

## 7034 Finding Identity Integers

Define function  $F$  on set of positive integers as

- $F(1) = \{0\}$ , set of size 1 containing number 0
- $F(p) = \{1\}$ , if  $p$  is a prime number
- $F(n) = \bigcup \{\{p\} * F(q) + \{q\} * F(p)\}$ , where the union is over all possible positive integers  $p$  and  $q$  greater than 1 such that  $p * q = n$ .

The  $*$  and  $+$  operators used over sets are defines as cross products, e.g.,

- $\{a, b\} + \{d, e, f\} = \{a + d, a + e, a + f, b + d, b + e, b + f\}$
- $\{a, b\} * \{d, e, f\} = \{a * d, a * e, a * f, b * d, b * e, b * f\}$

A positive integer  $n$  is called an “*identity integer*” if  $F(n) = \{n\}$ . Given multiple queries, each consisting of a single integer  $K$ , find the  $K$ -th “*identity integer*”.

### Input

First line contains a single integer  $Q$ , denoting the number of queries.

$Q$  lines follow, each containing a single integer  $K$ .

### Output

For each query, print a single integer, the  $K$ -th “*identity integer*” **modulo** 1000000007.

### Constraints:

- $1 \leq Q, K \leq 200000$

### Sample Input

```
1
1
```

### Sample Output

```
4
```