ICPC Shenyang in NEU, the Tenth Consecutive Year

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

This is an interactive problem.

Dear friends, welcome to Shenyang! As the problem setters, along with the entire staff, we are deeply honored to have all of you here to enjoy a well-prepared event and witness the tenth consecutive year since Northeastern University (NEU) started organizing the ICPC Shenyang Regional Contest.

The Lovely Northeastern University

Northeastern University (NEU) was founded on April 26, 1923. In its history of over 90 years, the university has formed its unique spirit: "Striving constantly for improvement and behaving in conformity with truth". It has gained a number of high-level scientific research achievements, such as the first analog computer, the first domestically produced CT, the first piece of super steel, the new technology of smelting vanadium titanium magnetite, the energy-saving theory and technology of steel industry, the controlled rolling and controlled cooling technique, and the mixed intelligent optimization control technology. By establishing the first university science park in China, it has established a series of high-tech enterprises, such as the Neusoft Corporation and the Neunn Technology Inc., and formed its unique characteristics in the areas of technological innovation, technological transfer and industry-university cooperation.

The university is situated in Shenyang, the central city of the Northeastern China, and it also has a campus in Qinhuangdao City, Hebei Province. The university occupies a total area of 2,550,000 square meters, of which the architectural area amounts to 1,680,000 square meters. It has 4,538 faculty members, among whom 2,711 are full-time teachers. The university has 5 academicians of the Chinese Academy of Engineering, 4 foreign academicians, 18 scholars who are selected into "National High-level Personnel of Special Support Program", 23 winners of "The National Science Fund for Distinguished Young Scholars", 16 winners of the "Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao", 102 who are selected into the "New Century Excellent Talents Support Project", and 14 who are selected into "the National Outstanding Talents Project". The university has 4 innovation groups of the National Natural Science Foundation and 3 innovation teams of the Ministry of Education. It has more than 100 research institutes including 3 national key laboratories, 4 national engineering (technology)

research centers and 3 national engineering laboratories. Besides, it has 2 national collaborative innovation centers and 3 collaborative innovation centers of Liaoning province.

You may view the website "About NEU-Northeastern University" for more related information.

Little Q reaches a year between 1923 and 2023 via a time machine to visit NEU in history. He tries to find out which year he has reached by asking at most 100 queries to passers-by.

Each query consists of an integer x. The interactor will output an integer t ($t \in \{0, 1\}$) as the answer.

- If $t = 0$, the year he has reached is not x;
- Otherwise, the year he has reached is x.

Note that the interactor is adaptive, meaning that the answer for each test case is not pre-determined. The interactor can determine the year he has reached, as long as it does not conflict with the previous queries and answers.

Input

The first line of the input contains an integer T ($1 \leq T \leq 100$), indicating the number of test cases. There is no extra input for each test case.

Interaction Protocol

If you want to ask a query, output one line. Firstly output `?` followed by a space, and then output an integer x ($1923 \leq x \leq 2023$). After flushing your output, your program should read a single integer t, indicating the answer to your query.

If you want to guess the year, output one line. Firstly output `!` followed by a space, and then output an integer y ($1923 \leq y \leq 2023$), indicating the year. After flushing your output, your program should continue processing the next test case, or exit immediately if there are no more test cases. Note that your guess does not count as a query.

To flush your output, you can use:

- `fflush(stdout)` (if you use `printf`) or `cout.flush()` (if you use `cout`) in C and C++.
- `System.out.flush()` in Java and Kotlin.
- `stdout.flush()` in Python.

Example

standard input	standard output
1 0 1	? 2023 ? 1923 ! 1923

Note

The blank lines in the sample case are added for readability. In your output, extra spaces or blank lines will be ignored.