Project Euler #92: Square digit chains

Problem Statement

This problem is a programming version of Problem 92 from projecteuler.net

A number chain is created by continuously adding the square of the digits in a number to form a new number until it has been seen before.

For example,

$44 \rightarrow 32 \rightarrow 13 \rightarrow 10 \rightarrow 1 \rightarrow 1$
$85 \rightarrow 89 \rightarrow 145 \rightarrow 42 \rightarrow 20 \rightarrow 4 \rightarrow 16 \rightarrow 37 \rightarrow 58 \rightarrow 89$

Therefore any chain that arrives at 1 or 89 will become stuck in an endless loop. What is most amazing is that EVERY starting number will eventually arrive at 1 or 89.

How many starting numbers below 10^K will arrive at 89? As the result can be large, print modulo $(10^9 + 7)$

Input Format
First and only line contains K.

Constraints
$1 \leq K \leq 200$

Output Format
Print the required answer.

Sample Input

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1
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Sample Output

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7
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