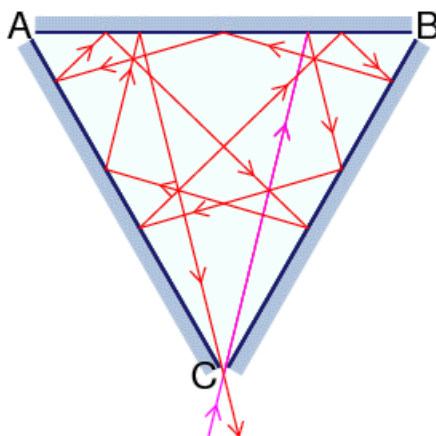


# Project Euler #202: Laserbeam

This problem is a programming version of [Problem 202](#) from [projecteuler.net](#)

Three mirrors are arranged in the shape of an equilateral triangle, with their reflective surfaces pointing inwards. There is an infinitesimal gap at each vertex of the triangle through which a laser beam may pass.

Label the vertices  $A$ ,  $B$  and  $C$ . There are 2 ways in which a laser beam may enter vertex  $C$ , bounce off 11 surfaces, then exit through the same vertex: one way is shown below; the other is the reverse of that.



There are 80840 ways in which a laser beam may enter vertex  $C$ , bounce off 1000001 surfaces, then exit through the same vertex.

In how many ways can a laser beam enter at vertex  $C$ , bounce off  $n$  surfaces, then exit through the same vertex?

## Input Format

First line of each test file contains a single integer  $Q$  which is the number of queries per this file.  $Q$  lines follow each containing a single integer  $n_i$  that is the corresponding number of surfaces laser beam should bounce off.

## Constraints

- $1 \leq Q \leq 25$
- $1 \leq n_i \leq 2 \times 10^{18}$

## Output Format

Output exactly  $Q$  lines with the answer for the  $i$ -th query on  $i$ -th line.

## Sample Input 0

```
2
11
1000001
```

### Sample Output 0

```
2
80840
```