

Problem A: N-digit Fibonacci number

Problem

The Fibonacci sequence is defined by the recurrence relation:

$$F_n = F_{n-1} + F_{n-2}, \text{ where } F_1 = 1 \text{ and } F_2 = 1$$

Hence the first 12 terms will be:

$$\begin{array}{cccccc} F_1 = 1 & F_2 = 1 & F_3 = 2 & F_4 = 3 & F_5 = 5 & F_6 = 8 \\ F_7 = 13 & F_8 = 21 & F_9 = 34 & F_{10} = 55 & F_{11} = 89 & F_{12} = 144 \end{array}$$

The 12th term, 144, is the first term to contain three digits.

What is the first term in the Fibonacci sequence to contain N digits?

Input

The first line contains an integer T, i.e., the number of test cases.

Next T lines will contain an integer N.

Output

Print the values corresponding to each test case.

Constraints

$$1 \leq T \leq 5000$$

$$2 \leq N \leq 5000$$

Sample Input	Sample Output
2 3 4	12 17
4 4 5 8 10	17 21 36 45

Problem B: Largest palindrome product

Problem

A palindromic number reads the same both ways. The smallest 6-digit palindrome made from the product of two 3-digit numbers is **101101** = **143** x **707**.

Find the largest palindrome made from the product of two 3-digit numbers which is less than **N**.

Input

First line contains **T** that denotes the number of test cases. This is followed by **T** lines, each containing an integer, **N**.

Output

Print the required answer for each test case in a new line.

Constraints

$$1 \leq T \leq 100$$

$$101101 < N < 1000000$$

Sample Input	Sample Output
2 101110 800000	101101 793397
3 150000 178047 847523	149941 174471 840048

Problem C: Number of Islands

Problem

Given an $m \times n$ 2D binary grid which represents a map of 'L's (land) and 'W's (water), return the number of islands.

An island is surrounded by water and is formed by connecting adjacent lands horizontally, vertically, or diagonally. You may assume all four edges of the grid are all surrounded by water.

Input

First line contains **T** which denotes the number of test cases.

The first line of each test case contains 2 integers **m** and **n**, the dimensions of the grid.

The following m lines contain the grid.

Output

Print a single integer corresponding to each test case.

Constraints

Sample Input	Sample Output
1 4 5 LLLLW LLWLW LLWWW WWWWW	1
1 4 5 LLWWW LLWWW WWLWW WWWLL	1

Problem D: Prime Extreme

Problem

By listing the first six prime numbers: **2, 3, 5, 7, 11** and **13**, we can see that the **6th** prime number is **13**.

What is the **Nth** prime number?

Input Format

First line contains **T** that denotes the number of test cases.
This is followed by **T** lines, each containing an integer, **N**.

Output Format

Print a single integer corresponding to each test case.

Constraints

$$1 \leq T \leq 10^3$$

$$1 \leq N \leq 10^4$$

Sample Input	Sample Output
2 3 6	5 13
4 4 8 11 13	7 19 31 41