

Guess A Number

Input file: `stdin`
Output file: `stdout`
Time limit: 3 seconds
Memory limit: 256 megabytes

This is an interactive problem.

Petya and Vasya are playing a game. The game consists of several rounds. At the beginning of each round Petya secretly chooses a number x from 1 to n (n is independent of the round number). Then Vasya can name a number y from 1 to n and Petya tells if y is less than x . Each round Vasya can name as many numbers as he wants. After that Vasya must name the number x . Vasya's goal is to guess the number correctly while making as few guesses as possible.

Help Vasya write a program that plays the game.

It is guaranteed that Petya won't change the chosen number during the round. However, at the beginning of a new round he can choose the number based on Vasya's behaviour during the past rounds.

Input

The first line contains two integers: maximal number n that can be guessed by Petya and the number of rounds k ($1 \leq n \leq 10^9$, $k = 10^4$).

After that each query is followed by Petya's answer. Each answer is «<» is Petya's number is less than the number in the query, or «>=» otherwise.

No response follows an attempt to guess the number.

Output

You should process all k rounds. Each line of output should contain exactly one query of form

`c x`

`c` — a single character describing the query type: '?' for a question, and '=' for a guess attempt.

`x` — an integer from 1 to n .

Total number of ?-queries should not exceed $k(\log_2(n + 1) + 0.1)$.

Examples

stdin	stdout
4 2	? 3
<	? 2
>=	= 2
>=	? 3
>=	? 4
	= 4

Note

Note that the sample test case is invalid since $k \neq 10^4$. Instead, the first test case will be this: 4 10000