

Round 1B 2011

[A. RPI](#)

B. Revenge of the Hot Dogs

[C. House of Kittens](#)

[Contest Analysis](#)

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Submissions

RPI

8pt	Not attempted 4532/4664 users correct (97%)
12pt	Not attempted 4408/4524 users correct (97%)

Revenge of the Hot Dogs

15pt	Not attempted 1244/2455 users correct (51%)
20pt	Not attempted 595/1216 users correct (49%)

House of Kittens

20pt	Not attempted 320/640 users correct (50%)
25pt	Not attempted 51/123 users correct (41%)

Top Scores

rng..58	100
ZhukovDmitry	100
winger	100
RAVEman	100
malcin	100
Gennady.Korotkevich	100
ivan.popelyshev	100
ilyakor	100
vepifanov	100
yeputons	100

Problem B. Revenge of the Hot Dogs

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
15 points

Solve B-small

Large input
20 points

Solve B-large

Problem

Last year, several hot dog vendors were lined up along a street, and they had a tricky algorithm to spread themselves out. Unfortunately, the algorithm was very slow and they are still going. All is not lost though! The hot dog vendors have a plan: time to try a new algorithm!

The problem is that multiple vendors might be selling too close to each other, and then they will take each other's business. The vendors can move along the street at 1 meter/second. To avoid interfering with each other, they want to stand so that every pair of them is separated by a distance of at least **D** meters.

Remember that the street is really long, so there is no danger of running out of space to move in either direction. Given the starting positions of all hot dog vendors, you should find the minimum time they need before all the vendors are separated (each two vendors are at least **D** meters apart from each other).

Input

Each point of the street is labeled with a number, positive, negative or zero. A point labeled *p* is */p/* meters east of the point labeled 0 if *p* is positive, and */p/* meters west of the point labeled 0 if *p* is negative. We will use this labeling system to describe the positions of the vendors in the input file.

The first line of the input file contains the number of cases, **T**. **T** test cases follow. Each case begins with a line containing the number of points **C** that have at least one hot dog vendor in the starting configuration and an integer **D** -- the minimum distance they want to spread out to. The next **C** lines each contain a pair of space-separated integers **P**, **V**, indicating that there are **V** vendors at the point labeled **P**.

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 minimum amount of time it will take for the vendors to spread out apart on the street. Answers with relative or absolute error of at most 10⁻⁶ will be accepted.

Limits

1 ≤ **T** ≤ 50.
All the values **P** are integers in the range [-10⁵, 10⁵].
Within each test case all **P** values are distinct and given in an increasing order. The limit on the sum of **V** values is listed below. All the **V** values are positive integers.

Small dataset

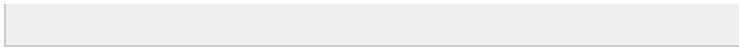
1 ≤ **D** ≤ 5
1 ≤ **C** ≤ 20.
The sum of all the **V** values in one test case does not exceed 100.

Large dataset

1 ≤ **D** ≤ 10⁶
1 ≤ **C** ≤ 200.
The sum of all **V** values does not exceed 10⁶

Sample

Input	Output
2	Case #1: 1.0
3 2	Case #2: 2.5
0 1	
3 2	
6 1	
2 2	
0 3	
1 1	



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