D. Fox and Perfect Sets

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

Fox Ciel studies number theory.

She thinks a non-empty set S contains non-negative integers is *perfect* if and only if for any (a can be equal to b), . Where operation xor means exclusive or operation (*http://en.wikipedia.org/wiki/Exclusive_or*).

Please calculate the number of perfect sets consisting of integers not greater than k. The answer can be very large, so print it modulo 1000000007 $(10^9 + 7)$.

Input

The first line contains an integer k ($0 \leq k \leq 10^9$).

Output

Print a single integer — the number of required sets modulo 1000000007 $(10^9 + 7)$.

Examples

input
1
output
2

input
2
output
3

input
3
output
5

input
4
output
6

Note

In example 1, there are 2 such sets: {0} and {0, 1}. Note that {1} is not a perfect set since 1 xor 1 = 0 and {1} doesn't contain zero.

In example 4, there are 6 such sets: {0}, {0, 1}, {0, 2}, {0, 3}, {0, 4} and {0, 1, 2, 3}.