Problem 2 - Slot machine (slotmachine)

Time spent with the Reply Code Masters team is time you'll never forget!

Spending a day with them at a casino, you start with an initial budget of B_i and your goal is to reach a budget of B_f by playing slot machines.

With their algorithmic skills, the Reply Code Masters team has identified a series of slot machines that will guarantee victory!

Specifically, you have N slot machines available to play, each of which require a C_i cost. This is subtracted from your current budget, but will ensure you a win of R_i money. Hower, you can't play a slot machine if its C_i is less than your current budget.

You can play an unlimited number of times on any slot machine if your budget allows, but be careful: the casino guards always monitor players, so you'll have to minimise the number of plays to reach the desired budget B_f before being kicked out of the casino.

Help the Reply Code Master team find the *minimum number* R of slot machine games needed to reach the desired budget B_f.

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:

- **N**, the number of slot machines
- B_f, the final budget to be reached
- B_i, the initial budget available

The next **N** lines will display information for each slot machine:

- C_i, the cost to play the i^{th} slot machine
- R_i, the reward gained by playing the i^{th} slot machine

Output data

The output file must contain **T** lines.

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

`Case #t: R`

Where **t** is the test case number, from 1 to **T**, and R is the number of slot machine games to reach the target of cash B_f.

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

Constraints

- $1 \leq T \leq 20$, the number of test cases
- $1 \leq N \leq 10\,000$, the number of slot machines
- $1 \leq B_i < B_f \leq 1\,000\,000\,000$, the initial and final budget
- $1 \leq C_i \leq 50\,000$ for each $0 \leq i \leq N-1$, the cost to play each of the N slot machines
- $1 \leq R_i \leq 50\,000$ for each $0 \leq i \leq N-1$, the reward gained for each of the N slot machines

Scoring

- **input 1** : $T = 1$, $N \leq 10$, $B_f \leq 500$
- **input 2** : $T = 5$, $N \leq 20$, $B_f \leq 1\,000$
- **input 3** : $T = 10$, $N \leq 200$, $B_f \leq 10\,000$
- **input 4** : $T = 15$, $N \leq 2\,000$, $B_f \leq 100\,000$
- **input 5** : $T = 20$, $N \leq 10\,000$, $B_f \leq 1\,000\,000\,000$

Examples

input	output
1 6 392 13 11 12 13 27 13 17 16 35 30 41 38 42	Case #1: 21

Explanation

In the first test case we start with an initial budget B_i of 13 and we have to reach a final budget B_f of 392. To reach the goal we have 6 different slot machines:

- Slot machine 1 with a cost C_i of 11 and reward R_i of 12
- Slot machine 2 with a cost C_i of 13 and reward R_i of 27
- Slot machine 3 with a cost C_i of 13 and reward R_i of 17
- Slot machine 4 with a cost C_i of 16 and reward R_i of 35
- Slot machine 5 with a cost C_i of 30 and reward R_i of 41
- Slot machine 6 with a cost C_i of 38 and reward R_i of 42

A possible optimal solution is:

- Use once the 2nd slot machine, increasing the budget from 13 to 27
- Use 20 times the 4th slot machine, increasing the budget from 27 to 407, thus reaching the final budget B_f of 392