

L. Villain numbers

time limit per test: 1 second🕒
memory limit per test: 256 megabytes
input: standard input
output: standard output

In mathematics, a non-negative integer with an even number of ones in its binary representation is called an evil number (for example, number 5 is evil, as its binary, 0101, has two ones).

These numbers are used in number theory when studying the Morse–Thue sequence and are applied in fractal image compression algorithms.

A positive integer is called a *villain* if it is even and the number of ones in its binary representation is also even. These are such numbers as 6, 10, 12, 18, 20, etc.

Given t test cases, in each test you will be given a number N , find the number of *villain* numbers which do not exceed N .

Input

The first line contains one positive integer t ($1 \leq t \leq 10^5$) — the number of test cases.

The next t lines, each, will contain a number N , ($1 \leq N \leq 10^{15}$) — the number you to need to count *villain* number up to.

Output

For each test case, you should output a separate line, which is the answer to the query.

Example

input	Copy
3 20 12 32	
output	Copy
5 3 7	

Contest #1

Finished

Contest Manager



→ About Time Scaling

This contest uses time limits scaling policy (depending on a programming language). The system automatically adjusts time limits by the following multipliers for some languages. Despite scaling (adjustment), the time limit cannot be more than 30 seconds. Read the details by the [link](#).

→ 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

→ Invitations

You can invite users to this contest. It will become visible to them regardless of contest visibility.

Manage invitations

→ Administration

Currently, manager mode is enabled. It means that you have manager access to this mashup contest.

Do you want to temporary disable manager mode?

Disable manager mode

→ Submit?

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
252669172	Mar/22/2024 05:21	Accepted

→ Contest materials