Problem A. Sequence and Sequence

Consider the following two sequences P and Q. We denote $P(i)$ as the i-th element in sequence P, and $Q(i)$ as the i-th element in sequence Q:

- Sequence P is a **sorted** sequence where for all $k \in \mathbb{Z}^+$, k appears in sequence P for $(k+1)$ times ($\mathbb{Z}^+$ is the set of all positive integers). That is to say,

$$P = \{1, 1, 2, 2, 2, 3, 3, 3, 3, 4, 4, 4, 4, 4, 5, 5, 5, 5, 5, 5, 6, \dots\}$$

- Sequence Q can be derived from the following equations:

$$\begin{cases} Q(1) = 1 \\ Q(i) = Q(i-1) + Q(P(i)) & \text{if } i > 1 \end{cases}$$

That is to say,

$$Q = \{1, 2, 4, 6, 8, 12, 16, 20, 24, 30, 36, 42, 48, 54, 62, \dots\}$$

n	P	Q
1-2	1 1	1 2
3-5	2 2 2	4 6 8
6-9	3 3 3 3	12 16 20 24
10-14	4 4 4 4 4	30 36 42 48 54
15-20	5 5 5 5 5 5	62 70 78 86 94 102
. . .	. . .	. . .

Given a positive integer n, please calculate the value of $Q(n)$.

Input

There are multiple test cases. The first line of the input contains an integer T (about 10^4), indicating the number of test cases. For each test case:

The first and only line contains an integer n ($1 \le n \le 10^{40}$).

Output

For each test case output one line containing one integer, indicating the value of $Q(n)$.

Example

standard input	standard output
4 10 100 1000 987654321123456789	30 2522 244274 2351398986890176073810176860961767 98