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, $(1 \leq P \leq 1000)$, 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, $(1 \leq m \leq 10000)$.

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

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

Sample Output

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