

# APIO '19 P1 - Strange Device

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**Time limit:** 1.8s    **Memory limit:** 512M

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Archaeologists have found a strange device that was probably created by some ancient civilization. The device has a screen that displays two integers:  $x$  and  $y$ .

After exploring the device the scientists have made a conclusion that the device is kind of a clock. It measures time  $t$  passed from some moment in the past, but shows it in some weird way, probably used by the creators of the device. If the time passed is an integer  $t$ , the two integers displayed are:  $x = ((t + \lfloor \frac{t}{B} \rfloor) \bmod A)$ , and  $y = (t \bmod B)$ . Here  $\lfloor x \rfloor$  is the *floor function* — the greatest integer less or equal to  $x$ .

The archaeologists have studied the device and found out that its screen wasn't turned on all the time. Actually it was only working during  $n$  continuous periods of time, the  $i$ -th of them was from the moment  $l_i$  to the moment  $r_i$ , inclusive. Now the scientists would like to calculate how many distinct pairs  $(x, y)$  were shown by the device when its screen was on.

Two pairs  $(x_1, y_1)$  and  $(x_2, y_2)$  are distinct if  $x_1 \neq x_2$  or  $y_1 \neq y_2$ .

## Input Specification

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The first line contains three integers  $n$ ,  $A$ , and  $B$  ( $1 \leq n \leq 10^6$ ;  $1 \leq A, B \leq 10^{18}$ ).

Each of the following  $n$  lines contains two integers  $l_i$  and  $r_i$ , the beginning and the end of the  $i$ -th segment  $[l_i, r_i]$  when the device screen was turned on ( $0 \leq l_i \leq r_i \leq 10^{18}$ ;  $r_i < l_{i+1}$ ).

## Output Specification

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Output the number of distinct pairs  $(x, y)$  that were shown on the device screen when it was turned on.

## Scoring

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Let  $S = \sum_{i=1}^n (r_i - l_i + 1)$  and  $L = \max_{1 \leq i \leq n} (r_i - l_i + 1)$ .

### Subtask 1 (points: 10)

$$S \leq 10^6$$

### Subtask 2 (points: 5)

$$n = 1$$

### Subtask 3 (points: 5)

$$A \cdot B \leq 10^6$$

### Subtask 4 (points: 5)

$$B = 1$$

### Subtask 5 (points: 5)

$$B \leq 3$$

### Subtask 6 (points: 20)

$$B \leq 10^6$$

### Subtask 7 (points: 20)

$$L \leq B$$

### Subtask 8 (points: 30)

No additional constraint.

## Sample Input 1

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```
3 3 3
4 4
7 9
17 18
```

## Sample Output 1

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```
4
```

## Sample Input 2

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```
3 5 10
1 20
50 68
89 98
```

## Sample Output 2

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```
31
```

### Sample Input 3

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```
2 16 13
2 5
18 18
```

### Sample Output 3

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```
5
```

### Explanation

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In the first test, the device screen shows the following integers.

$$t = 4, (x, y) = (2, 1)$$

$$t = 7, (x, y) = (0, 1)$$

$$t = 8, (x, y) = (1, 2)$$

$$t = 9, (x, y) = (0, 0)$$

$$t = 17, (x, y) = (1, 2)$$

$$t = 18, (x, y) = (0, 0)$$

So there are four distinct pairs  $(0, 0)$ ,  $(0, 1)$ ,  $(1, 2)$ ,  $(2, 1)$ .