A - Fighting over Candies

Time Limit: 2 sec / Memory Limit: 256 MB

Score : 100 points

Problem Statement

Two students of AtCoder Kindergarten are fighting over candy packs.

There are three candy packs, each of which contains a, b, and c candies, respectively.

Teacher Evi is trying to distribute the packs between the two students so that each student gets the same number of candies. Determine whether it is possible.

Note that Evi cannot take candies out of the packs, and the whole contents of each pack must be given to one of the students.

Constraints

- $1 \leqq a, b, c \leqq 100$

Input

The input is given from Standard Input in the following format:

$$a \quad b \quad c$$

Output

If it is possible to distribute the packs so that each student gets the same number of candies, print `Yes`. Otherwise, print `No`.

Sample Input 1

```
10 30 20
```

Sample Output 1

```
Yes
```

Give the pack with 30 candies to one student, and give the two packs with 10 and 20 candies to the other. Then, each gets 30 candies.

Sample Input 2

```
30 30 100
```

Sample Output 2

```
No
```

In this case, the student who gets the pack with 100 candies always has more candies than the other.

Note that every pack must be given to one of them.

Sample Input 3

```
56 25 31
```

Sample Output 3

```
Yes
```

B - Snuke's Coloring 2 (ABC Edit)

Time Limit: 2 sec / Memory Limit: 256 MB

Score : 200 points

Problem Statement

There is a rectangle in the xy-plane, with its lower left corner at $(0, 0)$ and its upper right corner at (W, H). Each of its sides is parallel to the x-axis or y-axis. Initially, the whole region within the rectangle is painted white.

Snuke plotted N points into the rectangle. The coordinate of the i-th ($1 \leqq i \leqq N$) point was (x_i, y_i).

Then, he created an integer sequence a of length N, and for each $1 \leqq i \leqq N$, he painted some region within the rectangle black, as follows:

- If $a_i = 1$, he painted the region satisfying $x < x_i$ within the rectangle.
- If $a_i = 2$, he painted the region satisfying $x > x_i$ within the rectangle.
- If $a_i = 3$, he painted the region satisfying $y < y_i$ within the rectangle.
- If $a_i = 4$, he painted the region satisfying $y > y_i$ within the rectangle.

Find the area of the white region within the rectangle after he finished painting.

Constraints

- $1 \leqq W, H \leqq 100$
- $1 \leqq N \leqq 100$
- $0 \leqq x_i \leqq W$ ($1 \leqq i \leqq N$)
- $0 \leqq y_i \leqq H$ ($1 \leqq i \leqq N$)
- W, H (21:32, added), x_i and y_i are integers.
- a_i ($1 \leqq i \leqq N$) is $1, 2, 3$ or 4.

Input

The input is given from Standard Input in the following format:

$$
\begin{array}{lll}
W & H & N \\
x_1 & y_1 & a_1 \\
x_2 & y_2 & a_2 \\
\vdots & & \\
x_N & y_N & a_N
\end{array}
$$

Output

Print the area of the white region within the rectangle after Snuke finished painting.

Sample Input 1

```
5 4 2
2 1 1
3 3 4
```

Sample Output 1

```
9
```

The figure below shows the rectangle before Snuke starts painting.

First, as $(x_1, y_1) = (2, 1)$ and $a_1 = 1$, he paints the region satisfying $x < 2$ within the rectangle:

Then, as $(x_2, y_2) = (3, 3)$ and $a_2 = 4$, he paints the region satisfying $y > 3$ within the rectangle:

Now, the area of the white region within the rectangle is 9.

Sample Input 2

```
5 4 3
2 1 1
3 3 4
1 4 2
```

Sample Output 2

```
0
```

It is possible that the whole region within the rectangle is painted black.

Sample Input 3

```
10 10 5
1 6 1
4 1 3
6 9 4
9 4 2
3 1 3
```

Sample Output 3

```
64
```

C - 1D Reversi

Time Limit: 2 sec / Memory Limit: 256 MB

Score : 300 points

Problem Statement

Two foxes Jiro and Saburo are playing a game called *1D Reversi*. This game is played on a board, using black and white stones. On the board, stones are placed in a row, and each player places a new stone to either end of the row. Similarly to the original game of Reversi, when a white stone is placed, all black stones between the new white stone and another white stone, turn into white stones, and vice versa.

In the middle of a game, something came up and Saburo has to leave the game. The state of the board at this point is described by a string S. There are |S| (the length of S) stones on the board, and each character in S represents the color of the i-th ($1 \leqq i \leqq |S|$) stone from the left. If the i-th character in S is `B`, it means that the color of the corresponding stone on the board is black. Similarly, if the i-th character in S is `W`, it means that the color of the corresponding stone is white.

Jiro wants all stones on the board to be of the same color. For this purpose, he will place new stones on the board according to the rules. Find the minimum number of new stones that he needs to place.

Constraints

- $1 \leqq |S| \leqq 10^5$
- Each character in S is `B` or `W`.

Input

The input is given from Standard Input in the following format:

$$S$$

Output

Print the minimum number of new stones that Jiro needs to place for his purpose.

Sample Input 1

```
BBBWW
```

Sample Output 1

```
1
```

By placing a new black stone to the right end of the row of stones, all white stones will become black. Also, by placing a new white stone to the left end of the row of stones, all black stones will become white.

In either way, Jiro's purpose can be achieved by placing one stone.

Sample Input 2

```
WWWWWW
```

Sample Output 2

```
0
```

If all stones are already of the same color, no new stone is necessary.

Sample Input 3

```
WBWBWBWBWB
```

Sample Output 3

```
9
```

D - An Invisible Hand

Time Limit: 2 sec / Memory Limit: 256 MB

Score : 400 points

Problem Statement

There are N towns located in a line, conveniently numbered 1 through N. Takahashi the merchant is going on a travel from town 1 to town N, buying and selling apples.

Takahashi will begin the travel at town 1, with no apple in his possession. The actions that can be performed during the travel are as follows:

- *Move*: When at town i ($i < N$), move to town $i + 1$.
- *Merchandise*: Buy or sell an arbitrary number of apples at the current town. Here, it is assumed that one apple can always be bought and sold for A_i yen (the currency of Japan) at town i ($1 \leqq i \leqq N$), where A_i are distinct integers. Also, you can assume that he has an infinite supply of money.

For some reason, there is a constraint on merchandising apple during the travel: the sum of the number of apples bought and the number of apples sold during the whole travel, must be at most T. (Note that a single apple can be counted in both.)

During the travel, Takahashi will perform actions so that the *profit* of the travel is maximized. Here, the profit of the travel is the amount of money that is gained by selling apples, minus the amount of money that is spent on buying apples. Note that we are not interested in apples in his possession at the end of the travel.

Aoki, a business rival of Takahashi, wants to trouble Takahashi by manipulating the market price of apples. Prior to the beginning of Takahashi's travel, Aoki can change A_i into another arbitrary non-negative integer A_i' for any town i, any number of times. The cost of performing this operation is $|A_i - A_i'|$. After performing this operation, different towns may have equal values of A_i.

Aoki's objective is to decrease Takahashi's expected profit by at least 1 yen. Find the minimum total cost to achieve it. You may assume that Takahashi's expected profit is initially at least 1 yen.

Constraints

- $1 \leqq N \leqq 10^5$
- $1 \leqq A_i \leqq 10^9$ ($1 \leqq i \leqq N$)
- A_i are distinct.
- $2 \leqq T \leqq 10^9$
- In the initial state, Takahashi's expected profit is at least 1 yen.

Input

The input is given from Standard Input in the following format:

$$N \quad T$$
$$A_1 \quad A_2 \quad \ldots \quad A_N$$

Output

Print the minimum total cost to decrease Takahashi's expected profit by at least 1 yen.

Sample Input 1

```
3 2
100 50 200
```

Sample Output 1

```
1
```

In the initial state, Takahashi can achieve the maximum profit of 150 yen as follows:

1. Move from town 1 to town 2.
2. Buy one apple for 50 yen at town 2.
3. Move from town 2 to town 3.
4. Sell one apple for 200 yen at town 3.

If, for example, Aoki changes the price of an apple at town 2 from 50 yen to 51 yen, Takahashi will not be able to achieve the profit of 150 yen. The cost of performing this operation is 1, thus the answer is 1.

There are other ways to decrease Takahashi's expected profit, such as changing the price of an apple at town 3 from 200 yen to 199 yen.

Sample Input 2

```
5 8
50 30 40 10 20
```

Sample Output 2

```
2
```

Sample Input 3

```
10 100
7 10 4 5 9 3 6 8 2 1
```

Sample Output 3

```
2
```