

# Several-Part Staircase

*Filename: staircase*

David's new company, the Ultimate Carpentry Foundation, has just come out with a new life changing product: the world's First Heavyweight Several-Part Staircase. As you may know, heavyweight staircases are difficult to manufacture, so the Ultimate Carpentry Foundation has instead decided to create several staircase parts and weld them together to make a single enormous staircase.

Each staircase part has a start and end height. A staircase part can be attached to another staircase part at either end, as long as the two ends that are being joined are the same height. Staircase parts can be used in either direction: going up or going down, but each part may only be used once in only one direction or not at all. Can David merge zero or more parts to create a staircase going from height 0 to height  $k$ , without using any part more than once?

## The Problem:

Given the end heights of  $n$  staircase parts, check whether it is possible to combine some parts to make a staircase from height 0 to height  $k$ , using each staircase part no more than once.

## The Input:

The first line of the input file begins with a single, positive integer,  $t$ , representing the number of test cases. Each test case begins starts with two integers  $n$  and  $k$  ( $1 \leq n \leq 3 \cdot 10^5$ ,  $0 \leq k \leq 10^9$ ), representing the number of staircase parts and the desired end height.  $n$  lines follow each containing two integers,  $a_i$  and  $b_i$  ( $0 \leq a_i, b_i \leq 10^9$ ), representing the heights of the two ends of the  $i$ 'th staircase.

## The Output:

For each test case, output a single line saying "Staircase # $i$ :  $p$ " without the quotes, where  $i$  is the number of the test case, and  $p$  is either "Possible" or "Impossible" depending on whether the target height can be reached.

**(Sample Input and Output are on the next page)**

**Sample Input:**

```
3
5 10
0 3
3 6
3 7
3 8
7 10
2 6
1 5
5 6
3 100
0 200
150 100
150 200
```

**Sample Output:**

```
Staircase #1: Possible
Staircase #2: Impossible
Staircase #3: Possible
```