Prime Digit Sums

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Chloe is fascinated by prime numbers. She came across the number 283002 on a sign and, though the number is not prime, found some primes hiding in it by using the following rules:

- Every three consecutive digits sum to a prime:

$$\underbrace{283}002 \quad 2\underbrace{830}02 \quad 28\underbrace{300}2 \quad 283\underbrace{002}$$

- Every four consecutive digits sum to a prime:

$$\underbrace{2830}02 \quad 2\underbrace{8300}2 \quad 28\underbrace{3002}$$

- Every five consecutive digits sum to a prime:

$$\underbrace{28300}2 \quad 2\underbrace{83002}$$

You must answer q queries, where each query consists of an integer, n. For each n, find and print the number of positive n-digit numbers, modulo $10^9 + 7$, that satisfy *all three* of Chloe's rules (i.e., every three, four, and five consecutive digits sum to a prime).

Input Format

The first line contains an integer, q, denoting the number of queries.
Each of the q subsequent lines contains an integer denoting the value of n for a query.

Constraints

- $1 \leq q \leq 2 \times 10^4$
- $1 \leq n \leq 4 \times 10^5$

Output Format

For each query, print the number of n-digit numbers satisfying Chloe's rules, modulo $10^9 + 7$, on a new line.

Sample Input 0

```
1
6
```

Sample Output 0

```
95
```

Explanation 0

There are 95 six-digit numbers satisfying the property above, where the respective first and last ones are 101101 and 902005.

Submissions:214

Max Score:50
Difficulty: Medium

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Current Buffer (saved locally, editable)

Java 7

```
1  import java.io.*;
2  import java.util.*;
3  import java.text.*;
4  import java.math.*;
5  import java.util.regex.*;
6
7  public class Solution {
8      public static void main(String args[] ) throws Exception {
9          /* Enter your code here. Read input from STDIN. Print output to STDOUT */
10     }
11 }
12
```

Line: 1 Col: 1

Upload Code as File Test against custom input Run Code Submit Code