Linear Equation Solver

Filename: *linear*
Time Limit: *1 second*

Your friend Mitchell is taking Arup's Discrete Structures I class. For his homework, he has to find integer solutions for x and y to the equation ax + by = 1, where a and b are given positive integers which are relatively prime to one another. Arup has added one final sinister twist to the homework questions. For each one, he's bounded the desired value(s) for x with a lower and upper bound. Arup's question is simply to find the number of ordered pairs (x, y) of integers that satisfy the equation within the given bounds.

For example, consider the equation 3x + 4y = 1 with the constraint that $-10 \leq x \leq 5$. In this case, the following ordered pairs satisfy the equation and the constraint on x:

(-9, 7), (-5, 4), (-1, 1), and (3, -2).

Thus, there are 4 solutions to the problem.

Help Mitchell by writing a program to solve all of his homework questions!

The Problem

Given positive integers, a and b, with gcd(a, b) = 1, and integers L and H, with $L \leq H$, find the number of integer solutions (x, y) to the equation $ax + by = 1$, with $L \leq x \leq H$.

The Input

The first line of input will consist of a single positive integer, c ($c \leq 100$), representing the number of input cases to process. Each input case will appear on a single line with the following four space separated values: a ($1 \leq a \leq 10^9$), b ($1 \leq b \leq 10^9$), L ($-10^9 \leq L$) and H ($L \leq H \leq 10^9$), with gcd(a, b) = 1.

The Output

For each input case, output a single integer, representing the number of solutions for the given problem.

Sample Input	Sample Output
2 3 4 -10 5 17 6 0 50	4 8