

SEASON 10 - SECOND ROUND

Atomic Bobby is an alchemist and makes all kinds of potions while searching for the elixir of immortality. Now he is facing a very serious task - to make a COVID-19 vaccine. For his next experiment he is going to mix N different substances, numbered from 1 to N , in a ratio $x_1 : x_2 : x_3 : \dots : x_N$. The alchemist has a variety of amounts of these substances, but he lost his measuring vessel, so he can't use whatever amount of substance he wants. More precisely, Atomic Bobby has a_1 bottles with substance 1 in his lab, each containing exactly b_1 millilitres. Similarly, he has a_2 bottles with substance 2, each containing b_2 millilitres and so on for all N substances. For each bottle, Bobby can either add all of its content to the vaccine or not use it at all. Help the alchemist by writing a program, which determines if he can obtain the desired ratio with the available stuff in his lab, and if he can, what is the minimum and the maximum amount of vaccine he can make.

Input (alchemy.in)

You have to solve T independent testcases in a single test. On the first line of the input file *alchemy.in* you are given the number T . Then, the descriptions of T testcases follow, in the following form: on the first line for each testcase you are given the integer N . On the next line you are given N integers $x_1, x_2, \dots, x_N$. On each of the following N lines there are two numbers a_i and b_i .

Output (alchemy.out)

For each testcase, print the following: if it's impossible to obtain the desired ratio, print the number -1 on a single line. Otherwise, print two numbers separated by a single space - the minimum and the maximum amount of the vaccine that Atomic Bobby can make.

Constraints

$$1 \leq T \leq 10$$

$$1 \leq N \leq 200\,000$$

$$1 \leq x_i, a_i, b_i \leq 10^9$$

The total amount of all substances in Atomic Bobby's lab is not greater than 10^{18} millilitres.

The sum of N across all testcases is not greater than 200 000.

Example

Input	Output
3	96 192
3	6 6
3 5 8	-1
18 2	
12 5	
16 6	
3	
2 4 6	
1 1	
1 2	
1 3	
2	
3 5	
1 5	
1 3	