Project Euler #249: Prime Subset Sums

Let $S = \{2, 3, 5, \dots\}$ be the set of prime numbers less than n.

Find the number of subsets of S, the sum of whose elements is a prime number. Print this number modulo 10^{16}. You should find this number for several values of n.

Input Format

The first line of input contains integer k — numbers of values of n.

The second line of input contains k values of n separated by single space.

Constraints

- $1 \leq k \leq 100$
- $3 \leq n \leq 7\,000$

Output Format

Print k numbers separated by space — your answers in corresponding order.

Sample Input 0

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2
10 4
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Sample Output 0

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7 3
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Explanation 0

There are four prime numbers under 10: 2, 3, 5 and 7. There are exactly seven ways to choose a subset with prime sum: $\{2\}$, $\{3\}$, $\{5\}$, $\{7\}$, $\{2, 3\}$, $\{2, 5\}$, $\{2, 3, 5, 7\}$. Only three of these subset consist of numbers under 4.