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TEST	TEST ENDS	REMAINING
Programming Aptitude Test	2017-05-23 19:12:41 CEST	13 days, 21:55:56

Problem B

Problem ID: abefbc839cd70e97
CPU Time limit: 4 seconds
Memory limit: 1024 MB
Difficulty: medium

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Source: Baylor Competitive Learning course

A prime number $p \geq 2$ is an integer which is evenly divisible by only two integers: 1 and p. A composite integer is one which is not prime. The fundamental theorem of arithmetic says that any integer x can be expressed uniquely as a set of *prime factors* – those prime numbers which, when multiplied together, give x. Consider the prime factorization of the following numbers:

$$10 = 2 \times 5 \qquad 16 = 2 \times 2 \times 2 \times 2 \qquad 231 = 3 \times 7 \times 11$$

Consider the following process, which we'll call prime reduction. Given an input x:

1. if x is prime, print x and stop
2. factor x into its prime factors $p_1, p_2, \ldots, p_k$
3. let $x = p_1 + p_2 + \cdots + p_k$
4. go back to step 1

Write a program that implements prime reduction.

Input

Input consists of a sequence of up to $20\,000$ integers, one per line, in the range 2 to 10^9. The number 4 will not be included in the sequence (try it to see why it's excluded). Input ends with a line containing only the number 4.

Output

For each integer, print the value produced by prime reduction executed on that input, followed by the number of times the first line of the process executed.

Sample Input 1

```
2
3
5
76
100
2001
4
```

Sample Output 1

```
2 1
3 1
5 1
23 2
5 5
5 6
```