

70. 10931 - Parity

Time limit: 3.000 seconds

Problem E - Parity**Time Limit: 1 second**

We define the parity of an integer n as the sum of the bits in binary representation computed modulo two. As an example, the number $21 = 10101_2$ has three 1 s in its binary representation so it has parity $3 \pmod{2}$, or 1 .

In this problem you have to calculate the parity of an integer $1 \leq I \leq 2147483647$.

Input

Each line of the input has an integer I and the end of the input is indicated by a line where $I = 0$ that should not be processed.

Output

For each integer I in the input you should print a line **The parity of B is $P \pmod{2}$.**, where B is the binary representation of I .

Sample Input

```
1
2
10
21
0
```

Sample Output

```
The parity of 1 is 1 (mod 2).
The parity of 10 is 1 (mod 2).
The parity of 1010 is 2 (mod 2).
The parity of 10101 is 3 (mod 2).
```

Problem setter: Sérgio Queiroz de Medeiros