

Round 1A 2010

A. Rotate

B. Make it Smooth

C. Number Game

Contest Analysis

Questions asked 1



Submissions

Rotate

11pt | Not attempted 2076/2436 users correct (85%)

12pt | Not attempted 1855/2071 users correct (90%)

Make it Smooth

12pt | Not attempted 509/954 users correct (53%) 24pt | Not attempted

319/482 users correct (66%)

Number Game

16pt Not attempted 680/1091 users correct (62%) Not attempted 244/450 users correct (54%)

 Top Scores 	
rng58	100
peter50216	100
cgy4ever	100
rem	100
XiaoZiqian	100
qizichao	100
exod40	100
GarnetCrow	100
hos.lyric	100
ACRush	100

Problem C. Number Game

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input 16 points

Solve C-small

Large input 25 points

Solve C-large

Problem

Arya and Bran are playing a game. Initially, two positive integers ${\bf A}$ and ${\bf B}$ are written on a blackboard. The players take turns, starting with Arya. On his or her turn, a player can replace ${\bf A}$ with ${\bf A}$ - ${\bf k}^*{\bf B}$ for any positive integer ${\bf k}$, or replace ${\bf B}$ with ${\bf B}$ - ${\bf k}*{\bf A}$ for any positive integer ${\bf k}.$ The first person to make one of the numbers drop to zero or below loses.

For example, if the numbers are initially (12, 51), the game might progress as follows:

- Arya replaces 51 with 51 3*12 = 15, leaving (12, 15) on the blackboard.
- Bran replaces 15 with 15 1*12 = 3, leaving (12, 3) on the blackboard.
- Arya replaces 12 with 12 3*3 = 3, leaving (3, 3) on the blackboard.
- Bran replaces one 3 with 3 1*3 = 0, and loses.

We will say (A, B) is a winning position if Arya can always win a game that starts with (A, B) on the blackboard, no matter what Bran does.

Given four integers A₁, A₂, B₁, B₂, count how many winning positions (A, B) there are with $A_1 \le A \le A_2$ and $B_1 \le B \le B_2$.

Input

The first line of the input gives the number of test cases, T. T test cases follow, one per line. Each line contains the four integers A1, A2, B1, B2, separated by spaces.

Output

For each test case, output one line containing "Case #x: y", where x is the case number (starting from 1), and y is the number of winning positions (A, B) with $A_1 \le A \le A_2$ and $B_1 \le B \le B_2$.

Limits

 $1 \le T \le 100$. $1 \le \mathbf{A_1} \le \mathbf{A_2} \le 1,000,000.$ $1 \le \mathbf{B_1} \le \mathbf{B_2} \le 1,000,000.$

Small dataset

 $A_2 - A_1 \le 30.$ $B_2 - B_1 \le 30.$

Large dataset

 $A_2 - A_1 \le 999,999.$ $B_2 - B_1 \le 999,999$.

No additional constraints.

Sample

Input	Output
3 5 5 8 8 11 11 2 2 1 6 1 6	Case #1: 0 Case #2: 1 Case #3: 20

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