Odd Catalan numbers P75985_en

The famous Catalan numbers can be defined by the recurrence

$$C_n = \sum_{i=0}^{n-1} C_i \cdot C_{n-i-1} \ ,$$

with $C_0 = 1$. The first Catalan numbers are 1, 1, 2, 5, 14, 42, 132, ...

You are given an index i. What is the smallest j such that $j \geq i$ and C_j is odd?

Input

Input consists of several cases, each with a natural number no larger than 10^{15}.

Output

For every i, print the smallest j such that $j \geq i$ and C_j is odd. If such a number does not exist, print "`Catalans are strange!`".

Sample input 1

```
0
1
2
3
1099511627768
```

Sample output 1

```
0
1
3
3
1099511627775
```

Problem information

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