Problem J. Two Airlines

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	256 mebibytes

This is an interactive problem.

In Berland, there are two airlines: Aeroshipping and Wicktory (it was called Kindplane earlier). Since Berland is a developed country, for each pair of cities, there is an airline which provides flights between them. Since Berland is an economical country, for each pair of cities, there is only one such airline.

The cities of Berland are numbered from 1 to n (so there are n cities in Berland). One tourist wants to travel around Berland, that is, he wants to visit each city exactly once and finish his trip in the city where he started. The starting city can be chosen arbitrarily.

As the tourist doesn't want to annoy the airlines' staff, he wants to change airline no more than once. Unfortunately, the tourist does not know which airline controls each of the possible flights. To learn that, he can ask questions of the form "which airline controls the flight from city u to city v"? Obviously, the tourist doesn't want to waste too much time, so he decided to ask no more than $2n$ such questions.

Help the tourist to make such a route! It is guaranteed that the answer exists.

Interaction Protocol

At first, you are given only the integer n, the number of cities in Berland ($3 \le n \le 777$).

Each time you want to know which airline connects cities u and v ($1 \le u, v \le n$; $u \ne v$), print a single line "`?` u v".

After each query, you will be given a line with one character which will be either "`A`" or "`W`": the first letter of the name of airline which connects the respective pair of cities.

If you make more than $2n$ queries, your solution will be terminated with outcome "`Wrong Answer`".

When you are ready to offer a route, print a single line "`!` a_1 a_2 ... a_n" which lists the numbers of cities in your trip in the order of visiting them. In this trip, all flights between adjacent cities must be provided by the same airline, or there must exist an integer k such that each flight between adjacent cities among $a_1, \ldots, a_k$ is provided by one airline, and each flight between adjacent cities among $a_k, \ldots, a_n, a_1$ is provided by the other airline (remember that the tourist must travel from a_n to a_1 at the end of his trip!). It is guaranteed that there exists at least one solution satisfying the above constraints.

After printing a route, your program must exit immediately.

Do not forget to end your lines with "new line" characters, and flush your output after each query.

Example

standard input	standard output
5 A A W W W	? 1 5 ? 5 4 ? 4 3 ? 3 2 ? 2 1 ! 1 5 4 3 2