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 1s in its binary representation so it has parity 3 (mod 2), or 1.

In this problem you have to calculate the parity of an integer **1 ≤ I ≤ 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 inputt you should print a line **The parity of B is P (mod 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).
```

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