How to Validate Such a Program

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

This is an interactive problem.

KUPC-kun wrote a program that solves the following problem.

> You are given a tree $T = (V, E)$ with N vertices.
> For a sequence $\{a_1, \ldots, a_k\}$ of vertices of T of length k, define its score as follows.
>
> - Let $d(u, v)$ be the number of edges on the path between vertices u and v in T. Then the score is $\prod_{i=1}^{k} d(a_i, a_{(i \bmod k)+1})$
>
> A subset S of V is given. For each $1 \leq k \leq N$, find the following value q_k.
>
> - The sum of the scores over all vertex sequences $\{a_1, \ldots, a_k\}$ of length k whose elements belong to S, taken modulo $2^{61} - 1$

KUPC-kun secretly keeps the information of the tree T in advance, and continues using T as the tree given to the program.

You are trying to recover the information of the leaves using the above program. Letting the number of vertices of the tree be N, you may ask the following question at most N times.

- Choose a subset S of V and ask for the output of the program.

Assuming that KUPC-kun's program is correct, identify all leaves contained in the tree T from the information obtained through the questions.

The judge is not adaptive, and the tree T is fixed before the interaction begins.

Interaction Protocol

First, N is given from standard input. ($2 \leq N \leq 50$)

For each question, output to standard output in the following format.

`?` $s_1 s_2 \cdots s_N$

Here, $s_1 s_2 \cdots s_N$ is a string of length N representing the subset S, where $s_i = 1$ if $i \in S$, and $s_i = 0$ if $i \notin S$.

In response, the following is given from standard input.

$q_1\ q_2\ \cdots\ q_N$

Once you have identified all leaves, output your answer in the following format.

`!` $t_1 t_2 \cdots t_N$

Here, $t_1 t_2 \cdots t_N$ is a string of length N, where $t_i = 1$ if i is a leaf, and $t_i = 0$ if it is not a leaf.

After this output, terminate your program immediately.

Whenever you output something, append a newline at the end and flush standard output.

Example

standard input	standard output
5 0 8 0 32 0 0 44 108 968 3960 0 0 0 0 0 0 76 348 3336 22200	? 00101 ? 11001 ? 10000 ? 11111 ! 11001

Note

For the first example, the edge set of the tree secretly held by the judge is $(1,3),(2,3),(3,4),(4,5)$.

In the first question, $S=\{3,5\}$.

Note that $d(3,3)=0, d(3,5)=d(5,3)=2, d(5,5)=0$.

For example, there are the following 4 vertex sequences a of length 2 whose elements belong to S.

- If $a=(3,3)$, then the score of this sequence is $d(3,3)\times d(3,3)=0\times 0=0$
- If $a=(3,5)$, then the score of this sequence is $d(3,5)\times d(5,3)=2\times 2=4$
- If $a=(5,3)$, then the score of this sequence is $d(5,3)\times d(3,5)=2\times 2=4$
- If $a=(5,5)$, then the score of this sequence is $d(5,5)\times d(5,5)=0\times 0=0$

The judge responds with 8 for q_2, which is the remainder when $0+4+4+0$ is divided by $2^{61}-1$.

By computing similarly for the other sequence lengths, we obtain the judge's response `0 8 0 32 0`.

The leaves of this tree are vertices $1,2,5$, and outputting `! 11001` correctly completes the identification of the leaves.