A. Tricky Sum

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

In this problem you are to calculate the sum of all integers from 1 to n, but you should take all powers of two with minus in the sum.

For example, for $n = 4$ the sum is equal to $-1 - 2 + 3 - 4 = -4$, because 1, 2 and 4 are 2^0, 2^1 and 2^2 respectively.

Calculate the answer for t values of n.

Input

The first line of the input contains a single integer t ($1 \le t \le 100$) — the number of values of n to be processed.

Each of next t lines contains a single integer n ($1 \le n \le 10^9$).

Output

Print the requested sum for each of t integers n given in the input.

Examples

input
2 4 1000000000

output
-4 499999998352516354

Note

The answer for the first sample is explained in the statement.