

## Problem G

### Looking-Glass House

*Source file name: lookingglass.c, lookingglass.cpp or lookingglass.java*

*There was a book lying near Alice on the table, ..., she turned over the leaves, to find some part that she could read, ‘ -- for it’s all in some language I don’t know,’ she said to herself. It was like this.*

*YKCOWREBBAJ  
sevot yhtils eht dna ,gillirb sawT‘  
;ebaw eht ni elbmig dna eryg diD  
,sevogorob eht erew ysmim lLA  
.ebargtuo shtar emom eht dnA*

*She puzzled over this for some time, but at last a bright thought struck her. ‘Why, it’s a Looking-glass book, of course! And if I hold it up to a glass, the words will all go the right way again.’ This was the poem that Alice read.*

*JABBERWOCKY  
‘Twas brillig, and the slithy toves  
Did gyre and gimble in the wabe;  
All mimsy were the borogoves,  
And the mome raths outgrabe.*

*Lewis Carroll, Through the Looking Glass*

Some few days later, Alice noticed that when she said 51, some people understood 15 and, some others, 51. And when she said 43, they understood 34 or 43. Of course, such a risk of misunderstanding is a serious trouble to play arithmetic games. Then she realized that there was no problem saying 343, because in this case the others would always understand what she meant.

But, what can she do if she wanted to say 51, anyway? She discovered that she could say the number in base 2, since  $51_2 = 110011$ . She could say a number  $n$  in a base  $b$  if  $n$  was written in that base as a *palindrome*, i.e., as a number that reads the same from left to right than from right to left. For example, neither  $43_{10} = 43$  nor  $43_2 = 101011$  are palindromes, but  $43_6 = 111$  is a palindrome.

Your task is to write a program to help Alice calculating the smallest base  $b \geq 2$  for which a given number  $n$  is a palindrome, if there is such a base  $b$ . The number  $n$  is given in base 10.

## Input

The input contains several test cases, each one described by one single line with an integer number  $n$ , written in base 10 ( $1 \leq n \leq 10^6$ ).

*The input must be read from standard input.*

## Output

For each test case, output a line with the smallest base  $b \geq 2$  in which the number  $n$  is written as a palindrome, if there is such a base. If there is not such a base, answer a line with a 0 value.

*The output must be written to standard output.*

Sample input	Output for the sample input
51	2
43	6
7	2
19	18