

Project Euler #200: Find the 200th prime-proof sqube containing the contiguous substring "200"

This problem is a programming version of Problem 200 from projecteuler.net

We shall define a sqube to be a number of the form, p^2q^3 , where p and q are distinct primes. For example, $200=5^22^3$ or $120072949=23^261^3$.

The first five squbes are 72, 108, 200, 392, and 500.

Interestingly, 200 is also the first number for which you cannot change any single digit to make a prime; we shall call such numbers, prime-proof. The next prime-proof sqube which contains the contiguous substring "200" is 1992008. Note that changing a digit may result in appearance of the leading zeroes - in the case with 200 as a number we can change the first digit 2 to 0, but the resulting number 000 = 0 is not a prime number and doesn't change the fact that 200 is prime-proof.

You're given the contiguous sub-string s and some queries n_i . For each query, find the n_i -th prime-proof sqube containing the contiguous sub-string s.

Input Format

The first line of each file contains s which is the sub-string from the problem statement. Next line contains a single integer q which is the number of queries per test file. q lines follow, each containing the corresponding n_i .

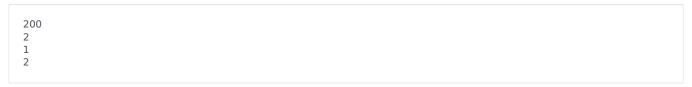
Constraints

- ullet s is a string representation of some number between 100 and 999
- $1 \le q \le 25000$
- $1 \le n_i \le 10^6$
- ullet For each query, the answer is less than 10^{15} .

Output Format

Print exactly q lines with the answers for the all q queries on each.

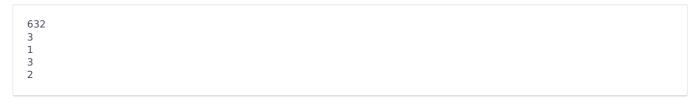
Sample Input 0



Sample Output 0

200 1992008

Sample Input 1



Sample Output 1

