

Möbius function

In number theory and combinatorics [Möbius function](#) $\mu(n)$ for integer $n > 0$ is defined as follows:

$$\mu(1) = 1$$

$$\mu(n) = (-1)^k \text{ if } n \text{ is the product of } k \text{ (} k > 0 \text{) distinct primes}$$

$$\mu(n) = 0 \text{ otherwise.}$$

Given integer $n > 0$ compute $\mu(n)$.

Note: 11/06/2018 added new test case.

Input

Each line of input contains one random integer number $1 \leq n \leq 10^8$ (100 000 000). Input terminates with 0 (zero). There will be two input files.

Output

For each n print $\mu(n)$ value on new line.

Example

Input:

1
2
3
4
5
6
0

Output:

1
-1
-1
0
-1
1