

Bugcat's Mahjong

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 1024 megabytes

During the Lunar New Year, Bugcat has been playing a Mahjong-themed "roguelike" game (similar to Balatro). In this game, Bugcat draws tiles from a deck and discards them, and it has perfect knowledge of the tile sequence in the "wall" (the deck).

Bugcat starts wondering: if there is a Mahjong set with n distinct types of tiles, what is the expected number of tiles drawn (including the initial 13 tiles) to complete a "Four Concealed Pongs" (Sūankō) hand, assuming optimal play? Output the result modulo $10^9 + 7$.

Definitions:

- The Mahjong set: There are n types of tiles. Each type has exactly 4 identical-looking but distinct tiles. Thus, there are a total of $4n$ tiles in the deck.
- Four Concealed Pongs: A "Pong" (or triplet) is defined as 3 tiles of the same type. To complete this hand, you need four Pongs and one pair (2 tiles of the same type).

Simplified Problem Statement:

There are $4n$ tiles, categorized into n colors (types), with 4 tiles per color. Even tiles of the same color are considered distinct.

Consider all $(4n)!$ possible permutations of the deck. For a given permutation, let the "cost" be the smallest index i such that among the first i tiles in the sequence, the following two conditions are met:

- At least 4 colors have appeared 3 or more times.
- At least 5 colors have appeared 2 or more times.

Find the expected value of the cost i over all possible permutations. Output the result modulo $10^9 + 7$.

Input

A single integer n ($1 \leq n \leq 2 \times 10^6$), representing the number of tile types.

Output

A single integer representing the expected cost modulo $10^9 + 7$.

Examples

standard input	standard output
5	80495372
4	0