D • 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?

$$\begin{aligned} 7 &\rightarrow 7^2 = 49 \\ 49 &\rightarrow 4^2 + 9^2 = 97 \\ 97 &\rightarrow 9^2 + 7^2 = 130 \\ 130 &\rightarrow 1^2 + 3^2 = 10 \\ 10 &\rightarrow 1^2 + 0^2 = 1 \end{aligned}$$

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, ($1 \le P \le 1000$), 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, ($1 <= m <= 10000$).

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	Sample Output
4 1 1 2 7 3 383 4 1000	1 1 NO 2 7 YES 3 383 YES 4 1000 NO