

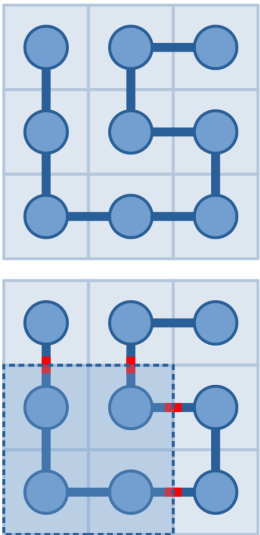
E. Serval and Snake

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

This is an interactive problem.

Now Serval is a senior high school student in Japari Middle School. However, on the way to the school, he must go across a pond, in which there is a dangerous snake. The pond can be represented as a $n \times n$ grid. The snake has a head and a tail in different cells, and its body is a series of adjacent cells connecting the head and the tail without self-intersecting. If Serval hits its head or tail, the snake will bite him and he will die.

Luckily, he has a special device which can answer the following question: you can pick a rectangle, it will tell you the number of times one needs to cross the border of the rectangle walking cell by cell along the snake from the head to the tail. The pictures below show a possible snake and a possible query to it, which will get an answer of 4.



Today Serval got up too late and only have time to make 2019 queries. As his best friend, can you help him find the positions of the head and the tail?

Note that two cells are adjacent if and only if they have a common edge in the grid, and a snake can have a body of length 0, that means it only has adjacent head and tail.

Also note that the snake is sleeping, so it won't move while Serval using his device. And what's obvious is that the snake position does not depend on your queries.

Input

The first line contains a single integer n ($2 \leq n \leq 1000$) — the size of the grid.

Output

When you are ready to answer, you should print ! x_1 y_1 x_2 y_2 , where (x_1, y_1) represents the position of the head and (x_2, y_2) represents the position of the tail. You can print head and tail in any order.

Interaction

To make a query, you should print ? x_1 y_1 x_2 y_2 ($1 \leq x_1 \leq x_2 \leq n$, $1 \leq y_1 \leq y_2 \leq n$), representing a rectangle consisting of all cells (x, y) such that $x_1 \leq x \leq x_2$ and $y_1 \leq y \leq y_2$. You will get a single integer as the answer.

After printing a query, do not forget to output the end of line and flush the output, otherwise you will get `Idleness limit exceeded`. To do this, use:

Codeforces Round #551 (Div. 2)

Finished

Practice



→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++11 5.1.0

Choose file: 未选择任何文件

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

→ Problem tags

binary search brute force *2100
No tag edit access

→ Contest materials

- Announcement (en)
- Tutorial (en)

- `fflush(stdout)` or `cout.flush()` in C++;
- `System.out.flush()` in Java;
- `flush(output)` in Pascal;
- `stdout.flush()` in Python;
- see documentation for other languages.

Answer `−1` instead of a valid answer means that you made an invalid query or exceeded the maximum number of queries. Exit immediately after receiving `−1` and you will see `Wrong answer` verdict. Otherwise you can get an arbitrary verdict because your solution will continue to read from a closed stream.

If your program cannot find out the head and tail of the snake correctly, you will also get a `Wrong Answer` verdict.

Hacks

To make a hack, print a single integer n ($2 \leq n \leq 1000$) in the first line, indicating the size of the grid.

Then print an integer k ($2 \leq k \leq n^2$) in the second line, indicating the length of the snake.

In the next k lines, print k pairs of integers x_i, y_i ($1 \leq x_i, y_i \leq n$), each pair in a single line, indicating the i -th cell of snake, such that the adjacent pairs are adjacent, and all k pairs are distinct.

Examples

input

Copy

2
1
0
0

output

Copy

? 1 1 1 1
? 1 2 1 2
? 2 2 2 2
! 1 1 2 1

input

Copy

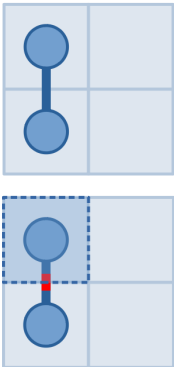
3
2
0

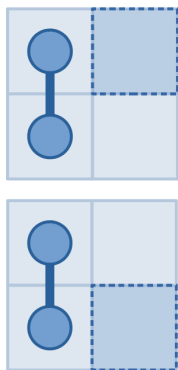
output

Copy

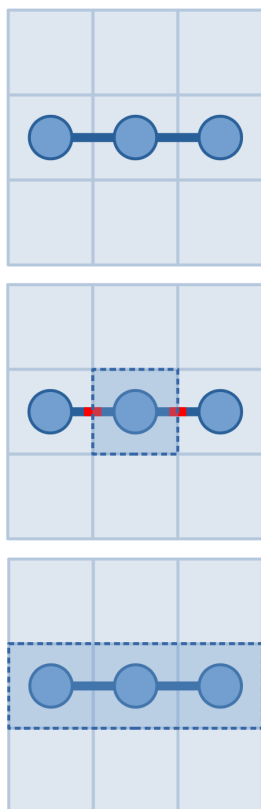
? 2 2 2 2
? 2 1 2 3
! 2 1 2 3

Note





The pictures above show our queries and the answers in the first example. We first made a query for $(1, 1)$ and got an answer 1, then found that it must be connected to exactly one other cell. Then we made a query for $(1, 2)$ and got an answer of 0, then knew that the snake never entered it. So the cell connected to $(1, 1)$ must be $(2, 1)$. Then we made a query for $(2, 2)$ and got an answer 0, then knew that it never entered $(2, 2)$ as well. So the snake cannot leave $(2, 1)$, which implies that the answer is $(1, 1)$ and $(2, 1)$.



The pictures above show our queries and the answers in the second example. By making query to $(2, 2)$ and receiving 2, we found that the snake occupies $(2, 2)$. And by making query to rectangle from $(2, 1)$ to $(2, 3)$ and receiving answer 0, we knew that it never goes out of the rectangle from $(2, 1)$ to $(2, 3)$. Since the first answer is 2, both $(2, 1)$ and $(2, 3)$ must be occupied but none of others, so the answer is $(2, 1)$ and $(2, 3)$.

[Codeforces](#) (c) Copyright 2010-2019 Mike Mirzayanov
 The only programming contests Web 2.0 platform
 Server time: Apr/14/2019 14:58:25^{UTC+8} (f1).
 Desktop version, switch to [mobile version](#).
[Privacy Policy](#)

Supported by



ITMO UNIVERSITY