

Bleak Numbers

Given an integer, check whether it is Bleak or not.

A number 'n' is called Bleak if it cannot be represented as sum of a positive number x and set bit count in x, i.e., $x + \text{countSetBits}(x)$ is not equal to n for any non-negative number x.

Examples:

3 is not Bleak as it can be represented as $2 + \text{countSetBits}(2)$.

4 is not Bleak as it cannot be represented as sum of a number x and $\text{countSetBits}(x)$ for any number x.

*countSetBits is program to count number of 1s in binary representation of an integer.

Input

The first line of input contains an integer T denoting the number of test cases. Then T test cases follow. Each test case consists of a single line. The first line of each test case contains a single integer N to be checked for Bleak.

Output

Print "1" or "0" (without quotes) depending on whether the number is Bleak or not.

Sample input

Sample output

3	1
4	0
167	0
3	
2	0
12	0
52	