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 20, 21 and 22 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 ($1 \le n \le 109$).

Output

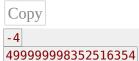
Print the requested sum for each of *t* integers *n* given in the input.

Examples

input

Copy 2 4 1000000000

output



Note

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