Problem C
Pyramid

Time limit: 3 seconds

Memory limit: 1024 megabytes

Problem Description

Consider an $n \times n$ grid where nodes are labelled as (i, j) for $0 \leq i, j < n$. We rotate it 45 degree in clockwise direction and keep only its top half part. Then you get a *pyramid*, as shown in Figure 1. All of the nodes laid on the anti-diagonal of the grid have labels $(n-1-j, j)$ for $0 \leq j < n$. They are located at the bottom line of the pyramid. For simplicity and clarity, we name node $(n-1-j, j)$ as exit j. Node $(0, 0)$ is called the starting point (labelled as P in Figure 1). When you insert a ball from the starting point, this ball will roll down to some of the exits. A ball located at node (i, j) can only roll down to either node $(i+1, j)$ or node $(i, j+1)$, and the ball shall never be broken or split. There is a tiny switch equipped on every node other than the exits that controls the move direction of the ball, and this switch always works well. The switch has exactly two states: either L or R, indicates that the ball can move to node $(i+1, j)$ or $(i, j+1)$, respectively. After the ball leaves this node, the switch changes immediately to the other state. The default setting for a switch is at L.

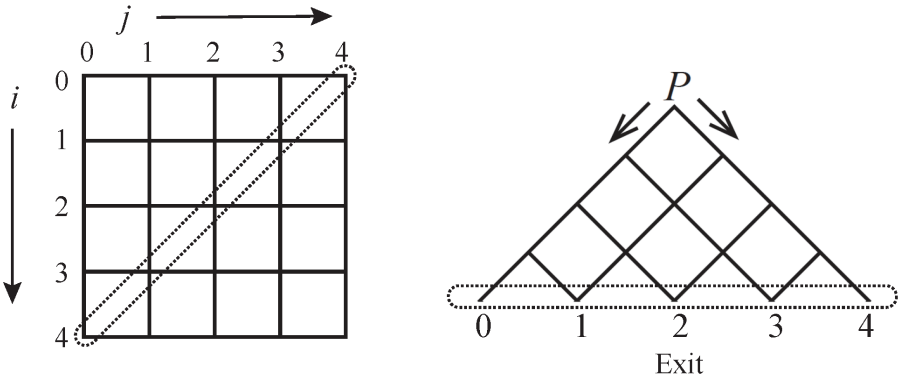

Figure 1: An example for $n = 5$.

When you insert the first ball into P, this ball will reach exit 0, and the states of nodes $(i, 0)$ for $0 \leq i < n-1$ are now all R's. Then you insert the second, third, and so on so forth, one by one, until the k^{th} ball finishes. The status of every switch accumulates with these balls. Please write a program to determine the number of the exit point for the k^{th} ball.

Input Format

The first line of the input is a number that specifies the number of test cases. Each test case has only one line that gives you two space-delimited numbers n and k.

Output Format

Please output the exit number of the k^{th} ball in one line.

Technical Specification

- There are at most 20 test cases.
- $1 \leq n \leq 10^4$.
- $1 \leq k \leq 10^8$.

Sample Input 1

```
2
5 1
5 2
```

Sample Output 1

```
0
1
```

Sample Input 2

```
3
5 3
5 4
5 5
```

Sample Output 2

```
2
3
2
```