

Problem E. Einstein

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 256 mebibytes

This is an interactive problem.

Doubtlessly, Albert Einstein has done a lot for modern physics. However, there are some funny things attributed to him. For example, Einstein's five-houses riddle: a puzzle where you are given a bunch of information of the kind "the Brit lives in the red house" or "the person who smokes Pall Mall rears birds", and you should determine who lives in which house. There is a rumor that once Einstein's friends could not find out where is his own house because he told them his address with a puzzle! His friends made guesses: "I think you live in the house number x ", and Einstein replied: "You are right!" or "You are wrong, and exactly k of your friends' guesses were closer to my house than yours". Luckily, now you don't have to solve any puzzles and may visit Einstein's museum in Bern, Kramgasse 49.

But if you want to practice in guessing, we can help. Jury has selected an **odd** number from 1 to n , and you have to guess it. You can post **even** numbers as queries, and for each query, you will receive the number of your previous queries which were closer to the selected number than the last query. Your task is to finally guess the selected number by posting an **odd** number as a guess.

You are allowed to make no more than 7 posts, including the final guess.

Interaction Protocol

You will play several games (test cases) in one test, from 1 to 100. When a new test case starts, you are given a line with one integer n ($1 \leq n \leq 100$, n is even). If $n = 0$, your program must quit immediately.

To make a query, print a single line "? x " with an even integer x ($0 \leq x \leq n$). A response to each query will be a single integer on a separate line: the number of your previous queries which were closer to the selected number than the last query.

To make a guess, print a single line "! y " with an odd integer y ($0 \leq y \leq n$). If you guessed correctly, the evaluation will proceed to the next test case. Otherwise, it will terminate with the outcome "Wrong Answer".

The total number of lines printed to solve a single test case can not be more than 7. If you print more lines, the evaluation will terminate with the outcome "Wrong Answer".

Do not forget to flush the output after each printed line. Otherwise, your solution will likely be terminated with the outcome "Idleness Limit Exceeded".

In each test case of each test, the number that you must guess is fixed and will be the same each time your solution is evaluated on that test case.

Example

standard input	standard output
2	
	! 1
6	
	? 2
0	
	? 6
1	
	? 0
1	
	! 3
0	