

game-2048

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 512 megabytes

You have 10^{1000} tiles, each with the number 2 written on them.
You can perform the following operation as many times as you like:

- Choose two existing tiles both with the same value X , and combine them to form a single tile with value $2X$. This operation gives you a score of $2X$.
- In particular, combining two tiles with 4096 written on them gives a single tile with value 8192. This operation gives you a score of 8192.

Given an integer Y , count the number of distinct final configurations of tiles possible such that your score is exactly Y . Two configurations are considered distinct if, for some integer X , the number of tiles with X written on them is different between both configurations - in particular, the sequence of operations used to reach the final configuration doesn't matter at all.
The answer can be large, so compute it modulo 998244353.

Input

The first line contains an integer t ($1 \leq t \leq 10^6$), the number of testcases. The second line contains t space-separated integers, each denoting a value of Y ($1 \leq Y \leq 4 \cdot 10^6$) that needs to be solved for.

Output

For each testcase, output a single integer on a new line: the number of distinct configurations with score Y , modulo 998244353.

Example

standard input	standard output
4	0
2 4 8 32	1
	1
	3

Note

In the first testcase, we can prove that there is no configuration with total score 2.
In the third test case, let's do the following operation 2 times. Take two 2 and combine them to make a 4.