A. Multicolored Marbles

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Polycarpus plays with red and blue marbles. He put n marbles from the left to the right in a row. As it turned out, the marbles form a *zebroid*.

A non-empty sequence of red and blue marbles is a *zebroid*, if the colors of the marbles in this sequence alternate. For example, sequences (`red; blue; red`) and (`blue`) are zebroids and sequence (`red; red`) is not a zebroid.

Now Polycarpus wonders, how many ways there are to pick a zebroid **subsequence** from this sequence. Help him solve the problem, find the number of ways modulo 1000000007 $(10^9 + 7)$.

Input

The first line contains a single integer n $(1 \le n \le 10^6)$ — the number of marbles in Polycarpus's sequence.

Output

Print a single number — the answer to the problem modulo 1000000007 $(10^9 + 7)$.

Examples

input

```
3
```

output

```
6
```

input

```
4
```

output

```
11
```

Note

Let's consider the first test sample. Let's assume that Polycarpus initially had sequence (`red; blue; red`), so there are six ways to pick a zebroid:

- pick the first marble;
- pick the second marble;
- pick the third marble;
- pick the first and second marbles;
- pick the second and third marbles;
- pick the first, second and third marbles.

It can be proven that if Polycarpus picks (`blue; red; blue`) as the initial sequence, the number of ways won't change.

B. Pixels

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Flatland is inhabited by pixels of three colors: red, green and blue. We know that if two pixels of different colors meet in a violent fight, only one of them survives the fight (that is, the total number of pixels decreases by one). Besides, if pixels of colors x and y $(x \neq y)$ meet in a violent fight, then the pixel that survives the fight immediately changes its color to z $(z \neq x; z \neq y)$. Pixels of the same color are friends, so they don't fight.

The King of Flatland knows that his land will be peaceful and prosperous when the pixels are of the same color. For each of the three colors you know the number of pixels of this color that inhabit Flatland. Help the king and determine whether fights can bring peace and prosperity to the country and if it is possible, find the minimum number of fights needed to make the land peaceful and prosperous.

Input

The first line contains three space-separated integers a, b and c $(0 \le a, b, c \le 2^{31}; a + b + c > 0)$ — the number of red, green and blue pixels, correspondingly.

Output

Print a single number — the minimum number of pixel fights before the country becomes peaceful and prosperous. If making the country peaceful and prosperous is impossible, print -1.

Examples

input

```
1 1 1
```

output

```
1
```

input

```
3 1 0
```

output

```
3
```

Note

In the first test sample the country needs only one fight to achieve peace and prosperity. Besides, it can be any fight whatsoever. For example, let's assume that the green and the blue pixels fight, then the surviving pixel will be red. As a result, after the fight there are two red pixels. There won't be other pixels.

In the second sample the following sequence of fights is possible: red and blue, green and red, red and blue. As a result, after all fights there is one green pixel left.

C. Trails and Glades

time limit per test: 4 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Vasya went for a walk in the park. The park has n glades, numbered from 1 to n. There are m trails between the glades. The trails are numbered from 1 to m, where the i-th trail connects glades x_i and y_i. The numbers of the connected glades may be the same $(x_i = y_i)$, which means that a trail connects a glade to itself. Also, two glades may have several non-intersecting trails between them.

Vasya is on glade 1, he wants to walk on all trails of the park exactly once, so that he can eventually return to glade 1. Unfortunately, Vasya does not know whether this walk is possible or not. Help Vasya, determine whether the walk is possible or not. If such walk is impossible, find the minimum number of trails the authorities need to add to the park in order to make the described walk possible.

Vasya can shift from one trail to another one only on glades. He can move on the trails in both directions. If Vasya started going on the trail that connects glades a and b, from glade a, then he must finish this trail on glade b.

Input

The first line contains two integers n and m $(1 \le n \le 10^6; 0 \le m \le 10^6)$ — the number of glades in the park and the number of trails in the park, respectively. Next m lines specify the trails. The i-th line specifies the i-th trail as two space-separated numbers, x_i, y_i $(1 \le x_i, y_i \le n)$ — the numbers of the glades connected by this trail.

Output

Print the single integer — the answer to the problem. If Vasya's walk is possible without adding extra trails, print `0`, otherwise print the minimum number of trails the authorities need to add to the park in order to make Vasya's walk possible.

Examples

input

```
3 3
1 2
2 3
3 1
```

output

```
0
```

input

```
2 5
1 1
1 2
1 2
2 2
1 2
```

output

```
1
```

Note

In the first test case the described walk is possible without building extra trails. For example, let's first go on the first trail, then on the second one, and finally on the third one.

In the second test case the described walk is impossible without adding extra trails. To make the walk possible, it is enough to add one trail, for example, between glades number one and two.