

## Problem A. Turn on the Light

Input file:            standard input  
Output file:           standard output  
Time limit:            2 seconds  
Memory limit:         1024 megabytes

**This is an interactive problem.**

Putata has  $n$  lights numbered from 1 to  $n$  from left to right. Initially, all the lights are off. One of the lights is his favorite light, and the number of the light is hidden. Budada wants to know the number of Putata's favorite light, and he can make the following query:

- “?  $x$ ”: Turn on the light numbered  $x$  if the light numbered  $x$  is off, and ask Putata the **absolute value** of the number of lights turned on on the left of Putata's favorite light minus the number of lights turned on on the right. Please notice that you can **not** turn off the light.

Budada can only make no more than 40 queries. Please help him find Putata's favorite light.

In this problem, the interactor is **adaptive**, which means that the answer might not be fixed beforehand and the interactor can select it arbitrarily and the answer will be consistent with your interaction with the interactor.

### Input

The first line contains an integer  $n$  ( $1 \leq n \leq 10^6$ ), denoting the number of lights.

### Interaction Protocol

You can make no more than 40 queries. To make a query, output “?  $x$ ” ( $1 \leq x \leq n$ ) on a separate line, then you should read the response from standard input.

In response to the query, the interactor will output the absolute value of the number of lights turned on on the left of Putata's favorite light minus the number of lights turned on on the right.

To give your answer, print “!  $x$ ” ( $1 \leq x \leq n$ ) on a separate line, where  $x$  is the number of Putata's favorite light. The output of the answer is **not** counted towards the limit of 40 queries.

After that, your program should terminate.

After printing a query, do not forget to output end of line and flush the output. To do this, use `fflush(stdout)` or `cout.flush()` in C++, `System.out.flush()` in Java, `flush(output)` in Pascal, or `stdout.flush()` in Python.

### Example

standard input	standard output
3	? 1
1	? 2
2	? 3
2	! 3