A. Energy Crystals

time limit per test: 2 seconds
memory limit per test: 512 megabytes

There are three energy crystals numbered 1, 2, and 3; let's denote the energy level of the i-th crystal as a_i. Initially, all of them are discharged, meaning their energy levels are equal to 0. Each crystal needs to be charged to level x **(exactly x, not greater)**.

In one action, you can increase the energy level of any one crystal by any positive amount; however, the energy crystals are synchronized with each other, so an action can only be performed if the following condition is met afterward:

- for each pair of crystals i, j, it must hold that $a_i \geq \lfloor \frac{a_j}{2} \rfloor$.

What is the minimum number of actions required to charge all the crystals?

Input

Each test consists of several test cases. The first line contains a single integer t ($1 \leq t \leq 10^4$) — the number of test cases. The description of the test cases follows.

The only line of each test case contains a single integer x ($1 \leq x \leq 10^9$).

Output

For each test case, output a single integer — the minimum number of actions required to charge all energy crystals to level x.

Example

input Copy

```
7
1
5
14
2025
31415
536870910
1000000000
```

output Copy

```
3
7
9
23
31
59
61
```

Note

In the first test case, one possible sequence of actions is:

$$[0, 0, 0] \to [1, 0, 0] \to [1, 0, 1] \to [1, 1, 1]$$

One of the possible sequences of actions in the second test case is:

$$[0, 0, 0] \to [1, 0, 0] \to [1, 1, 0] \to [1, 1, 2] \to [3, 1, 2] \to [3, 5, 2] \to [5, 5, 2] \to [5, 5, 5]$$