

## Problem C

### New Maths

“Drat!” cursed Charles. “This stupid carry bar is not working in my Engine! I just tried to calculate the square of a number, but it’s wrong; all of the carries are lost.”

“Hmm,” mused Ada, “arithmetic without carries! I wonder if I can figure out what your original input was, based on the result I see on the Engine.”

*Carryless addition*, denoted by  $\oplus$ , is the same as normal addition, except any carries are ignored (in base 10). Thus,  $37 \oplus 48$  is 75, not 85.

*Carryless multiplication*, denoted by  $\otimes$ , is performed using the schoolboy algorithm for multiplication, column by column, but the intermediate additions are calculated using *carryless addition*. More formally, Let  $a_m a_{m-1} \dots a_1 a_0$  be the digits of  $a$ , where  $a_0$  is its least significant digit. Similarly define  $b_n b_{n-1} \dots b_1 b_0$  be the digits of  $b$ . The digits of  $c = a \otimes b$  are given by the following equation:

$$c_k = (a_0 b_k \oplus a_1 b_{k-1} \oplus \dots \oplus a_{k-1} b_1 \oplus a_k b_0) \bmod 10,$$

where any  $a_i$  or  $b_j$  is considered zero if  $i > m$  or  $j > n$ . For example,  $9 \otimes 1\,234$  is 9 876,  $90 \otimes 1\,234$  is 98 760, and  $99 \otimes 1\,234$  is 97 536.

Given  $N$ , find the smallest positive integer  $a$  such that  $a \otimes a = N$ .



A Cam from a  
Babbage Analytical Engine

### Input

The input consists of a single line with a positive integer  $N$ , with at most 25 digits and no leading zeros.

### Output

Print, on a single line, the least positive number  $a$  such that  $a \otimes a = N$ . If there is no such  $a$ , print ‘-1’ instead.

### Examples

Sample Input 1	Sample Output 1
6	4
Sample Input 2	Sample Output 2
149	17
Sample Input 3	Sample Output 3
123476544	11112
Sample Input 4	Sample Output 4
15	-1