

Smallest Inverse Euler Totient Function

This task is the inverse of [ETF](#) problem, given an integer n find smallest integer i such that $\varphi(i)=n$, where φ denotes [Euler's totient function](#).

Input

The first line is an integer T ($1 \leq T \leq 100,000$), denoting the number of test cases. Then, T test cases follow.

For each test case, there is an integer n ($1 \leq n \leq 100,000,000$) written in one line. (one integer per line)

Output

For each test case, output Smallest Inverse Euler's Totient Function of n . if n doesn't have inverse, output -1.

Example

Input:

5
10
20
30
40
50

Output:

11
25
31
41
-1

[Time Limit \$\approx 3 \times\$ \(My Program Top Speed\)](#)

See also: [Another problem added by Tjandra Satria Gunawan](#)