

Loving Power

Angel Luis is now getting math class. His teacher is teaching to him the XOR operation:

- $0 \text{ XOR } 0 = 0$
- $0 \text{ XOR } 1 = 1$
- $1 \text{ XOR } 0 = 1$
- $1 \text{ XOR } 1 = 0$

When a number has more than one bit, the operation is applied to all bits. The teacher write two numbers x, y ($0 \leq x, y \leq N$) and make the XOR operation between x and y , Angel Luis would like to know how many pairs x, y such $x \text{ XOR } y = 2^z$ where $z \geq 0$.

See that for $N = 3$:

- $0 \text{ XOR } 1 = 2^0$
- $0 \text{ XOR } 2 = 2^1$
- $3 \text{ XOR } 1 = 2^1$
- $2 \text{ XOR } 3 = 2^0$

So there are 4 pairs.

Given N you should return the number of pairs modulo 1000000007.

Input

First line contains number t - the number of cases. Following t lines will each have a number N .

$t \leq 100$

$N \leq 1000000000000000$ (10^{15}).

Output

For each case the number of pairs modulo 1000000007.

Example

Input:

3
1
2
3

Output:

1
2
4