1 F. Integer Game (Codeforces Global Round 9)

http://codeforces.com/contest/1375/problem/F

This is an interactive problem.

Anton and Harris are playing a game to decide which of them is the king of problemsetting.

There are three piles of stones, initially containing a , b, and c stones, where a, b, and c are distinct positive integers. On each turn of the game, the following sequence of events takes place:

- The first player chooses a positive integer y and provides it to the second player.
- The second player adds y stones to one of the piles, with the condition that he cannot choose the same pile in two consecutive turns.

The second player loses if, at any point, two of the piles contain the same number of stones. The first player loses if 1000

turns have passed without the second player losing.

Feeling confident in his skills, Anton decided to let Harris choose whether he wants to go first or second. Help Harris defeat Anton and become the king of problemsetting!

Input

The first line of input contains three distinct positive integers a , b, and c $(1 \leq a, b, c \leq 10^9)$ — the initial number of stones in piles 1, 2, and 3

respectively.

Interaction

The interaction begins by reading the integers a , b and c .

After reading the integers, print a single line containing either "First"or "Second", denoting who you want to play as (as first or second correspon-

dently).

On each turn, the first player (either you or the judge) must print a positive integer y ($1 \leq y \leq 10^{12}$).

Then, the second player must print 1 , 2, or 3, indicating which pile should have y stones added to it. From the second turn onwards, the pile that the second player chooses must be different from the pile that they chose on the previous turn.

If you are playing as Second and complete 1000 turns without losing, or if you are playing as First and the judge has determined that it cannot make a move without losing, the interactor will print 0

and will finish interaction. This means that your program is correct for this test case, and you should exit immediately.

If you are playing as First and complete 1000 turns without winning, or if you are playing as Second and print a move that makes two piles have the same number of stones, or if you output an invalid move as either player, the interactor will print -1 and will finish interaction. You will receive a Wrong Answer verdict. Make sure to exit immediately to avoid getting other verdicts.

Example

Input
5 2 6

3

0

Output

First
2

3

2 C. Travelling Salesman Problem (Codeforces Round #712 (Div. 1))

http://codeforces.com/contest/1503/problem/C

There are n cities numbered from 1 to n, and city i has beauty a_i.

A salesman wants to start at city 1, visit every city exactly once, and return to city 1.

For all $i \neq j$, a flight from city i to city j costs $\max(c_i, a_j - a_i)$ dollars, where c_i is the price floor enforced by city i . Note that there is no absolute value. Find the minimum total cost for the salesman to complete his trip.

Input

The first line contains a single integer n ($2 \leq n \leq 10^5$) — the number of cities.

The i -th of the next n lines contains two integers a_i, c_i ($0 \leq a_i, c_i \leq 10^9$) — the beauty and price floor of the i -th city.

Output

Output a single integer — the minimum total cost.

Examples

Input

3
1 9
2 1
4 1

Output

11

Input

6
4 2
8 4
3 0
2 3
7 1
0 1

Output

13

Note

In the first test case, we can travel in order 1 to 3 to 2 to 1.

- The flight 1 to 3 costs $\max(c_1, a_3 - a_1) = \max(9, 4 - 1) = 9$.
- The flight 3 to 2 costs $\max(c_3, a_2 - a_3) = \max(1, 2 - 4) = 1$.
- The flight 3 to 2 costs $\max(c_2, a_1 - a_2) = \max(1, 1 - 2) = 1$.

The total cost is 11, and we cannot do better.