Your task is to guess the location of a point A on the 2D plane. We assume that the coordinates (X, Y) of A are integers and satisfy $-100\,000 \leq X, Y \leq 100\,000$.

You may ask questions, each consisting of a point B having integer coordinates (x, y) satisfying $-100\,000 \leq x, y \leq 100\,000$. As an answer to such a question, you receive the squared Euclidean distance between A and B, that is, the value $(X - x)^2 + (Y - y)^2$.

Can you determine the coordinates of the point A by asking just a few questions? Please keep in mind the limits shown below in the *Grading* section.

Communication

Your program should use a library which allows asking questions and announcing the final answer.

The library (`dislib.h`) for C++ provides the following functions:

- `long long int query(int x, int y);`
- `void give_answer(int X, int Y);`

For Java, the class `dislib` provides the following methods:

- `static public long query(int x, int y);`
- `static public void give_answer(int X, int Y);`

After your program calls `give_answer`, it is not allowed to ask more questions. It should call `give_answer` exactly once.

In this problem, you are not allowed to read from the standard input or to write to the standard output. After calling `give_answer`, your program should terminate immediately.

In some of the test cases, the library actually does not need to choose the point A at the beginning (it may be adaptive), but you can assume that all answers from the library are consistent and there is always a valid answer.

Example interaction

Let A be $(-2, 5)$.

Call	Returned value
`query(0, 0)`	29
`query(2, -1)`	52
`query(-2, 5)`	0
`query(-2, 4)`	1
`query(-2, 10005)`	100000000
`give_answer(-2, 5)`	–

Please notice that in this case there is no need to ask all five questions. The location of the point A can be trivially deduced after querying for $(-2, 5)$ but asking redundant questions is not forbidden.

Grading

The test set is divided into the following subtasks with additional constraints. Tests in each of the subtasks consist of one or more separate test groups. Each test group may contain one or more test cases.

Let Q be the limit for the number of calls of `query`.

Subtask	Conditions	Points
1	$-10 \leq X, Y \leq 10$, $Q = 1000$	9
2	$Q = 1000$	25
3	$Q = 3$	29
4	$Q = 2$	37

From the above table it can be observed that in the last subtask you are allowed to call `query` at most twice and `give_answer` exactly once.

Experiments

In `public` directory there is an example library allowing you to test formal correctness of your solution. The library allows to answer queries of your solution by interacting with the program.

The provided library **does not** make all checks of your solution. It is not the same as the (secret) library on the grader.

An example input for the library is given in `dis0.in` file.

After `give_answer` is called, the library prints the given answer and the number of calls to `query` to the standard output.

For compiling the solution with the example library you may use the following commands:

- **C**: `gcc -O2 -static dislib.c dis.c -lm -std=gnu99`

- **C++**: `g++ -O2 -static dislib.c dis.cpp -lm -std=c++11`

For Java you do not need to use any special command to compile the solution with the library.

Files with the solution and the library should be in the same directory.