

10931 Parity

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 $3(\bmod 2)$, 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 $P (\bmod 2)$.' , 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).
```