

Recursion [III]

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

points: 100 · problem code: recursion3 · author: glipR

We introduce a new recursive sequence, which satisfies:

$$\begin{cases} H(0) = 0 \\ H(n) = 4 \times H(n-1) + \sum_{i=1}^{n-1} ((n-i)^2 \times F(i-1)) \end{cases} n \geq 1$$

Where $F(n)$ is the n th fibonacci number, following the previous definition.

For example, $H(0), H(1), H(2), H(3), H(4)$ can be written as 0, 0, 1, 9, 51

In this question, you must compute $H(n)$ for some value n . Since the value may be quite large, output your answer modulo $10^9 + 7$.

Input

Input will contain a single integer n

Output

Output should contain a single integer, representing $H(n) \bmod 10^9 + 7$.

Constraints

- $0 \leq n \leq 10^{18}$

Example

Input

5

Output

240