Interactive Primality

Input file:	*standard input*
Output file:	*standard output*
Time limit:	10 seconds
Memory limit:	1024 mebibytes

This is an interactive problem.

The jury has chosen $T \leqslant 10$ integers from 1 to 10^{18} inclusive. You need to guess all these numbers one by one.

Let us say the jury has chosen the number x. You can repeatedly call out an integer y from 1 to 10^{18} inclusive, and in response, you will be informed whether the number $x + y$ is prime or composite. When you guess the number, state it, and then start guessing the next one.

In all tests except for the example, all T numbers are chosen independently and uniformly at random from the interval $[1; 10^{18}]$. You need to guess all of them using a total of no more than 8750 queries.

Interaction Protocol

First, read a line with the integer T: the number of integers chosen by the jury ($1 \leq T \leq 10$). The jury chose T secret integers $x_1, \ldots, x_T$, and you need to guess them all in turn ($1 \leq x_i \leq 10^{18}$).

Assume you are trying to guess the number x_i. To make a query, print a line formatted as "`?` y" ($1 \leq y \leq 10^{18}$). Then read the next line:

- if $x_i + y$ is prime, you will read the word "`Prime`";
- if $x_i + y$ is composite, you will read the word "`Composite`";
- if you made an incorrect query (the 8751st during the entire program run; or one that does not fit the specified format; or one in which y is not a positive integer within the required limits), you will read the word "`Busted`".

When you think you know that $x_i = z$, print a line formatted as "`!` z" ($1 \leq z \leq 10^{18}$). This line is not counted towards the query limit. Then read the next line:

- if indeed $x_i = z$, you will read the word "`Correct`". If $i = T$, the program should terminate; otherwise, proceed to guess the number x_{i+1}.
- if $x_i \neq z$ or if you violated the output format, you will read the word "`Busted`".

After reading "`Busted`", your program must immediately terminate to get `Wrong Answer` verdict. Otherwise, the verdict will be unpredictable.

Example

standard input	*standard output*
1 Composite Prime Prime Prime Correct	? 6 ? 5 ? 3 ? 1 ! 2

Note

There are exactly 30 tests. In the i-th test, $T = \min\{i, 10\}$. In each test, the T chosen integers are fixed in advance: they are the same for each run of each solution and don't change during the interaction.