

Problem H

Smith Numbers

Source: smith.(c|cc|pas|java)

Input: read from stdin

While skimming his phone directory in 1982, Albert Wilansky, a mathematician of Lehigh University, noticed that the telephone number of his brother-in-law H. Smith had the following peculiar property: The sum of the digits of that number was equal to the sum of the digits of the prime factors of that number. Got it? Smith's telephone number was 493-7775. This number can be written as the product of its prime factors in the following way:

$$4937775 = 3 \cdot 5 \cdot 5 \cdot 65837$$

The sum of all digits of the telephone number is $4 + 9 + 3 + 7 + 7 + 7 + 5 = 42^\dagger$, and the sum of the digits of its prime factors is equally $3 + 5 + 5 + 6 + 5 + 8 + 3 + 7 = 42$. Wilansky was so amazed by his discovery that he named this kind of numbers after his brother-in-law: Smith numbers.

As this observation is also true for every prime number, Wilansky decided later that a (simple and unsophisticated) prime number is not worth being a Smith number, so he excluded them from the definition.

Wilansky published an article about Smith numbers in the *Two Year College Mathematics Journal* and was able to present a whole collection of different Smith numbers: For example, 9985 is a Smith number and so is 6036. However, Wilansky was not able to find a Smith number that was larger than the telephone number of his brother-in-law. It is your task to find Smith numbers that are larger than 4937775!

Input

The input file consists of a sequence of positive integers, one integer per line. Each integer will have at most 8 digits. The input is terminated by a line containing the number 0.

Output

For every number $n > 0$ in the input, you are to compute the smallest Smith number which is larger than n , and print it on a line by itself. You can assume that such a number exists.

Sample Input

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4937774
0
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Sample Output

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4937775
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[†] What else did you expect???