

Modular Fibonacci Period

Perhaps the first thing one notices when the Fibonacci sequence is reduced mod M is that it seems periodic.

For example :

$F \pmod{4} = 0\ 1\ 1\ 2\ 3\ 1\ 0\ 1\ 1\ 2\ 3\ \dots$

$F \pmod{5} = 0\ 1\ 1\ 2\ 3\ 0\ 3\ 3\ 1\ 4\ 0\ 4\ 4\ 3\ 2\ 0\ 2\ 2\ 4\ 1\ 0\ 1\ 1\ 2\ 3\ \dots$

We define $K(M)$ the period of the Fibonacci sequence reduced mod M if it is periodic.

We just saw that $K(4) = 6$ and $K(5) = 20$.

Input

The input begins with the number T of test cases in a single line.

In each of the next T lines there are one integer M .

Output

For each test case, on a single line, print $K(M)$, or "Not periodic." without quotes if need.

Example

Input:

3
4
5
6

Output:

6
20
24

Constraints

$1 < T < 10^4$

$1 < M < 10^{12}$

Edit 2017-02-11, after compiler changes ; new TL. My old Python code end in 1.92s.