Hidden Integer

Time limit:	2 seconds
Memory limit:	1024 megabytes

This is an interactive problem.

The interactor has a hidden integer n between 1 and 10^9, inclusive. Your task is to determine it.

For each query, you choose an integer x between 1 and 10^9, inclusive. The response is

$$(n \bmod x) \bmod 2.$$

Here $a \bmod b$ denotes the remainder when a is divided by b.

You may make at most 30 queries.

Interaction Protocol

The interactor does not send any initial input.

To make a query, print a line of the form "`? x`", where x is an integer ($1 \le x \le 10^9$). Then read the response, either 0 or 1, equal to $(n \bmod x) \bmod 2$.

When you have determined n, print a line of the form "`! n`", where n is the hidden integer ($1 \le n \le 10^9$). Then terminate the program.

You may make at most 30 queries. Printing the final answer does not count as a query.

The interactor is not adaptive: the hidden value n is fixed before the interaction begins.

Example

standard input	standard output
1 0 0	? 12 ? 3 ? 5 ! 5

Note

This example shows a possible exchange with $n = 5$, so the final answer is correct. In a test with $n = 15$, the same queries would produce the same responses, but the final answer would be wrong. These queries alone do not determine the hidden integer.

The blank lines in the example show the order of queries and responses. They are not part of the actual interaction.