

Round 3 2015

- A. Fairland
- B. Smoothing Window
- C. Runaway Quail
- D. Log Set
- E. River Flow

Contest Analysis
Questions asked

Submissions

Fairland	
3pt	Not attempted 319/328 users correct (97%)
9pt	Not attempted 212/291 users correct (73%)
Smoothing Window	
6pt	Not attempted 194/268 users correct (72%)
7pt	Not attempted 184/194 users correct (95%)
Runaway Quail	
8pt	Not attempted 45/107 users correct (42%)
15pt	Not attempted 16/20 users correct (80%)
Log Set	
6pt	Not attempted 197/212 users correct (93%)
19pt	Not attempted 55/109 users correct (50%)
River Flow	
10pt	Not attempted 15/43 users correct (35%)
17pt	Not attempted 11/11 users correct (100%)

Top Scores

rng..58	73
tkociumaka	73
Gennady.Korotkevich	73
Xhark	73
linguo	72
iwi	68
tczajka	64
simonlindholm	60
kevinsogo	60
vepifanov	58

Problem C. Runaway Quail

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 8 points	Solve C-small
Large input 15 points	Solve C-large

Problem

Oh no -- your N pet quail have all gotten loose! You are currently at position 0 on a line; the i th quail starts off at some nonzero integer (positive or negative) position P_i on that line, in meters, and will continuously run away from you at a constant integer speed of S_i meters per second. You can run at a constant integer speed of Y meters per second, and can change direction instantaneously whenever you want. Note that quail constantly run away from you even if you are not running toward them at the time. Whenever you occupy the same point as a quail, that quail is caught (this takes no additional time).

What is the minimum number of seconds it will take you to catch all of the quail?

Input

The first line of the input gives the number of test cases, T . T test cases follow. Each begins with one line with two space-separated integers Y , your speed, and N , the number of quail, and is followed by two more lines with N space-separated integers each. The first of these gives the positions P_i of the quail, and the second gives the speeds S_i .

Output

For each test case, output one line containing "Case #x: y", where x is the test case number (starting from 1) and y is the minimum number of seconds needed to catch all the quail.

y will be considered correct if it is within an absolute or relative error of 10^{-6} of the correct answer. See the FAQ for an explanation of what that means, and what formats of real numbers we accept.

Limits

- $1 \leq T \leq 100$.
- $2 \leq Y \leq 1000$.
- $-10^7 \leq P_i \leq 10^7$; no P_i is 0.
- $1 \leq S_i < Y$.

Small dataset

- $1 \leq N \leq 25$.

Large dataset

- $1 \leq N \leq 500$.

Sample

Input	Output
2	Case #1: 3.000000
4 3	Case #2: 5.000000
-3 -6 -9	
3 2 1	
2 2	
1 -1	
1 1	

In Case #1, you can run to the left and catch all three quail at the same time, 12 meters to the left of the starting position, which takes 3 seconds.

In Case #2, one optimal strategy is to run to the left until the second quail is caught at -2 m, which takes one second, and then run to the right in pursuit of

the first quail, which you will catch at 6 m, taking four more seconds.

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