

Guess the number

0.3 s/256 MiB

Write a program that guesses an integer X in the range $1, \dots, N$.

Communication

This is an interactive task. When your program starts, the first line of input contains the integer N ($1 \leq N \leq 10^9$). The value of X is kept secret by the grading system.

Then your program can issue queries by writing them to the output in the form “? P ”, where P is an integer ($1 \leq P \leq N$). The grading system writes the response in the next line of the input. The response is -1 if $P < X$, 0 if $P = X$, and 1 if $P > X$. Your program may issue at most 50 queries in each test case.

When your program wants to guess the number X , it should output “= X ” ($1 \leq X \leq N$) and terminate. The grading system will not respond to this output and will not accept further queries after that.

Notes

To establish proper communication between your program and the grading system, you should flush the output stream after each query (Table 1).

Language	Command
C++	<code>std::cout << std::endl;</code> ¹
Java	<code>System.out.flush();</code>
Python	<code>sys.stdout.flush()</code>

Table 1: Flush commands

It is possible to receive an “Output isn’t correct” outcome even after printing a correct answer, if task constraints were violated during the communication. Violating the communication protocol itself may result in an “Execution killed” outcome.

Submitting user tests requires specifying an input file with the testcase parameters. The format of the input file is “ N X ” on a single line.

Example

Input	Output
5	? 1
-1	? 3
1	? 2
0	= 2

In this example, the secret value X was 2.

Grading

The test groups satisfy the following conditions:

- (29 points) $1 \leq N \leq 50$
- (71 points) No further constraints

¹`std::endl` writes a newline and flushes the stream.