

# SWE2004 : Principles in Programming ( Spring 2016 )

## Programming Lab #6

Due-date : April 19, 14:45PM

Q & A : kisys18 at gmail.com

Time limit: 3.000 seconds

### Description

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  $4 + 9 + 3 + 7 + 7 + 7 + 5 = 42$ , 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 type 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 and 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 give a Smith number which was larger than the telephone number of his brother-in-law. It is your task to find Smith numbers which are larger than 4937775.

### Input

The input consists of several test cases, the number of which you are given in the first line of the input. Each test case consists of one line containing a single positive integer smaller than  $10^9$ .

### Output

For every input value  $n$ , you are to compute the smallest Smith number which is larger than  $n$  and print each number on a single line. You can assume that such a number exists.

### Sample Input

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1
4937774
```

## Sample Output

4937775