

## Problem E: Perfect Pth Powers

We say that  $x$  is a perfect square if, for some integer  $b$ ,  $x = b^2$ . Similarly,  $x$  is a perfect cube if, for some integer  $b$ ,  $x = b^3$ . More generally,  $x$  is a perfect  $p$ th power if, for some integer  $b$ ,  $x = b^p$ . 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
```

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