Project Euler #171: Finding numbers for which the sum of the squares of the digits is a square

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This problem is a programming version of Problem 171 from projecteuler.net

For a positive integer n, let $f(n)$ be the sum of the squares of the digits (in base 10) of n, e.g.

$$f(3) = 3^2 = 9,$$
$$f(25) = 2^2 + 5^2 = 4 + 25 = 29,$$
$$f(442) = 4^2 + 4^2 + 2^2 = 16 + 16 + 4 = 36$$

Find the sum of all n, $0 \le n \le k$, such that $f(n)$ is a perfect square modulo $10^9 + 7$.

Input Format

The first line of input contains the only integer k.

Constraints

$1 \le k \le 10^{100}$

Output Format

Output the only integer which is the answer for the problem.

Sample Input 0

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100
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Sample Output 0

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826
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Explanation 0

You have to sum up following numbers:
$1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 34, 40, 43, 50, 60, 68, 70, 80, 86, 90, 100.$