Problem K. Three Hundred Queries

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	1024 mebibytes

This is an interactive problem. You have to use `flush` operation right after printing each line. For example, in C++ you should use the function `fflush(stdout)` or `cout.flush()`, in Java or Kotlin — `System.out.flush()`, and in Python — `sys.stdout.flush()`.

You are given a circle and 10^9 points on it. The points are uniformly distributed and numbered from 0 to $10^9 - 1$ in clockwise order.

Let us define the *distance* between points i and j as $d(i, j) = \min(|i - j|, 10^9 - |i - j|)$, or the length of the shorter of the two arcs that the given points divide the circle into.

Among these points, the system has chosen and hidden exactly three distinct points. Your task is to determine the lengths of the arcs between the hidden points.

You can ask queries of the following form:

- you can choose any point $x \in [0, 10^9 - 1]$ and ask about it;
- the system will calculate the distance from x to each of the hidden points and return the smallest of the **non-zero** distances.

You can ask no more than 300 queries, but there is a catch: after every third query, the circle is cyclically shifted by a random integer. In other words, after responding to the 3-rd, 6-th, 9-th, and so on queries, a random number s is chosen, and each hidden point i is shifted to $i' = (i + s) \bmod 10^9$.

In every test case, the points are fixed beforehand, but the shifts are always random. For each shift, every integer $s \in [0, 10^9 - 1]$ is chosen with the same probability.

Interaction Protocol

Initially, the jury program prints one line containing a single integer t ($1 \le t \le 10$) — the number of test cases.

To ask a query, you should print a line in the following format:

- `?` x ($0 \le x < 10^9$) — the point you are asking about.

In response, the jury program will print one line containing a single integer — the minimum non-zero integer from $[d_1, d_2, d_3]$, where d_i is the distance from x to the i-th hidden point.

To give the answer, you should print a line in the following format:

- `!` a b c ($1 \le a, b, c \le 10^9$), where a, b, and c are the lengths of the arcs between the hidden points.

You can output the lengths of the arcs in any order. However, note that the lengths of the arcs do not always coincide with the distances between the points as defined in the problem. In other words, the sum $a + b + c$ must be equal to 10^9.

After printing the answer, you should proceed to the next test case (or terminate the program if this was the last test case).

After printing anything, do not forget to flush the output buffer. Otherwise, you may get the `Idleness Limit Exceeded` verdict.

Example

standard input	standard output
2 1 1 1 218790401 2 200000000 150000000	 ? 0 ? 1 ? 2 ? 0 ? 781209599 ! 2 1 999999997 ? 500000000 ? 150000000 ! 300000000 400000000 300000000

Note

Note that empty lines are added only for readability — the interactor will not add empty lines.

In the first test case, the points $[1, 2, 4]$ were hidden. After the third query, they were shifted by $781\,209\,595$ (the value is chosen only for example).

In the second test case, the points $[0, 300\,000\,000, 700\,000\,000]$ were hidden.