## Problem E: Perfect P*th* Powers

We say that *x* is a perfect square if, for some integer *b*, *x = b2*. Similarly, *x* is a perfect cube if, for some integer *b*, *x = b3*. More generally, *x* is a perfect p*th* power if, for some integer *b*, *x = bp*. Given an integer *x* you are to determine the largest *p* such that *x* is a perfect p*th* power.

Each test case is given by a line of input containing *x*. The value of *x* will have magnitude at least 2 and be within the range of a (32-bit) *int* in C, C++, and Java. A line containing 0 follows the last test case.

For each test case, output a line giving the largest integer *p* such that *x* is a perfect p*th* power.

### Sample Input

17

1073741824

25

0

### Output for Sample Input

1

30

2

*G. V. Cormack*