# Task Procesor

Initially, Fran has an empty array $a$. Fran processes $n$ queries of the form $x$ — he appends $x$ elements to the end of $a$. After each query, Fran wants to determine the smallest element in the array $a$, and once he identifies it, he removes it from the array without altering the indices of the other elements.

Your task is to determine the smallest element of the array for each query by asking questions.

## Interaction

This is an interactive task. Your goal is to write a program that responds to the queries.

The input begins with a single line containing $n$ — the number of queries ($1 \leq n \leq 40$). Then, $n$ queries follow, each starting with $x_i$ — the number of elements added to the array ($1 \leq x_i \leq 2000$).

After each query, your program may ask questions of the form ? $i$ $j$. The interactor will respond with 0 if $a_i < a_j$, or 1 if $a_i > a_j$. You may assume all elements in the array are distinct. $i \neq j$ must hold, and indices $i$ and $j$ must not correspond to already removed elements.

After determining the smallest element, you must print ! $x$, which indicates that $a_x$ is the smallest element in the array $a$ (excluding already removed elements). The index $x$ must not correspond to an already removed element.

You may ask questions multiple times, and after printing the smallest element, the next query begins.

Once you determine the smallest element, the interaction continues with subsequent queries. After the last query, the interaction ends, and your solution is evaluated based on the number of questions asked.

The total length of the array will not exceed 2000.

## Scoring

Your program will earn points based on the number of questions asked. Let $q$ be the total number of questions your program asked.

- If $q \leq 2700$, your program will earn 120 points.
- If $2700 < q \leq 7000$, your program will earn 75 points.
- If $7000 < q \leq 2 \cdot 10^4$, your program will earn 35 points.
- If $2 \cdot 10^4 < q \leq 8 \cdot 10^4$, your program will earn 15 points.

## Sample Cases

**input**

```
3
3

1

0

0

1

1

1

0
```

**output**

```
? 1 2

? 1 3

? 2 3

! 2

? 1 4

! 4

? 1 5

! 1
```

**Explanation of the Sample Case:**
The final array is of the form $3, 2, 4, 1, 5$.

The first query outputs 1 because $a_1 > a_2$.

The second query outputs 0 because $a_1 < a_3$.

The third query outputs 0 because $a_2 < a_3$.

After this, it can be determined that $a_2$ is the smallest current element, so the output is `! 2`. The interaction continues with the subsequent queries.