Project Euler #162: Hexadecimal numbers

This problem is a programming version of Problem 162 from projecteuler.net

In the hexadecimal number system numbers are represented using 16 different digits:

$$0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F$$

The hexadecimal number AF when written in the decimal number system equals $10 \times 16 + 15 = 175$.

In the $3 - digit$ hexadecimal numbers $10A, 1A0, A10,$ and $A01$ the digits $0, 1$ and A are all present.

Like numbers written in base ten we write hexadecimal numbers without leading zeroes.

How many hexadecimal numbers containing at most n hexadecimal digits exist with all of the digits $0, 1,$ and A present at least once?

Give your answer modulo $(10^9 + 7)$.

Input Format

The first line contains an integer, n.

Constraints

- $3 \leqslant n \leqslant 100$

Output Format

Print the answer modulo $1000000007 = 10^9 + 7$.

Sample Input

```
3
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Sample Output

```
4
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