Problem D: Digits

A googol written out in decimal has 101 digits. A googolplex has one plus a googol digits. That's a lot of digits!

Given any number x_0, define a sequence using the following recurrence:

$$x_{i+1} = \text{the number of digits in the decimal representation of } x_i$$

Your task is to determine the smallest positive i such that $x_i = x_{i-1}$.

Input Specification

Input consists of several lines. Each line contains a value of x_0. Every value of x_0 is non-negative and has no more than one million digits. The last line of input contains the word `END`.

Sample Input

```
42
END
```

Output Specification

For each value of x_0 given in the input, output one line containing the smallest positive i such that $x_i = x_{i-1}$.

Output for Sample Input

```
3
```

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