# Happy Happy Prime Prime

RILEY VASHTEE: [reading from display] Find the next number in the sequence:

313 331 367 ...? What?

THE DOCTOR: 379.

MARTHA JONES: What?

THE DOCTOR: It's a sequence of happy primes - 379.

MARTHA JONES: Happy what?

THE DOCTOR: Any number that reduces to one when you take the sum of the square of its digits and continue iterating it until it yields 1 is a happy number. Any number that doesn't, isn't. A happy prime is both happy and prime.

THE DOCTOR: I dunno, talk about *dumbing down*. Don't they teach recreational mathematics anymore?

Excerpted from "Dr. Who," Episode 42 (2007).

The number 7 is certainly prime. But is it happy?

$$7 \rightarrow 7^2 = 49$$

$$49 \rightarrow 4^2 + 9^2 = 97$$

$$97 \rightarrow 9^2 + 7^2 = 130$$

$$130 \rightarrow 1^2 + 3^2 = 10$$

$$10 \rightarrow 1^2 + 0^2 = 1$$

It is happy:-) As it happens, 7 is the smallest happy prime. Please note that for the purposes of this problem, 1 is not prime.

For this problem you will write a program to determine if a number is a happy prime.

#### Input

The first line of input contains a single integer P, (1  $\leq P \leq 10\,000$ ), which is the number of data sets that follow. Each data set should be processed identically and independently.

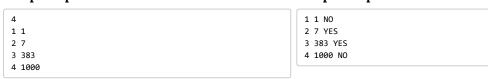
Each data set consists of a single line of input. It contains the data set number, K, followed by the happy prime candidate, m,  $(1 \le m \le 10\,000)$ .

### Output

For each data set there is a single line of output. The single output line consists of the data set number, K, followed by a single space followed by the candidate, m, followed by a single space, followed by YES or NO, indicating whether m is a happy prime.

## Sample Input 1

## Sample Output 1



Problem ID:happyprime Time limit:1 second Memory limit:1024 MB Difficulty:2.4

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