

Problem B. B

Time limit	1000 ms
Code length Limit	50000 B
OS	Linux

Alice is very fond of prime numbers. Given a number she wants to determine whether it is prime or not. If a number is prime she wants to know that which prime number is it.
e.g. 2 is 1st prime number, 3 is 2nd and so on.

Input

First line of input contains number of test cases t . t lines follow. Each line contains a positive integer ($<10^9$).

Output

For each test case output a single integer. If the number is not prime output -1 otherwise output a integer say n such that the number is n th prime number.

Example

Input:

3
2
3
4

Output:

1
2
-1