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PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

H. Stock Exchange

time limit per test: 6 seconds memory limit per test: 16 megabytes input: standard input output: standard output

Warning: This problem has an unusual memory limit!

Bob decided that he will not waste his prime years implementing GUI forms for a large corporation and instead will earn his supper on the Stock Exchange Reykjavik. The Stock Exchange Reykjavik is the only actual stock exchange in the world. The only type of transaction is to take a single share of stock x and exchange it for a single share of stock y, provided that the current price of share x is at least the current price of share y.

There are 2n stocks listed on the SER that are of interest to Bob, numbered from 1 to 2n. Bob owns a single share of stocks 1 through n and would like to own a single share of each of n+1 through 2n some time in the future.

Bob managed to forecast the price of each stock — in time $t\geq 0$, the stock i will cost $a_i\cdot\lfloor t\rfloor+b_i$. The time is currently t=0. Help Bob find the earliest moment in time in which he can own a single share of each of n+1 through 2n, and the minimum number of stock exchanges he has to perform in order to do that.

You may assume that the Stock Exchange has an unlimited amount of each stock at any point in time.

Input

The first line contains a single integer n ($1 \le n \le 2200$) — the number stocks currently owned by Bob.

Each of the next 2n lines contains integers a_i and b_i ($0 \le a_i, b_i \le 10^9$), representing the stock price of stock i.

Output

If it is impossible for Bob to achieve his goal, output a single integer -1.

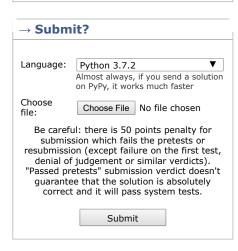
Otherwise, output two integers T and E, where T is the minimum time in which he can achieve his goal, and E is the minimum number of exchanges in which he can achieve his goal at time T.

Examples

input	Сору
1	
3 10	
1 16	
output	Сору
3 1	

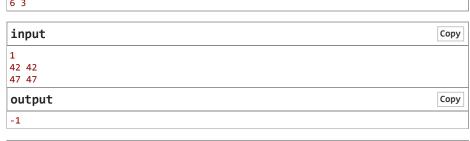
input	Сору
2	
3 0	
2 1	
1 10	
1 11	
output	Сору

Codeforces Global Round 4 Contest is running 00:44:20 Contestant



→ Score table		
e		
2		
3		
,		
3		
5		
)		

^{*} If you solve problem on 01:45 from the first attempt







Note

In the first example, Bob simply waits until time t=3, when both stocks cost exactly the same amount.

In the second example, the optimum strategy is to exchange stock 2 for stock 1 at time t=1, then exchange one share of stock 1 for stock 3 at time t=5 (where both cost 15) and then at time t=6 exchange the second on for the stock number 4 (when they cost 18 and 17, respectively). Note that he can achieve his goal also with only two exchanges, but this would take total time of t=9, when he would finally be able to exchange the share number 2 for the share number 3.

In the third example, Bob can never achieve his goal, as the second stock is always strictly more expensive than the first one.

7/20/2019 Problem - H - Codeforces

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