A Rational Sequence 2

A sequence of positive rational numbers is defined as follows:

An infinite full binary tree labeled by positive rational numbers is defined by:

- The label of the root is $1/1$.
- The left child of label p/q is $p/(p + q)$.
- The right child of label p/q is $(p + q)/q$.

The top of the tree is shown in the following figure:
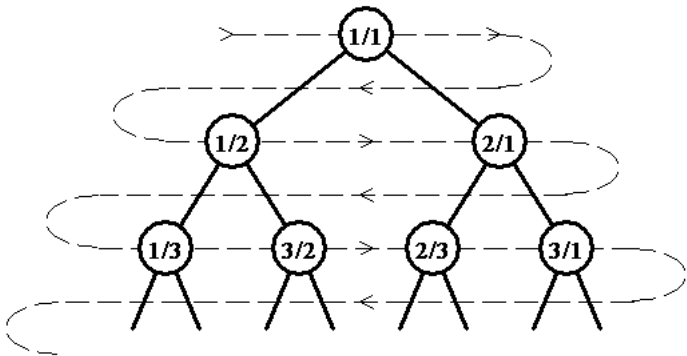
The sequence is defined by doing a level order (breadth first) traversal of the tree (indicated by the light dashed line). So that:

$$F(1) = 1/1, F(2) = 1/2, F(3) = 2/1, F(4) = 1/3, F(5) = 3/2, F(6) = 2/3, \ldots$$

Write a program which finds the value of n for which $F(n)$ is p/q for inputs p and q.

Input

The first line of input contains a single integer $P, (1 \leq P \leq 1000)$, which is the number of data sets that follow. Each data set should be processed identically and independently. Each data set consists of a single line of input. It contains the data set number, K, a single space, the numerator, p, a forward slash ($/$) and the denominator, q, of the desired fraction.

Output

For each data set there is a single line of output. It contains the data set number, K, followed by a single space which is then followed by the value of n for which $F(n)$ is p/q. Inputs will be chosen so n will fit in a 32-bit integer.

Sample Input 1

```
4
1 1/1
2 1/3
3 5/2
4 2178309/1346269
```

Sample Output 1

```
1 1
2 4
3 11
4 1431655765
```