Problem F. Fibonacci's Nightmare

Input file:	`fibonacci.in`
Output file:	`fibonacci.out`
Time limit:	2 seconds
Memory limit:	256 mebibytes

Define a *random linear recursive sequence (RLRS)* as a sequence of random variables $a_0, a_1, \ldots$ which is generated as follows. First, $a_0 = 1$. Then, for every n starting from 1, choose integers i and j independently and equiprobably from $[0;\ n-1]$, and set $a_n = a_i + a_j$ (note that at this moment, the values of $a_0, \ldots, a_{n-1}$ are already determined).

For example, $a_1 = a_0 + a_0 = 2$, and a_2 is equally likely to be $a_0 + a_0$, $a_0 + a_1$, $a_1 + a_0$ and $a_1 + a_1$, thus it has 25% probability to be 2, 50% to be 3 and 25% to be 4. After that, a_3 is equiprobably chosen from $a_0 + a_0$, $a_0 + a_1$, $a_0 + a_2$, $a_1 + a_0$, $a_1 + a_1$, $a_1 + a_2$, $a_2 + a_0$, $a_2 + a_1$, $a_2 + a_2$; and so on.

You are to determine the variance of n-th term of RLRS.

The *variance* of a random variable X is defined as $\mathbf{Var}(X) = \mathbf{E}(X - \mathbf{E}(X))^2$ (here $\mathbf{E}(X)$ means *expectation* or *mean value* of the random variable X).

Input

The first line of input contains the integer n ($0 \le n \le 10^6$).

Output

Let the variance of a_n be a rational number equal to U/V when cancelled to lowest terms (that is, U and V are integers, $V > 0$ and the greatest common divisor of U and V is 1). Output the number $X = (U \cdot V^{-1}) \bmod (10^9 + 7)$. That is, X should satisfy the congruence $VX \equiv U$ modulo $(10^9 + 7)$. It is guaranteed that such X exists and is the only root of this equation with $0 \le X < 10^9 + 7$.

Examples

fibonacci.in	fibonacci.out
1	0
2	500000004
5	305555565

Note

a_1 is always equal to 2, so $\mathbf{Var}(a_1) = 0$.

$\mathbf{Var}(a_2) = \frac{1}{2}$.

$\mathbf{Var}(a_5) = \frac{263}{36}$.