Real Mangoes for Ranjith

Ranjith is very fond of mangoes. One fine sunny day, he goes to market to get some mangoes. In the market place, he finds *N* boxes (indexed from 1 to *N*), filled with mangoes kept infront of him. Each box indexed *i* is denoted by b_i and contains exactly *i* mangoes. The number of mangoes in b_i is denoted by m_i and *m_i = i*. Let t_i denotes the type of mangoes in box b_i (t_i is either "real" or "fake"). He can choose any box b_i (*i <= N-2*), but he doesn't know if the box contains "real" mangoes or "fake" mangoes i.e. type of box b_i.

The type of mangoes in b_i depends on the number of mangoes in boxes b_i, b_{i+1}, b_{i+2} i.e. {m_i, m_{i+1}, m_{i+2}}. Mangoes in box b_i are "real" if for each pair of numbers taken from set {m_i, m_{i+1}, m_{i+2}}, Greatest common divisor(GCD) equals 1. Otherwise, "fake". Note that t_i is not defined for *i = N-1* and *i = N* and assumed to be "fake".

Given *N*, Ranjith wants to know the total number of "real" mangoes he will get from all boxes. As Ranjith cannot count beyond *N*, output the result modulo *N*.

Input

Test File starts with number of test cases - *T*;

T lines follows, each containing *N*, number of boxes.

Output

Output *T* lines Number of "real" mangoes Ranjith gets (modulo *N*) in each one of the *T* cases.

Constraints

2 < *N* <= 10^8
T <= 10000

Example

Input:
2
9
5

Output:
7
4