

Problem B

The Archeologists' Dilemma

An archeologist seeking proof of the presence of extraterrestrials in the Earth's past, stumbles upon a partially destroyed wall containing strange chains of numbers. The left-hand part of these lines of digits is always intact, but unfortunately the right-hand one is often lost by erosion of the stone. However, she notices that all the numbers with all its digits intact are powers of 2, so that the hypothesis that all of them are powers of 2 is obvious. To reinforce her belief, she selects a list of numbers on which it is apparent that the number of legible digits is strictly smaller than the number of lost ones, and asks you to find the smallest power of 2 (if any) whose first digits coincide with those of the list.

Thus you must write a program such that given an integer, it determines (if it exists) the smallest exponent E such that the first digits of 2^E coincide with the integer (remember that more than half of the digits are missing).

Input

It is a set of lines with a positive integer N not bigger than 2147483648 in each of them.

Output

For every one of these integers a line containing the smallest positive integer E such that the first digits of 2^E are precisely the digits of N, or, if there is no one, the sentence "`no power of 2`".

Sample Input

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1
2
10
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Sample Output

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7
8
20
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