Problem B. Random Interactive MST Bot

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

How do setters come up with problems? Sometimes they just take a couple of buzzwords and smash them together. But we are in 2024, so this totally can be outsourced to AI. Introducing our creation based on ChatGPT: RICH B! And its second official problem:

Prompt: Minimum Spanning Tree

Problem: A complete graph with n nodes and $\frac{n \cdot (n-1)}{2}$ edges is chosen. Each edge is randomly assigned a real-valued weight within the range of $[0, 1]$. Your task is to find its minimum spanning tree. But you are not given the edges. Instead, you can make queries of the form "`?` v_1 u_1 v_2 u_2", and the jury program will respond to you with 1 if the weight of edge (v_1, u_1) is less than the weight of edge (v_2, u_2), and it will respond with 0 if it's not.

When you think that you know the minimum spanning tree, print it as "`!` v_1 u_1 v_2 u_2 ... v_{n-1} u_{n-1}", where edges (v_i, u_i) form the minimum spanning tree. Constraints: $2 \le n \le 100$, and you can make at most 6000 queries.

Interaction Protocol

First, read a line that contains a single n ($2 \le n \le 100$): the size of the graph.

To compare two edges, print a single line in the following format: "`?` v_1 u_1 v_2 u_2". You will then have to read a line with the result of the comparison: 1 if the weight of the first edge is less than the weight of the second edge, or 0 otherwise.

To output the answer, print a single line in the following format: "`!` v_1 u_1 v_2 u_2 ... v_{n-1} u_{n-1}". Your program has to immediately terminate after printing this line, otherwise, you may get unpredictable verdicts.

In every line you print, (v_i, u_i) should be pairs of integers where $1 \le v < u \le n$), otherwise, you may get unpredictable verdicts.

Your program should not make more than 6000 comparisons.

Example

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

Note

The Minimum Spanning Tree (MST) of a graph is defined as the graph's spanning tree having the minimum possible total weight.

A spanning tree is a connected subgraph of the given graph that contains all of the graph's vertices and does not contain cycles.

The interactor is **not adaptive**.

Remember to end the line and flush the output after every line you print. To flush the output, you can use `fflush(stdout)` in C/C++, `System.out.flush()` in Java, or `sys.stdout.flush()` in Python.