

Drones (Junior)

SEASON 6 – ROUND SIX – 150 points



Queen bees mate early in their lives and only attend one mating flight. After several matings during this flight, a queen stores up to 100 million sperm within her oviducts. However, only five to six million are stored within the queen's spermatheca. The queen uses only a few of these sperm at a time in order to fertilize eggs throughout her life. If a queen runs out of sperm in her lifetime, new generations of queens will mate and produce their own colonies.

Honey bee queens control the gender of their offspring: as eggs pass through the ovary into the oviduct, a queen can determine whether a particular egg is fertilized or not. Unfertilized eggs become drone honey bees, while fertilized eggs develop into female workers and queens.

So it turns out that drone bees have only a mother, while worker bees and queen bees have both a mother and a father.

Your task is to calculate the number of n -th order parents of a drone.

Note: 1-st order parents are the drone's direct parents, i.e. his mother, 2-nd order parents are the parents of his parents, i.e. the parents of his mother (not counting his mother), etc. We will assume that each drone has one 0-th order parent – the drone itself.

Input

The first row of the file `drones.in` contains a single integer Q – the number of queries which will be performed.

Each of the next Q rows contains a single integer n .

Output

In the output file `drones.out` for each query, print the number of n -th order parents a drone has on a newline. Since that number can be quite large, print your answer modulo

$2^{64} - 59$

Constraints

$$1 \leq Q \leq 10^5$$

$$1 \leq n \leq 10^5$$

Time limit: 1.5 sec

Memory limit: 256 MB

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Example test

Input (drones.in)	Output (drones.out)
4	1
1	13
6	55
9	89
10	