



CSES Problem Set

Distinct Numbers

[TASK](#) | [SUBMIT](#) | [RESULTS](#) | [STATISTICS](#) | [HACKING](#)

Time limit: 1.00 s **Memory limit:** 512 MB

You are given a list of n integers, and your task is to calculate the number of *distinct* values in the list.

Input

The first input line has an integer n : the number of values.

The second line has n integers x_1, x_2, \dots, x_n .

Output

Print one integers: the number of distinct values.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq x_i \leq 10^9$

Example

Input:

```
5
2 3 2 2 3
```

Output:

```
2
```



CSES Problem Set

Apartments

[TASK](#) | [SUBMIT](#) | [RESULTS](#) | [STATISTICS](#) | [HACKING](#)

Time limit: 1.00 s **Memory limit:** 512 MB

There are n applicants and m free apartments. Your task is to distribute the apartments so that as many applicants as possible will get an apartment.

Each applicant has a desired apartment size, and they will accept any apartment whose size is close enough to the desired size.

Input

The first input line has three integers n , m , and k : the number of applicants, the number of apartments, and the maximum allowed difference.

The next line contains n integers a_1, a_2, \dots, a_n : the desired apartment size of each applicant. If the desired size of an applicant is x , he or she will accept any apartment whose size is between $x - k$ and $x + k$.

The last line contains m integers b_1, b_2, \dots, b_m : the size of each apartment.

Output

Print one integer: the number of applicants who will get an apartment.

Constraints

- $1 \leq n, m \leq 2 \cdot 10^5$
- $0 \leq k \leq 10^9$
- $1 \leq a_i, b_i \leq 10^9$

Example

Input:

```
4 3 5
60 45 80 60
30 60 75
```

Output:

```
2
```



CSES Problem Set

Ferris Wheel

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Time limit: 1.00 s **Memory limit:** 512 MB

There are n children who want to go to a Ferris wheel, and your task is to find a gondola for each child.

Each gondola may have one or two children in it, and in addition, the total weight in a gondola may not exceed x . You know the weight of every child.

What is the minimum number of gondolas needed for the children?

Input

The first input line contains two integers n and x : the number of children and the maximum allowed weight.

The next line contains n integers p_1, p_2, \dots, p_n : the weight of each child.

Output

Print one integer: the minimum number of gondolas.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq x \leq 10^9$
- $1 \leq p_i \leq x$

Example

Input:

```
4 10
7 2 3 9
```

Output:

```
3
```



CSES Problem Set

Concert Tickets

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Time limit: 1.00 s **Memory limit:** 512 MB

There are n concert tickets available, each with a certain price. Then, m customers arrive, one after another.

Each customer announces the maximum price they are willing to pay for a ticket, and after this, they will get a ticket with the nearest possible price such that it does not exceed the maximum price.

Input

The first input line contains integers n and m : the number of tickets and the number of customers.

The next line contains n integers h_1, h_2, \dots, h_n : the price of each ticket.

The last line contains m integers t_1, t_2, \dots, t_m : the maximum price for each customer in the order they arrive.

Output

Print, for each customer, the price that they will pay for their ticket. After this, the ticket cannot be purchased again.

If a customer cannot get any ticket, print -1 .

Constraints

- $1 \leq n, m \leq 2 \cdot 10^5$
- $1 \leq h_i, t_i \leq 10^9$

Example

Input:

```
5 3
5 3 7 8 5
4 8 3
```

Output:

```
3
8
-1
```



CSES Problem Set

Restaurant Customers

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Time limit: 1.00 s **Memory limit:** 512 MB

You are given the arrival and leaving times of n customers in a restaurant.

What was the maximum number of customers in the restaurant at any time?

Input

The first input line has an integer n : the number of customers.

After this, there are n lines that describe the customers. Each line has two integers a and b : the arrival and leaving times of a customer.

You may assume that all arrival and leaving times are distinct.

Output

Print one integer: the maximum number of customers.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq a < b \leq 10^9$

Example

Input:

```
3
5 8
2 4
3 9
```

Output:

```
2
```



CSES Problem Set

Movie Festival

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Time limit: 1.00 s **Memory limit:** 512 MB

In a movie festival n movies will be shown. You know the starting and ending time of each movie. What is the maximum number of movies you can watch entirely?

Input

The first input line has an integer n : the number of movies.

After this, there are n lines that describe the movies. Each line has two integers a and b : the starting and ending times of a movie.

Output

Print one integer: the maximum number of movies.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq a < b \leq 10^9$

Example

Input:

```
3
3 5
4 9
5 8
```

Output:

```
2
```



CSES Problem Set

Sum of Two Values

[TASK](#) | [SUBMIT](#) | [RESULTS](#) | [STATISTICS](#) | [HACKING](#)

Time limit: 1.00 s **Memory limit:** 512 MB

You are given an array of n integers, and your task is to find two values (at distinct positions) whose sum is x .

Input

The first input line has two integers n and x : the array size and the target sum.

The second line has n integers a_1, a_2, \dots, a_n : the array values.

Output

Print two integers: the positions of the values. If there are several solutions, you may print any of them. If there are no solutions, print `IMPOSSIBLE`.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq x, a_i \leq 10^9$

Example

Input:

```
4 8
2 7 5 1
```

Output:

```
2 4
```



CSES Problem Set

Maximum Subarray Sum

[TASK](#) | [SUBMIT](#) | [RESULTS](#) | [STATISTICS](#) | [HACKING](#)

Time limit: 1.00 s **Memory limit:** 512 MB

Given an array of n integers, your task is to find the maximum sum of values in a contiguous, nonempty subarray.

Input

The first input line has an integer n : the size of the array.

The second line has n integers x_1, x_2, \dots, x_n : the array values.

Output

Print one integer: the maximum subarray sum.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $-10^9 \leq x_i \leq 10^9$

Example

Input:

8
-1 3 -2 5 3 -5 2 2

Output:

9



CSES Problem Set

Stick Lengths

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Time limit: 1.00 s **Memory limit:** 512 MB

There are n sticks with some lengths. Your task is to modify the sticks so that each stick has the same length.

You can either lengthen and shorten each stick. Both operations cost x where x is the difference between the new and original length.

What is the minimum total cost?

Input

The first input line contains an integer n : the number of sticks.

Then there are n integers: p_1, p_2, \dots, p_n : the lengths of the sticks.

Output

Print one integer: the minimum total cost.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq p_i \leq 10^9$

Example

Input:

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

Output:

```
5
```



CSES Problem Set

Missing Coin Sum

[TASK](#) | [SUBMIT](#) | [RESULTS](#) | [STATISTICS](#) | [HACKING](#)

Time limit: 1.00 s **Memory limit:** 512 MB

You have n coins with positive integer values. What is the smallest sum you cannot create using a subset of the coins?

Input

The first input line has an integer n : the number of coins.

The second line has n integers x_1, x_2, \dots, x_n : the value of each coin.

Output

Print one integer: the smallest coin sum.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq x_i \leq 10^9$

Example

Input:

```
5
2 9 1 2 7
```

Output:

```
6
```



CSES Problem Set

Collecting Numbers

[TASK](#) | [SUBMIT](#) | [RESULTS](#) | [STATISTICS](#) | [HACKING](#)

Time limit: 1.00 s **Memory limit:** 512 MB

You are given an array that contains each number between $1 \dots n$ exactly once. Your task is to collect the numbers from 1 to n in increasing order.

On each round, you go through the array from left to right and collect as many numbers as possible. What will be the total number of rounds?

Input

The first line has an integer n : the array size.

The next line has n integers x_1, x_2, \dots, x_n : the numbers in the array.

Output

Print one integer: the number of rounds.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$

Example

Input:

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

Output:

```
3
```



CSES Problem Set

Collecting Numbers II

[TASK](#) | [SUBMIT](#) | [RESULTS](#) | [STATISTICS](#) | [HACKING](#)

Time limit: 1.00 s **Memory limit:** 512 MB

You are given an array that contains each number between $1 \dots n$ exactly once. Your task is to collect the numbers from 1 to n in increasing order.

On each round, you go through the array from left to right and collect as many numbers as possible.

Given m operations that swap two numbers in the array, your task is to report the number of rounds after each operation.

Input

The first line has two integers n and m : the array size and the number of operations.

The next line has n integers x_1, x_2, \dots, x_n : the numbers in the array.

Finally, there are m lines that describe the operations. Each line has two integers a and b : the numbers at positions a and b are swapped.

Output

Print m integers: the number of rounds after each swap.

Constraints

- $1 \leq n, m \leq 2 \cdot 10^5$
- $1 \leq a, b \leq n$

Example

Input:

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

Output:

```
2
3
4
```