Project Euler #26: Reciprocal cycles

This problem is a programming version of Problem 26 from projecteuler.net

A unit fraction contains 1 in the numerator. The decimal representation of the unit fractions with denominators 2 to 10 are given:

$$\frac{1}{2} = 0.5$$
$$\frac{1}{3} = 0.(3)$$
$$\frac{1}{4} = 0.25$$
$$\frac{1}{5} = 0.2$$
$$\frac{1}{6} = 0.1(6)$$
$$\frac{1}{7} = 0.(142857)$$
$$\frac{1}{8} = 0.125$$
$$\frac{1}{9} = 0.(1)$$
$$\frac{1}{10} = 0.1$$

Where $0.1(6)$ means $0.166666...$, and has a 1-digit recurring cycle. It can be seen that $\frac{1}{7}$ has a 6-digit recurring cycle.

Find the value of smallest $d < N$ for which $\frac{1}{d}$ contains the longest recurring cycle in its decimal fraction part.

Input Format

The first line contains an integer T , i.e., number of test cases.
Next T lines will contain an integer N.

Constraints

$1 \leq T \leq 1000$
$4 \leq N \leq 10000$

Output Format

Print the values corresponding to each test case.

Sample Input

```
2
5
10
```

Sample Output

```
3
7
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