INFORMATICS COMPETITION − EDITORIAL

TASK 01

Thieves from Ugijevo

time limit	memory limit	input	output
0.5 s	64 MB	standard input	standard output

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Please, be aware that there are some important notices in the section INFORMATION on the left panel (grade mode, min number of submissions per task, source code limit, the command-line compilation, ...).

You may notice during a practice session:

1. All questions regarding the tasks will be answered via an online judge system.
2. All announcements are created via an online judge system.

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Two MG Cup gold medal winners, Jovan Milićev and Filip Marković, would like to present You with the legendary Ugijevo thieves problem.

Ugijevo is the town with the highest crime rate in the world. Since the old sheriff could not deal with the legendary Ugijevo thieves, you have been appointed as the new sheriff. You have just received a group of arrested thieves and the policemen who arrested them. They should go in a line through the hallway to the prison cells. However, without your supervision, the policemen relax and stop carefully watching the thieves.

Formally, we will represent the line of policemen and thieves as an array consisting only of zeros and ones (0 represents a thief and 1 a policeman). If it happens that in some prefix of the array there are more thieves than policemen (more zeros than ones), then the policemen will not be able to watch over all the thieves and they will run away. Similarly, if there are more thieves than policemen in some suffix of the array, the thieves will again run away.

You, as the sheriff, want to add some policemen and some thieves to the line so that the thieves can't run away and also get as many political points as possible. You can modify the array in 2 ways:

1. Add a thief between any 2 members of the array, to the beginning of the sequence or to the end of the array. We put one more thief in prison, so this modification gives us 1 political point.
2. Add a policeman between any 2 members of the array, at the beginning of the array or at the end of the array. We have to pay for one more policeman, so this modification costs us 1 political point. For modifications, you can use as many thieves as you want(after all, you live in Ugijevo) and also as many policemen as you want.

What is the maximum number of political points you can get so that no thieves run away?

Input

The first and only line of standard input contains a string S **(consisting only of 0 and 1), which represents the initial array of policemen and thieves.**

Output

Print the maximum number of political points you can get to standard output.

Constrains:

$|S| \leq 3 * 10^5$

Example1

Input

```
10
```

Output

```
-1
```

Explanation

We have one policeman and one thief. In order for the thief not to run away, we have to add one policeman to the end of the array and that modification brings us -1 political point. It can be shown that we cannot possibly score more political points.

Example2

Input

```
11
```

Output:

```
1
```

Explanation

We have 2 policemen. It can be shown that we will get the most political points if we put one thief between them and get the array 101.

TASK 02

Jovan and interesting arrays

time limit	memory limit	input	output
0.5 s	64 MB	standard input	standard output

Jovan likes a simple array with at most K numbers. A simple array of length K is an array composed of the integer numbers from 0 through K-1 in that order.

For example, simple arrays are [0], [0, 1, 2, 3], [0, 1, 2, 3, 4, 5, 6].

But, the arrays [1], [0, 1, 3, 2], [0, 1, 3] are not simple arrays.

Jovan decided to construct more complex arrays by combining several simple arrays of lengths up to K in one array. He calls the resulting array an interesting array.

For example, for K=3 such interesting arrays are [0, 1], [0, 1, 2, 0], [0, 1, 0, 1], [0, 0, 0], [0, 1, 2], but arrays [0, 1, 2, 3], [0, 1, 1], [0, 0, 2] are not interesting arrays.

Jovan presents you with some arrays of numbers and asks you if it is an interesting array made up of simple arrays of at most K numbers! Also, he wants to know the length of the longest simple array in a given interesting array. Write a program that solves the problem.

Input

On the first line of the standard input, the natural numbers N and K are given - respectively the length of the array and the maximum length of a simple array construct. On the second line of the standard input, N natural numbers are given - the numbers of the array that Jovan presents to you.

Output

The only line of the standard output should display "Yes" or "No" in depending on whether the given array is interesting with the maximum length K for simple building array. Also, you should print in the same line (separated by a single space) the length of the maximum simple array in the given array.

Constraints

$1 \le K \le N \le 10^6$

Example 1

Input

```
4 3

0 0 1 2
```

Output

```
Yes 3
```

Explanation

The simple arrays are [0] and [0, 1, 2] and array [0, 1, 2] has the largest length equal to 3.

Example 2

Input

```
4 2

0 0 1 2
```

Output

```
No 3
```

Explanation

Here, simple array must have a length of at most 2 and array [0, 1, 2] has the largest length equal to 3.

Example 3

Input

```
4 4

1 2 1 2
```

Output

```
No 0
```

Explanation

Here, there is no way to split the array into valid ones simple arrays, so the given array is not interesting.

TASK 03

Outlier

time limit	memory limit	input	output
0.3 s	64 MB	standard input	standard output

Write a program that for given three positive integers (which are not necessarily distinct) finds the smallest positive integer which cannot be represented as a sum of some of them.

Attention: Your task will be a bit complicated. Each test case consists of three triples of positive integers, and for each triple, Your program must find the smallest positive integer that cannot be represented as the sum of any of the numbers in the triplet.

You will only get points for this test case if your answer is correct for all three triples of numbers.

Input

Three target triples are entered from three consecutive lines of standard input. Each line is presented with positive integers A, B and C separated by a single space.

Output

On three consecutive lines of standard output, output one integer each positive number - the minimum number found that cannot be represented as sum of some of the numbers A, B and C for the corresponding triple.

Constraints

$3 \le A+B+C \le$ **1 000 000 000**

Example

Input

```
1 4 1

1 123456789 2

5 2 3
```

Output

```
3

4

1
```

Explanation

Let us analyse tripple: A=1, B=4, C=1 The answer is equal to 3, because

1=A

2=A+C

TASK 04

UnFriendly triangle

time limit	memory limit	input	output
0.3 s	64 MB	standard input	standard output

Two MG Cup gold medal winners, Jovan Milićev and Filip Marković, would like to introduce You to the famous MG students: Gvole, Steva and Ivo

Gvole and Steva have skipped class again! Only Fića, Ivo and Joca remained. As you all know, they cannot stand each other. Since Professor Gaja also knows that, as soon as he entered the classroom, he told them exactly where to stand, so that the minimum distance between any two of the three classmates is as large as possible (Professor Gaja can stand anywhere, everyone loves him).

The first task that Professor Gaja assigned to his angry students was to find the ratio of the largest and smallest distance between any two of the three in the current layout. We will assume that the classroom is a rectangle with side lengths A and B. Help the friends to solve this problem, in order to return to finding function limits as soon as posible.

Input

The first and only line of the standard input contains two integers A and B, the dimensions of the classroom.

Output

Print one real number on the standard output, the number representing the solution to Professor Gaja's problem, rounded to 5 decimal places.

Constraints

$0<A,B\leq 10^9$

Example

Input

```
2 2
```

Output:

```
1.00000
```

Explanation

It can be shown that for a square shaped classroom Professor Gaja's arrangement is an equilateral triangle, so the required ratio is equal to 1.