Sky_miner and Odious Number

Description

Sky_miner decides to BG all the members of BG Zhejiang University ACM-ICPC Team. At the same time, he came up with a problem. If you can solve this problem, you can eat one more BG by sky_miner.

The problem is about the Odious Number, of which the definition is given below:

An Odious Number is a number whose binary representation contains an odd number of '1'.

For instance, $10 = (1010)_2$ with 2 '1's in its binary representation so it's not an odious number; meanwhile, $7 = (111)_2$ with 3 '1's in its binary representation so it's an odious number.

Please find the i-th odious number so that you can baipiao one more BG.

Input

The input will consist of multiple cases.

The first line will contain a single integer $T(T \leq 100)$, indicating the number of cases.

For the next T lines, each line contains one interger $N(1 \leq N \leq 1e18)$.

Output

For each case, output one integer in a separate line, indicating the N-th odious number.

Sample Input

2

2

3

Sample Output

2

4