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PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS STANDINGS CUSTOM INVOCATION

E. Tree Colorings

time limit per test: 4 seconds memory limit per test: 256 megabytes

Consider a rooted undirected tree. Each vertex can be colored blue, green, or yellow. A coloring is called beautiful if it meets these conditions:

- · the root of the tree is green;
- if you consider all blue and green vertices, they are reachable from each other without passing through any yellow vertices;
- if you consider all yellow and green vertices, they are reachable from each other without passing through any blue vertices;

You are given an integer m. Your task is to calculate the minimum number of vertices in a tree with exactly m beautiful colorings.

Input

The first line contains a single integer ($1 \le t \le 10^5$) — the number of test cases.

The only line of each test case contains a single integer m ($1 \le m \le 5 \cdot 10^5$).

Output

For each test case, print a single integer — the minimum number of vertices in a tree with exactly m beautiful colorings. If such a tree does not exist, print -1.

Example

input	Сору
5	
1	
3	
5	
7	
9	
output	Сору
1	
2	
3	
4	
3	

Note

In the following notes, let q describe green color, b be blue, and y be yellow.

In the first example, consider a simple tree with just 1 vertex. This tree has exactly 1 beautiful coloring: the root is green.

In the second example, consider a simple tree with 2 vertices with a root at the 1-st vertex. There are exactly 3 beautiful colorings: [g, g], [g, b] and [g, y].

In the third example, consider a bamboo tree with 3 vertices with a root at the 1-st vertex. There are exactly 5 beautiful colorings: [g,g,g], [g,g,b], [g,g,y], [g,b,b] and [g,y,y].

In the fifth example, consider a tree with 3 vertices with a root at the 1-st vertex, and the other 2vertices connected to it. There are exactly 9 beautiful colorings: [g,g,g], [g,g,b], [g,g,y], [g,b,g],[g,b,b],[g,b,y],[g,y,g],[g,y,b] and [g,y,y].

Educational Codeforces Round 180 (Rated for Div. 2)

Finished

Practice



→ Virtual participation

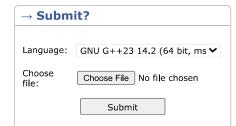
Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest



→ Last submissions		
Submission	Time	Verdict
325960745	Jun/25/2025 08:38	Accepted
325960546	Jun/25/2025 08:35	Wrong answer on test 2
325960311	Jun/25/2025 08:33	Wrong answer on test 2
325786155	Jun/23/2025 18:55	Wrong answer on test 2
325723415	Jun/23/2025 17:49	Wrong answer on test 2





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The only programming contests Web 2.0 platform
Server time: Jun/25/2025 12:38:23^{UTC+7} (n2).
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