i^k \ (i \geq 1).$$

In this problem, your task is to calculate the following sum: $A_1(k) + A_2(k) + ... + A_n(k)$. The answer can be very large, so print it modulo $1000000007 \ (10^9 + 7)$.

Input

The first line contains two space-separated integers $n, k \ (1 \leq n \leq 10^{17}; 1 \leq k \leq 40)$.

Output

Print a single integer — the sum of the first n elements of the sequence $A_i(k)$ modulo $1000000007 \ (10^9 + 7)$.

Examples

input
1 1
output
1

input
4 1
output
34

input
5 2
output
316

input
7 4
output
73825