



Minimum XOR

There is a set of n nonnegative integers x_1, \dots, x_n that you have to determine.

For determining it, you can make the following type of query: you give a nonnegative integer y and it is returned to you the value $\min_{i=1, \dots, n} (x_i \oplus y)$, where \oplus is the bitwise exclusive-or operation (XOR). You must find the values of the n numbers using at most 20000 queries.

$$\begin{array}{r} 11010 \\ \oplus 01110 \\ \hline 10100 \end{array}$$

Input and output

This is an interactive problem. You must flush the output (`cout << endl` or `cout << flush` in C++, `System.out.flush()` in Java, `stdout.flush()` in Python).

The first line of the input contains an integer n , the number of elements of the set. You must read this value before making any query.

For making a query you must write a line in the format `? y`, where y is an integer that must satisfy $0 \leq y < 2^{30}$. Después making a query, you must read from the input an integer, the result. If you make an invalid query or exceed the query limit you will read -1 , if your program reads -1 it must terminate immediately.

Once you have determined the n numbers, you must write a line with the format `! x_1 x_2 ... x_n`, where $x_1 < x_2 < \dots < x_n$ are the n integers of the set **in ascending order**. After writing this, your program must terminate.



Sample

Input:

```
3
1
1
0
1
```

Output:

```
? 1
? 2
? 3
? 4
! 0 3 5
```

Explanation: The hidden values are 0, 3, 5. The first line is n , the number of values. Then a query with $y = 1$ is made: the interactor computes $0 \oplus 1 = 1, 3 \oplus 1 = 2, 5 \oplus 1 = 4$ and returns the smallest value, which is 1. Then for $y = 2$, $0 \oplus 2 = 2, 3 \oplus 2 = 1, 5 \oplus 2 = 7$ and 1 is returned. With $y = 3$, $1 \oplus 3 = 2, 3 \oplus 3 = 0, 5 \oplus 3 = 6$ and 0 is returned. With $y = 4$, $1 \oplus 4 = 5, 3 \oplus 4 = 7, 5 \oplus 4 = 1$ and 1 is returned. Finally, the elements of the set are given.

Constraints

$1 \leq n \leq 10000$.

$0 \leq x_i < 2^{30}$. The n values of x_i are distinct numbers.

You can make at most 20000 queries (giving the answer does not count as a query).

Subtasks

1. (7 points) $x_i < 20000$.
2. (13 points) $x_i < 2^{15}$.
3. (8 points) $n = 2$.
4. (20 points) $n \leq 300$.
5. (12 points) $n \leq 600$.
6. (20 points) $n \leq 5000$.
7. (20 points) No additional constraints.