Let $f(n)$ be the number of ways to write n as a sum of powers of 2. Each power can be used at most twice For example, there are five ways to partition 10:

$$8+2,\ 8+1+1,\ 4+4+2,\ 4+4+1+1,\ 4+2+2+1+1$$

So we have $f(10) = 5$.

Given n, find the maximal value among $f(0), f(1), \ldots, f(n)$.

Input

The input contains at most 1000 test cases. Each test case contains a single line containing an integer n ($1 \leq n \leq 10^{18}$). The last test case is followed by a single zero, which should not be processed.

Output

For each test case, print the case number and the maximal value from $f(0)$ to $f(n)$. Look at the output for sample input for details.

Sample Input

```
4
10
87
3456
1000000000
0
```

Sample Output

```
Case 1: 3
Case 2: 5
Case 3: 21
Case 4: 233
Case 5: 1346269
```