

Round 1B 2017

A. Steed 2: Cruise Control

B. Stable Neigh-bors

C. Pony Express

Contest Analysis

Questions asked

Submissions

Steed 2: Cruise Control

11pt	Not attempted 8047/8909 users correct (90%)
14pt	Not attempted 7488/7986 users correct (94%)

Stable Neigh-bors

13pt	Not attempted 3667/5961 users correct (62%)
22pt	Not attempted 729/2356 users correct (31%)

Pony Express

16pt	Not attempted 2195/2731 users correct (80%)
24pt	Not attempted 1107/1387 users correct (80%)

Top Scores

JAPLJ	100
scottwu	100
linguo	100
W4yneb0t	100
Lewin	100
ivan.popelyshev	100
yutaka1999	100
ImBarD	100
XraY	100
math314	100

Problem A. Steed 2: Cruise Control

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
11 points

Solve A-small

Large input
14 points

Solve A-large

Problem

Annie is a bus driver with a high-stress job. She tried to unwind by going on a Caribbean cruise, but that also turned out to be stressful, so she has recently taken up horseback riding.

Today, Annie is riding her horse to the east along a long and narrow one-way road that runs west to east. She is currently at kilometer 0 of the road, and her destination is at kilometer **D**; kilometers along the road are numbered from west to east.

There are **N** other horses traveling east on the same road; all of them will go on traveling forever, and all of them are currently between Annie's horse and her destination. The *i*-th of these horses is initially at kilometer **K_i** and is traveling at its maximum speed of **S_i** kilometers per hour.

Horses are very polite, and a horse *H₁* will not pass (move ahead of) another horse *H₂* that started off ahead of *H₁*. (Two or more horses can share the same position for any amount of time; you may consider the horses to be single points.) Horses (other than Annie's) travel at their maximum speeds, except that whenever a horse *H₁* catches up to another slower horse *H₂*, *H₁* reduces its speed to match the speed of *H₂*.

Annie's horse, on the other hand, does not have a maximum speed and can travel at any speed that Annie chooses, as long as it does not pass another horse. To ensure a smooth ride for her and her horse, Annie wants to choose a single constant "cruise control" speed for her horse for the entire trip, from her current position to the destination, such that her horse will not pass any other horses. What is the maximum such speed that she can choose?

Input

The first line of the input gives the number of test cases, **T**; **T** test cases follow. Each test case begins with two integers **D** and **N**: the destination position of all of the horses (in kilometers) and the number of other horses on the road. Then, **N** lines follow. The *i*-th of those lines has two integers **K_i** and **S_i**: the initial position (in kilometers) and maximum speed (in kilometers per hour) of the *i*-th of the other horses on the road.

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 maximum constant speed (in kilometers per hour) that Annie can use without colliding with other horses. *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 ≤ **T** ≤ 100.
0 < **K_i** < **D** ≤ 10⁹, for all *i*.
K_i ≠ **K_j**, for all *i* ≠ *j*. (No two horses start in the same position.)
1 ≤ **S_i** ≤ 10000.

Small dataset

1 ≤ **N** ≤ 2.

Large dataset

1 ≤ **N** ≤ 1000.

Sample

Input	Output
3	Case #1: 101.000000
2525 1	Case #2: 100.000000

```
2400 5    Case #3: 33.333333
300 2
120 60
60 90
100 2
80 100
70 10
```

In sample case #1, there is one other (very slow!) horse on the road; it will reach Annie's destination after 25 hours. Anything faster than 101 kilometers per hour would cause Annie to pass the horse before reaching the destination.

In sample case #2, there are two other horses on the road. The faster horse will catch up to the slower horse at kilometer 240 after 2 hours. Both horses will then go at the slower horse's speed for 1 more hour, until the horses reach Annie's destination at kilometer 300. The maximum speed that Annie can choose without passing another horse is 100 kilometers per hour.

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