Function

Time Limit: 1 Second
Memory Limit: 256 MB

A function f is defined as follows:

- $f(0) = 4$

- $f(1) = 9$

- $f(2) = 5$

- $\forall n > 2, f(n) = 4f(n-3) + 9f(n-2) + 5f(n-1)$

Given a number k ($0 \leq k \leq 10^{18}$), find the value of $f(k)$. Since the value might be too large, output the value modulo 998 244 353.

Input

The only line of input contains a single integer k ($0 \leq k \leq 10^{18}$), as described in the problem statement.

Output

Output the value of $f(k)$ modulo 998 244 353.

Sample Inputs

1145141919810

Sample Outputs

930878487