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, $(1 \leq P \leq 10000)$, 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, $(1 \leq m \leq 10000)$.

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 1

```
4
1 1
2 7
3 383
4 1000
```

Sample Output 1

```
1 1 NO
2 7 YES
3 383 YES
4 1000 NO
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