

IOI Training Camp 2013 – Test 1, 1 May, 2013

RoV Wolves

You are playing your favourite game, called “Rage of Vampires”, and you are looking for wolves to capture. To capture a wolf, your scout needs to start from his village and search in a spiral format. In the figure below, point 0 is the origin of the map, and the location of his coven(home village). From there, he travels to the point (1, 0), and then (1, 1) etc. as shown. The numbers are the time points at which he visits the corresponding location (with ‘a’ = 10, ‘b’ = 11 etc.) In this question, you must be able to tell where he will be at a particular point of time or at what point of time will he reach a particular place.

```

...z--y--x--w--v--u
      |
    g--f--e--d--c  t
    |             | |
    h  4--3--2  b  s
    |  |       |  | |
    i  5  0--1  a  r
    |  |       |  |
    j  6--7--8--9  q
    |             |
    k--l--m--n--o--p

```

Input format

- The first line contains Q , the number of queries.
- The next Q lines describe one Query each. Queries are of the following two kinds:
 - 0 t : You need to output the coordinates of the scout at time ‘ t ’,
 - 1 x y : You need to output the time point at which the scout was at (x, y) .

Output format

For each query, output the corresponding answer. If it is a ‘0’ query, output ‘ x y ’ (without quotes). If it is a ‘1’ query, output the time point t .

Test data

In all subtasks, $1 \leq Q \leq 100,000$.

- Subtask 1 (20 marks) : $1 \leq t \leq 10^6$ for all “0 t ” queries, and the answer for each “1 x y ” query.
- Subtask 2 (30 marks) : $1 \leq t \leq 10^{10}$ for all “0 t ” queries, and the answer for each “1 x y ” query.
- Subtask 3 (50 marks) : $1 \leq t \leq 10^{18}$ for all “0 t ” queries, and the answer for each “1 x y ” query.

Sample input

```
5
0 3
1 -1 1
1 50 132
0 34
0 39
```

Sample output

```
0 1
4
69514
-1 3
-3 0
```

Limits

- *Memory limit* : 128 MB
- *Time limit* : 5s