Our unsung tower-breaking heroes (players $P_1$ and $P_2$) only have one tower left, and they've decided to break it for a special game commemorating the end of $5$ days of Game Theory! The rules are as follows:

- $P_1$ always moves first, and both players always move optimally.
- Initially there is $1$ tower of height $N$.
- The players move in alternating turns. The moves performed by each player are different:
    1. At each turn, $P_1$ divides the current tower into some number of smaller towers. If the turn starts with a tower of height $H$ and $P_1$ breaks it into $x \geq 2$ smaller towers, the following condition must apply: $H = h_1 + h_2 + \ldots + h_x$, where $h_i$ denotes the height of the $i^{th}$ new tower.
    2. At each turn, $P_2$ chooses some tower $k$ of the $x$ new towers made by $P_1$ (where $1 \leq k \leq x$). Then $P_1$ must pay $k^2$ coins to $P_2$. After that, $P_1$ gets another turn with tower $h_k$ and the game continues.
- The game is over when no valid move can be made by $P_1$, meaning that $H = 1$.
- $P_1$'s goal is to pay as few coins as possible, and $P_2$'s goal is to earn as many coins as possible.

Can you predict the number of coins that $P_2$ will earn?

**Input Format**

The first line contains a single integer, $T$, denoting the number of test cases.
Each of the $T$ subsequent lines contains a single integer, $N$, defining the initial tower height for a test case.

**Constraints**

- $1 \leq T \leq 100$
- $2 \leq N \leq 10^{18}$

**Output Format**

For each test case, print a single integer denoting the number of coins earned by $P_2$ on a new line.

**Sample Input**

```
3
4
2
7
```

**Sample Output**

```
6
4
8
```

**Explanation**

*Test Case 0:*
Our players make the following moves:

1. $H = N = 4$
    1. $P_1$ splits the initial tower into $2$ smaller towers of sizes $3$ and $1$.
    2. $P_2$ chooses the first tower and earns $1^2 = 1$ coin.
2. $H = 3$
    1. $P_1$ splits the tower into $2$ smaller towers of sizes $2$ and $1$.
    2. $P_2$ chooses the first tower and earns $1^2 = 1$ coin.
3. $H = 2$
    1. $P_1$ splits the tower into $2$ smaller towers of size $1$.
    2. $P_2$ chooses the second tower and earns $2^2 = 4$ coins.

The total number of coins earned by $P_2$ is $1 + 1 + 4 = 6$, so we print $6$ on a new line.