
Medulla

2.5 second, 32 megabytes

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Finally, Toda just figured how to do modulo operations. Toda is a normal student in grade 20. Each day, her teacher, Demo, will always give homework. The homework has t questions, the each question is to find the value of $f(x) \bmod 20,011$. While $f(x)$ has an equation shown below.

$$f(x) = \begin{cases} x^3 & x \leq 2 \\ f(x-3)^3 + f(x-2) \times f(x-1) & \text{otherwise} \end{cases}$$

Input

First line An integer t : The number of questions ($1 \leq t \leq 7,500,000$)

Next t lines An integer x ($0 \leq x \leq 7,500,000$).

Output

For each question Output the value of $f(x) \bmod 20,011$ with a new line.

Input and Output Example

Input Example	Output Example
3	8
2	8
3	65
4	
5	11080
7	7908
9	11254
10	8
3	8
2	