

Problem 1 - Car Racing (carracing)

A group of drivers competes in a qualifying race, where a predetermined number of cars C will race on a track R meters long.

Each of the C cars has a set of technical characteristics that set it apart from the others, in particular:

- C_{id} : the car's identifier, starting from 0
- C_s : the car's normal speed, in meters per second
- C_t : the car's turbo speed, in meters per second
- C_c : the car's turbo boost cooldown time, in seconds
- C_d : the car's turbo boost duration time, in seconds

The race takes place in rounds of one second each, where each car will instantly advance at its current speed in meters per second.

Each car has a normal speed of C_s meters per second and the ability to active a turbo boost for a limited period, enabling the car to reach a speed of C_t meters per second.

When activated, the turbo boost is used continuously for C_d seconds, after which the car will need C_c seconds to recharge before it can use the turbo boost again.

Note: the turbo boost can be used any amount of time if fully recharged.

Every car will start the race with a fully charged and ready-to-use turbo boost.

Calculate which vehicle will complete the race first, bearing in mind that each driver will do their best to win. In the case of a tie, the driver with the lower identifier will be declared the winner.

Input data

The first line of the input file contains an integer T , the number of test cases to solve.

For each test case, the first line of the input file contains the integers:

- R , the length of the track, in meters
- C , the number of cars

The next C lines will contain five different space-separated integer numbers, representing a car's information:

- C_{id} : the car identifier
- C_s : the car's normal speed, in meters per second
- C_t : the car's turbo speed, in meters per second
- C_c : the car's turbo boost cooldown time, in seconds
- C_d : the car's turbo boost duration time, in seconds

Output data

The output file must contains T lines.

For each test case in the input file, the output file must contain a line with the characters:

Case t : C_{id}

Where t is the test case number, from 1 to T , and C_{id} is the identifier of the winning car.

Note: the lines of the output file must be ordered from **Case #1:** to **Case #T:**.

Constraints

- $1 \leq T \leq 20$
- $1 \leq R \leq 10\,000$
- $1 \leq C \leq 500$
- $1 \leq C_s, C_t, C_c, C_d \leq 1\,000$
- $C_t \geq C_s$

Scoring

- **input 1** : $T = 1, R \leq 50, C \leq 5$
- **input 2** : $T = 5, R \leq 500, C \leq 10$
- **input 3** : $T = 10, R \leq 1\,000, C \leq 50$
- **input 4** : $T = 15, R \leq 2\,000, C \leq 150$
- **input 5** : $T = 20, R \leq 10\,000, C \leq 500$

Examples

input	output
2 20 2 0 3 5 2 1 1 1 7 4 6 50 3 0 1 15 4 2 1 6 10 11 3 2 3 20 10 4	Case #1: 1 Case #2: 2

Explanation

In the *first example*, for each car we have that:

Car with $C_{id} = 0$ will need 6 seconds to finish the race, and in particular:

- In second 1, the car will reach 5m, with a *turbo* speed of 5m/s
- In second 2, the car will reach 8m, with a speed of 3m/s
- In second 3, the car will reach 11m, with a speed of 3m/s
- In second 4, the car will reach 16m, with a *turbo* speed of 5m/s

- In second 5, the car will reach 19m, with a speed of 3m/s
- In second 6, the car will reach 22m, with a speed of 3m/s, finishing the race

Car with $C_{id} = 1$ will need 3 seconds to finish the race, and in particular:

- In second 1, the car will reach 7m, with a *turbo* speed of 7m/s
- In second 2, the car will reach 14m, with a *turbo* speed of 7m/s
- In second 3, the car will reach 21m, with a *turbo* speed of 7m/s

Therefore, the winner is the car with identifier 1.

In the *second example*, for each car we have that:

- Car with $C_{id} = 0$ will need 8 seconds to finish the race.
- Car with $C_{id} = 1$ will need 7 seconds to finish the race.
- Car with $C_{id} = 2$ will need 3 seconds to finish the race.

Therefore, the winning is the car with identifier 2.