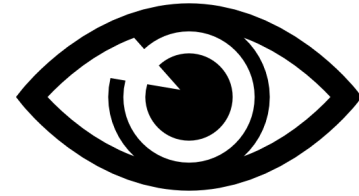# Problem 6: Big ~~Brother~~ Ben
3+4+5 Points

Problem ID: `literally1984`

Rank: `2+2+3`

Introduction

Upon achieving [world domination](#), Big Ben becomes a [totalitarian](#) [dictator](#) and decides to construct a [panopticon](#) for his citizens where the CALICO Team conducts [mass surveillance](#)!

To accomplish this, he bulldozes every residence on the planet and rebuilds them at specific coordinates on the coordinate plane to force everyone to live in properties under his control, which he watches from his watchtower at the origin: [“All that mine eyes cannot behold shall not exist”](#) – he exclaims.

Problem Statement

Big Ben builds a house at every coordinate (x, y) where x and y are positive integers. Then, he orders the destruction of every house that he cannot “see” from (0, 0). In other words, if multiple houses have coordinates collinear with (0, 0), he destroys all houses except the one closest to (0, 0).

Then, Big Ben sorts all house coordinates by increasing [Manhattan distance](#) from (0, 0), then by increasing x-coordinate if multiple coordinates have the same distance. He assigns ascending integer addresses starting at 1 to each house using this order.

Your house has address $\mathbf{N}$. Find the coordinates of your house.

Here’s a plot of the houses with addresses 1-21:
https://www.desmos.com/calculator/tuottmjb42

Input Format

The first line of input contains a single integer T denoting the number of test cases that follow. Each test case is described in a single line containing a positive integer N denoting an address to find the coordinates of.

Output Format

For each test case, output a single line containing two space separated integers $x\ y$, the (x, y) coordinates of each address.

Constraints

Time limit: **2 seconds**
Memory limit: **256 MB**

Main Test Set

$1 \leq T \leq 100$
$1 \leq N \leq 100$

Bonus Test Set 1

$1 \leq T \leq 10^5$
$1 \leq N \leq 10^5$

Bonus Test Set 2

$1 \leq T \leq 10^5$
$1 \leq N \leq 10^9$

Sample Test Cases

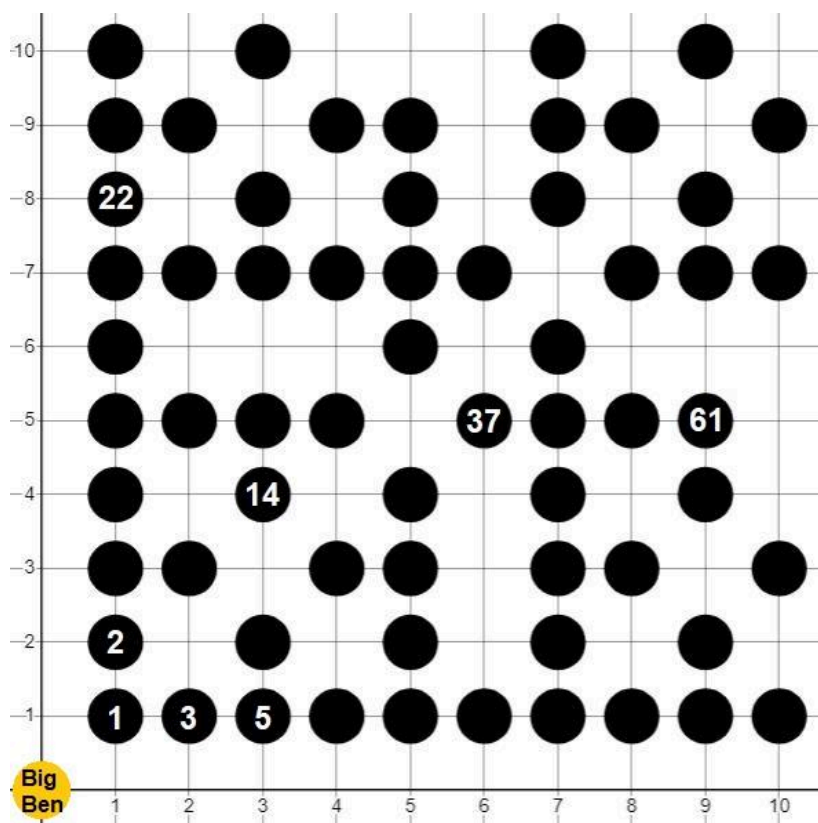| **Main Sample Input**	Download	**Main Sample Output**	Download

Main Sample Input:
```
8
1
2
3
5
14
22
37
61
```

Main Sample Output:
```
1 1
1 2
2 1
3 1
3 4
1 8
6 5
9 5
```

Sample Explanations

A picture of some of the houses is shown below. The ones labeled are our sample test cases.

Bonus 2 Sample Input   Download

```
2
123456789
1000000000
```

Bonus 2 Sample Output   Download

```
13234 6919
48623 8734
```