Codeforces Round #244 (Div. 2)

A. Police Recruits

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

The police department of your city has just started its journey. Initially, they don't have any manpower. So, they started hiring new recruits in groups.

Meanwhile, crimes keeps occurring within the city. One member of the police force can investigate only one crime during his/her lifetime.

If there is no police officer free (isn't busy with crime) during the occurrence of a crime, it will go untreated.

Given the chronological order of crime occurrences and recruit hirings, find the number of crimes which will go untreated.

Input

The first line of input will contain an integer n $(1 \le n \le 10^5)$, the number of events. The next line will contain n space-separated integers.

If the integer is -1 then it means a crime has occurred. Otherwise, the integer will be positive, the number of officers recruited together at that time. No more than 10 officers will be recruited at a time.

Output

Print a single integer, the number of crimes which will go untreated.

Sample test(s)

input
3 -1 -1 1
output
2

input
8 1 -1 1 -1 -1 1 1 1
output
1

input
11 -1 -1 2 -1 -1 -1 -1 -1 -1 -1 -1
output
8

Note

Lets consider the second example:

1. Firstly one person is hired.
2. Then crime appears, the last hired person will investigate this crime.
3. One more person is hired.
4. One more crime appears, the last hired person will investigate this crime.
5. Crime appears. There is no free policeman at the time, so this crime will go untreated.
6. One more person is hired.
7. One more person is hired.
8. One more person is hired.

The answer is one, as one crime (on step 5) will go untreated.

B. Prison Transfer

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

The prison of your city has n prisoners. As the prison can't accommodate all of them, the city mayor has decided to transfer c of the prisoners to a prison located in another city.

For this reason, he made the n prisoners to stand in a line, with a number written on their chests. The number is the severity of the crime he/she has committed. The greater the number, the more severe his/her crime was.

Then, the mayor told you to choose the c prisoners, who will be transferred to the other prison. He also imposed two conditions. They are,

- The chosen c prisoners has to form a contiguous segment of prisoners.
- Any of the chosen prisoner's crime level should not be greater then t. Because, that will make the prisoner a severe criminal and the mayor doesn't want to take the risk of his running away during the transfer.

Find the number of ways you can choose the c prisoners.

Input

The first line of input will contain three space separated integers n $(1 \le n \le 2 \cdot 10^5)$, t $(0 \le t \le 10^9)$ and c $(1 \le c \le n)$. The next line will contain n space separated integers, the i^{th} integer is the severity i^{th} prisoner's crime. The value of crime severities will be non-negative and will not exceed 10^9.

Output

Print a single integer — the number of ways you can choose the c prisoners.

Sample test(s)

input
4 3 3 2 3 1 1

output
2

input
1 1 1 2

output
0

input
11 4 2 2 2 0 7 3 2 2 4 9 1 4

output
6

C. Checkposts

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

Your city has n junctions. There are m **one-way** roads between the junctions. As a mayor of the city, you have to ensure the security of all the junctions.

To ensure the security, you have to build some police checkposts. Checkposts can only be built in a junction. A checkpost at junction i can protect junction j if either $i = j$ or the police patrol car can go to j from i and then come back to i.

Building checkposts costs some money. As some areas of the city are more expensive than others, building checkpost at some junctions might cost more money than other junctions.

You have to determine the minimum possible money needed to ensure the security of all the junctions. Also you have to find the number of ways to ensure the security in minimum price and **in addition in minimum number of checkposts**. Two ways are different if any of the junctions contains a checkpost in one of them and do not contain in the other.

Input

In the first line, you will be given an integer n, number of junctions $(1 \le n \le 10^5)$. In the next line, n space-separated integers will be given. The i^{th} integer is the cost of building checkpost at the i^{th} junction (costs will be non-negative and will not exceed 10^9).

The next line will contain an integer m $(0 \le m \le 3 \cdot 10^5)$. And each of the next m lines contains two integers u_i and v_i $(1 \le u_i, v_i \le n;\ u \ne v)$. A pair u_i, v_i means, that there is a one-way road which goes from u_i to v_i. There will not be more than one road between two nodes in the same direction.

Output

Print two integers separated by spaces. The first one is the minimum possible money needed to ensure the security of all the junctions. And the second one is the number of ways you can ensure the security modulo 1000000007 $(10^9 + 7)$.

Sample test(s)

input

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

output

```
3 1
```

input

```
5
2 8 0 6 0
6
1 4
1 3
2 4
3 4
4 5
5 1
```

output

```
8 2
```

input

```
10
1 3 2 2 1 3 1 4 10 10
12
1 2
2 3
3 1
3 4
4 5
5 6
5 7
6 4
7 3
8 9
9 10
10 9
```

output

```
15 6
```

input

```
2
7 91
2
1 2
2 1
```

output

```
7 1
```

D. Match & Catch

time limit per test: 1 second
memory limit per test: 512 megabytes
input: standard input
output: standard output

Police headquarter is monitoring signal on different frequency levels. They have got two suspiciously encoded strings s_1 and s_2 from two different frequencies as signals. They are suspecting that these two strings are from two different criminals and they are planning to do some evil task.

Now they are trying to find a common substring of minimum length between these two strings. The substring must occur only once in the first string, and also it must occur only once in the second string.

Given two strings s_1 and s_2 consist of lowercase Latin letters, find the smallest (by length) common substring p of both s_1 and s_2, where p is a unique substring in s_1 and also in s_2. See notes for formal definition of substring and uniqueness.

Input

The first line of input contains s_1 and the second line contains s_2 $(1 \le |s_1|, |s_2| \le 5000)$. Both strings consist of lowercase Latin letters.

Output

Print the length of the smallest common unique substring of s_1 and s_2. If there are no common unique substrings of s_1 and s_2 print -1.

Sample test(s)

input
apple pepperoni
output
2

input
lover driver
output
1

input
bidhan roy
output
-1

input
testsetses teeptes
output
3

Note

Imagine we have string $a = a_1a_2a_3...a_{|a|}$, where $|a|$ is the length of string a, and a_i is the i^{th} letter of the string.

We will call string $a_la_{l+1}a_{l+2}...a_r$ $(1 \le l \le r \le |a|)$ the substring $[l, r]$ of the string a.

The substring $[l, r]$ is unique in a if and only if there is no pair l_1, r_1 such that $l_1 \ne l$ and the substring $[l_1, r_1]$ is equal to the substring $[l, r]$ in a.

E. Police Patrol

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Imagine that your city is an infinite 2D plane with Cartesian coordinate system. The only crime-affected road of your city is the x-axis. Currently, there are n criminals along the road. No police station has been built on this road yet, so the mayor wants to build one.

As you are going to be in charge of this new police station, the mayor has asked you to choose a suitable position (some integer point) for building it. You should choose the best position for the police station, so that you could minimize the total time of your criminal catching mission. Your mission of catching the criminals will operate only from this station.

The new station will have only **one** patrol car. You will go to the criminals by this car, carry them on the car, bring them back to the police station and put them in prison. The patrol car can carry at most m criminals at a time. Note that, the criminals don't know about your mission. So, they will stay where they are instead of running away.

Your task is to find the position for the police station, so that total distance you need to cover to catch all the criminals will be minimum possible. Note that, you also can built the police station on the positions where one or more criminals already exist. In such a case all these criminals are arrested instantly.

Input

The first line of the input will have two integers n $(1 \le n \le 10^6)$ and m $(1 \le m \le 10^6)$ separated by spaces. The next line will contain n integers separated by spaces. The i^{th} integer is the position of the i^{th} criminal on the x-axis. Absolute value of positions will not exceed 10^9. If a criminal has position x, he/she is located in the point $(x, 0)$ of the plane.

The positions of the criminals will be given in non-decreasing order. Note, that there can be more than one criminal standing at some point of the plane.

Note: since the size of the input/output could be very large, don't use slow input/output techniques in your language. For example, do not use input/output streams (cin, cout) in C++.

Output

Print a single integer, that means the minimum possible distance you need to cover to catch all the criminals.

Sample test(s)

input
3 6 1 2 3
output
4

input
5 5 -7 -6 -3 -1 1
output
16

input
1 369 0
output
0

input
11 2 -375 -108 1336 1453 1598 1892 2804 3732 4291 4588 4822
output
18716