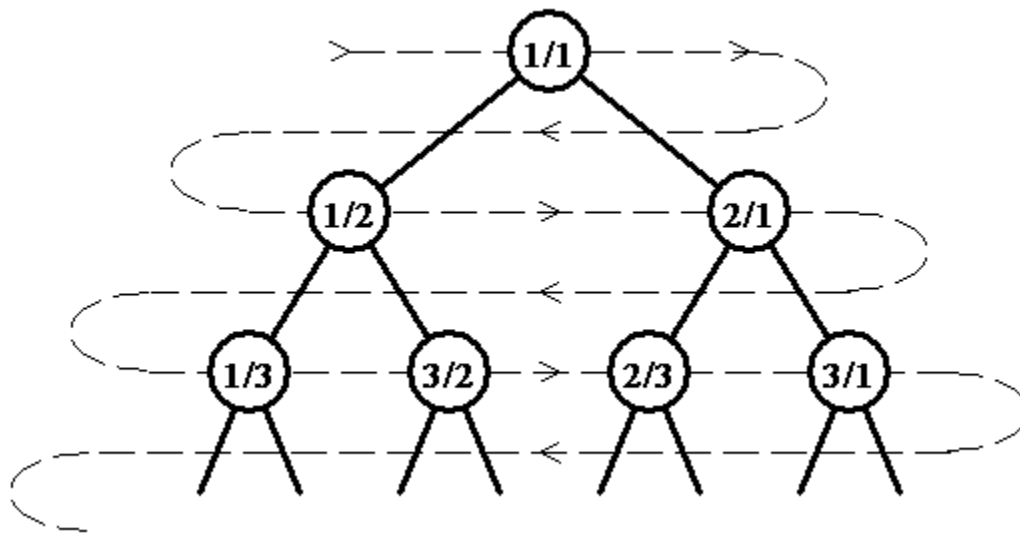# F • A Rational Sequence

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:



A rational 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, …`

Write a program which takes as input a rational number, `p/q`, in lowest terms and finds the next rational number in the sequence. That is, if `F(n) = p/q`, then the result is `F(n+1)`.

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, $K$, which is then followed by a space, then the numerator of the fraction, $p$, followed immediately by a forward slash (/), followed immediately by the denominator of the fraction, $q$. Both $p$ and $q$ will be relatively prime and $0 <= p, q <= 2147483647$.

## 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 numerator of the fraction, followed immediately by a forward slash ('/') followed immediately by the denominator of the fraction. Inputs will be chosen such that neither the numerator nor the denominator will overflow a 32-bit integer.

| Sample Input | Sample Output |
|---|---|
| 5 | 1 1/2 |
| 1  1/1 | 2 3/2 |
| 2  1/3 | 3 2/5 |
| 3  5/2 | 4 1346269/1860498 |
| 4  2178309/1346269 | 5 10000000/9999999 |
| 5  1/10000000 | |