Smallest Inverse Euler Totient Function

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

Input

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

For each test case, there is an integer **n** (1 ≤ **n** ≤ 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 ≈ 3*(My Program Top Speed)

See also: Another problem added by Tjandra Satria Gunawan