Count Set Bits

You are given a number *n* and you need to find the count of number of set bits in its binary representation from *1* to *n inclusively.*

Input

The first line of input contains *t denoting the number of test cases.*

Next *t* lines contains a single integer *n.*

Constraints

- $1 \leq t \leq 20$
- $1 \leq N \leq 10^4$

Output

Output a single integer denoting the count of sets bits from 1 to n inclusively.

Example

Input:

5
7
4
10
9
6

Output:

12
5
17
15
9