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 2^2respectively.

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

Copy

```
2
4
1000000000
```

output

Copy

```
-4
499999998352516354
```

Note

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