

Submissions

Vanishing Numbers

10pt	Not attempted 27/126 users correct (21%)
17pt	Not attempted 3/27 users correct (11%)

Battlefield

12pt	Not attempted 20/61 users correct (33%)
21pt	Not attempted 17/19 users correct (89%)

Radio Receiver

15pt	Not attempted 9/23 users correct (39%)
25pt	Not attempted 6/9 users correct (67%)

Top Scores

RalfKistner	83
amrSamir	83
Noodles	83
mohamedafattah	83
fegla	60
seanwentzel	58
TheKro	50
emadwill	48
Keegan	43
mRefaat88	43

Problem C. Radio Receiver

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 C-small

Large input
25 points

Solve C-large

Problem

You have a radio receiver and want to receive **N** messages. Each message is transmitted at a predetermined time measured in seconds since the epoch. Also each message is transmitted from a predetermined position representing the displacement in meters from the origin (you are in 1-dimensional space). Your radio is capable of receiving any message that is transmitted no farther than **D** meters from your current position, where **D** is a nonnegative real number.

You can start at any position of your choice and move at the rate of at most one meter per second. The action of receiving a message itself takes no time. Your task is to find the smallest **D** that allows you to get all messages.

Input

The first line of input gives the number of test cases, **C**. **C** test cases follow. For each test case there will be:

- One line containing the integer **N**, the number of messages.
- **N** lines corresponding to the **N** messages where each of them contains 2 integers **P** and **T** separated by one space. **P** is the position where the message is transmitted from and **T** is the time when this message is transmitted (The messages will have distinct transmission times).

Output

For each test case, output one line containing "Case #**x**: ", where **x** is the number of the test case, followed by the minimum value **D** that allows you to get all messages. Answers with a relative or absolute error of at most 10^{-9} will be considered correct.

Limits

$$1 \leq C \leq 100$$

$$1 \leq N \leq 1000$$

Small dataset

$$0 \leq P \leq 1000$$

$$0 \leq T \leq 1000$$

Large dataset

$$0 \leq P \leq 10^9$$

$$0 \leq T \leq 10^9$$

Sample

Input	Output
3	Case #1: 6
3	Case #2: 0
7 2	Case #3: 2.00
20 3	
0 11	
2	
6 5	
6 3	
4	
5 3	
2 1	
9 4	
7 2	

Here is one possible scenario with **D** = 6 for test case #1. Start at position 13 and time 2 to get message 0. Then walk to the right to position 14, arriving at time 3 to get message 1. Then walk left to position 6, arriving at time 11 to get

message 2.

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