Problem G. CNOI Knowledge

This is an interactive problem.

CNOI, or Chinese Olympiad in Informatics, is generally used to refer to a series of Olympiad in Informatics competitions in China. Competitors in China excel at solving intricate data structure problems and complex combinatorial counting problems. Furthermore, students are diverse in their interests and personalities, and the community embraces this diversity.

Mr. Wuwuwu, an anonymous teacher, is a grandmaster in CNOI techniques. He really enjoys different kinds of data structure problems and often wonders if he can get something new out of them. Today, he is teaching one of his students Little Cyan Fish how to solve the following problem.

Figure 2: The yellow hibiscus, also known as **pua alo alo**, is Hawaii's state flower.

Original Problem
You are given a string S of length n consisting of positive integers in $[1, 10^9]$. You need to handle q queries. In each query, you are given two integers l and r. You need to count the number of distinct substrings in the string $S[l \cdots r]$.

This problem first appeared in China about 10 years ago and has since become well-known worldwide. However, Mr. Wuwuwu thought this problem was too easy for the year 2024, so he presented a slightly different version:

New Problem
There is a string S of length n consisting of positive integers in $[1, 10^9]$. You can do the following queries for at most 10^4 times:

- ? l r: Ask for the number of distinct substrings in the string $S[l \cdots r]$ $(1 \le l \le r \le n)$.

Your task is to recover the original string S by using these queries. If there are multiple possible strings , you may print any of them. In particular, a string T will be considered as a correct answer if and only if the number of distinct substrings in the string $S[l \cdots r]$ equals to the number of distinct substrings in the string $T[l \cdots r]$ for all $1 \le l \le r \le n$.

Can you show Mr. Wuwuwu that you can solve this new problem?

Interaction Protocol

The first line of the input contains a single integer n $(2 \le n \le 10^3)$.

Then, the interaction begins. You may perform at most 10^4 queries in the interaction process. To perform a query, you need to print a single line "`?` l r" $(1 \le l \le r \le n)$, indicating a query. Then, you need to read the result of your query from the standard input.

To give your answer, you need to print "`!` s_1 s_2 $\cdots$ s_n" $(1 \le s_i \le 10^9)$. If there are multiple possible answers, you may print any of them. Printing the answer is not considered a query and does not count toward the limit (10^4) on the number of queries. After printing your answer, you need to terminate your program immediately.

After printing a query, do **NOT** forget to output an 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.

In this problem, it is guaranteed that the interactor is **non-adaptive**. That is, the string s is decided before the interaction process. They will not be changed based on your queries.

Example

standard input	standard output
12 1 3 72 25 19	 ? 1 1 ? 1 2 ? 1 12 ? 6 12 ? 5 10 ! 6 12 15 23 5 18 12 5 20 20 5 18