Problem H. Historic Breakthrough

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

Rikka is taking the undergraduate cryptography course this year. In the class, it is mentioned that a new method of factorization was recently discovered, which is considered a historic breakthrough in cryptography. Rikka believes that there will be comparable algorithms for some specific class of numbers with simpler goals.

Now you are asked to design and implement such a "factorization" algorithm: given an integer m, print an integer n such that

$$m = \frac{n\varphi(n)}{2} = \sum_{\substack{1 \le i \le n, \\ \gcd(i,n) = 1}} i.$$

It is guaranteed that such an n exists in all the test cases.

Input

The first line of input contains an integer T $(1 \le T \le 51)$, the number of test cases.

The i-th of the following T lines contains a single integer m_i $(0 < m_i < 10^{36})$.

Output

For each test case, print an integer n_i for the corresponding m_i. It is guaranteed that the answer exists in every test case. If there are several possible answers, print any one of them.

Example

standard input	standard output
3	10
20	7
21	1497700821900508526
4757503812224206565866462245096576000	