4519 The Last Term

An integer f is a positive factor of an integer d if f is greater than zero and there exists some integer n such that $f \times n = d$. Thus 12 is a factor of 60 because $12 \times 5 = 60$.

A sequence of integers $x_1, x_2, \ldots, x_n$ is a decimal-digit factor sequence (DDF) if each x_i is a positive integer, $x_1 > 1$, and x_{i+1} (for all $i \geq 1$) is the sum of the digits of all positive factors of x_i.

Example

The numbers $17, 9, 13, 5, 6, \ldots$ form a DDF as we can see from the following observations.

- The positive factors of 17 are 1 and 17, and $1 + 1 + 7 = 9$.
- The positive factors of 9 are 1, 3, and 9; $1 + 3 + 9 = 13$.
- The positive factors of 13 are 1 and 13; $1 + 1 + 3 = 5$.
- The positive factors of 5 are 1 and 5; $1 + 5 = 6$.

Every DDF beginning with a number greater than or equal to 1000 repeats no number greater than or equal to 1000, and also contains a number less than 1000. Also, every DDF beginning with a number less than 1000 contains no number greater than 999. Thus every DDF must eventually repeat numbers less than 1000. It has also been shown that every DDF eventually repeats a single number x_n which is called the *last term*. That is, there exists x_n such that for all $j > n$, $x_j = x_n$.

In this problem you are to determine the length of DDFs that begin with a given value. The length of a DDF is the value of n, where x_n is the last term of the DDF.

Input

There will be multiple input cases to consider. For each case there will be a single input line containing the first term x_1 of the DDF to be considered. This value will never be larger than 2000. The input for the last case will be followed by a line containing '0'.

Output

For each input case, display the case number $(1, 2, \ldots)$ and the length of the DDF. Display a blank line after the output for each case.

The sample input and output illustrate the appropriate formats.

Sample Input

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17
31
68
1448
0
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Sample Output

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Case 1: 13 terms

Case 2: 11 terms

Case 3: 19 terms

Case 4: 20 terms
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