Problem N. Non-Coprime Josephus

Source file name:	Noncoprime.c, Noncoprime.cpp, Noncoprime.java, Noncoprime.py
Input:	Standard
Output:	Standard
Time / Memory limit:	4/8/8 (C++/Java/Python) second(s) / 512 megabytes
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Professor Humbertov Moralov teaches the Data Structures course and, since the exam on linked lists is approaching, he proposes to exempt one of the students through a game in which this topic could be applied. The game proceeds as follows:

- There is a bag with n pieces of paper, each containing a number from 1 to n, where each number appears exactly once.

- Each of the n students draws one piece of paper from the bag, and the number on it identifies the student in the game.

- The student with the number 1 is excluded from the game.

- The remaining students stand in a circle, all facing the center, so that for each student i ($2 \leq i \leq n-1$), the student to their left is $i+1$, and the student n has student 2 to their left.

- Several rounds are played until only one student remains. In each round, a student writes their number on a sheet of paper and passes it to their left. Each time a student receives the sheet, they observe the number on it, compute the GCD (Greatest Common Divisor) between their number and the number on the sheet, and if the result is greater than 1, they leave the game. Otherwise, they pass the sheet to the left. The student who starts in the first round is number 2, and in subsequent rounds, the one to the left of the student who was eliminated starts.
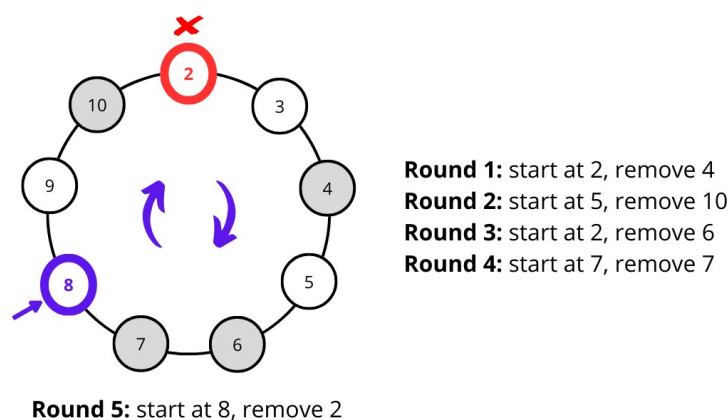

Round 1: start at 2, remove 4
Round 2: start at 5, remove 10
Round 3: start at 2, remove 6
Round 4: start at 7, remove 7
Round 5: start at 8, remove 2

Figure 3. First test case, round 5

Given the number of students, your task is to determine who wins the game.

Input

The first line contains an integer t ($1 \leq t \leq 100$), indicating the number of test cases. Each test case consists of a line with an integer n ($3 \leq n \leq 10^6$), indicating the number of students.

It is guaranteed that the sum of all n across test cases is at most 10^6.

Output

For each test case, print a line with a single integer, indicating the number of the student who wins the game.

Example

Input	Output
4	3
3	3
7	3
8	8
10	