Math Class

Kou is having her first math class. Her teacher gave her N positive integers and asked her to build a largest possible number. The only allowed operation is to concatenate the numbers one after another. Kou can reorganized the numbers as she sees fit, but she cannot remove or rearrange the digits within the numbers.

She turns to you for help in producing this number.

Input

The first line of the input contains a single integer N ($1 <= N <= 50$), indicating the number of integers. The next line contains N positive integers between 1 and 10^{100}.

Output

You should print a line containing a single integer, the largest number that can be created by concatenating the given numbers in any order.

Example 1

```
Input:
4
123 124 56 90

Output:
9056124123
```

Example 2

```
Input:
5
123 124 56 90 9

Output:
99056124123
```

Example 3

```
Input:
5
9 9 9 9 9

Output:
99999
```

Unique Subarray

A subarray is the sequence of consecutive elements in an array. A *unique* subarray is a subarray in which all elements are unique (i.e., no repeated values). Given an array, your task is to calculate the maximum length of a *unique* subarray.

For example [4, 3, 2, 2, 1], the maximum length of of a *unique* subarray is 3. The *unique* subarray is [4,3,2]. [3,2,2,1] is a subarray of length 4, but since 2 appears twice in this subarray, it is not a *unique* subarray.

Input

The 1st line contains an integer n (1 <= n <= 10^6), specifying the length of the array.

The following line contains n integers, in range [1, 10^9], denoting the elements of the array.

Output

A line containing the maximum length of a *unique* subarray.

Example 1

```
Input:
5
4 3 2 2 1

Output:
3
```

Example 2

```
Input:
6
1 1 1 1 1 1

Output:
1
```

Poppi's Rocket

The World Tree is a towering tree standing in the center of the endless Cloud Sea. The fabled paradise Elysium is said to be located at the top of the World Tree. The exterior of the World Tree is covered in thick growths of branches, while the interior is a high-tech ladder with n rungs.

Poppi can use rocket jumping to climb the ladder, but she cannot skip any rungs. Initially Poppi is on the ground. Initial strength of the rocket is set to k. As long as her jumps are strictly smaller than k, her rocket's strength remains at k. If her jump is ever equal to k, the strength decreases by 1. The rocket cannot be used to propel her to the height greater than k.

For example let the height of the rungs from the ground be 2, 7, 8, 12, 14 respectively and the initial strength of the rocket be k = 5.

Her jumps are:

1. Jumped 2 feet from the ground to the 1st rung (ground to 2), k remains 5.
2. Jumped 5 feet to the next rung (2 to 7). So, k decreases to 4.
3. Jump 1 feet to the 3rd rung (7 to 8). So, k remains 4.
4. Jump 4 feet to the 4th rung (8 to 12). So, k decreases to 3.
5. Jump 2 feet to the 5th rung (12 to 14). So, k remains 3.

Since the rockets with the greater strength cost more, Poppi asks you for help in figuring out the minimum initial strength k for the rocket so that she can reach the top rung.

Input

The first line contains 1 integer: a positive n (0 < n <= 10^5) giving the number of rungs in the ladder.

The next line contains n space separated integers, r1, r2, ... , rn (1 <= r1 < r2 < ... < rn <= 10^7), denoting the heights of the rungs from the ground.

Output

Print the minimum value of k as described above. The output ends with a newline.

Example 1

```
Input:
5
2 7 8 12 14

Output:
5
```

Matrix Query

You are given a N by M matrix A, it has the following properties: + A(i,1) <= A(i,2) <= ... <= A(i,M) for any 1 <= i <= N + A(1,j) <= A(2,j) <= ... <= A(N,j) for any 1 <= j <= M

Now here are some queries, each of which is denoted by two integers P and Q. For each query, you have to find the largest square sub-matrix such that every entry in that sub-matrix must within the interval [P, Q].

Input

The first line of the input contains two integers N (1 <= N <= 500) and M (1 <= M <= 500). The following N lines describe the matrix, each of which contains M integers between 0 and 100000. It is guaranteed that the matrix satisfies the properties described above.

The next line contains a single integer K (1 <= K <= 10000), indicating the number of queries. Each of the following K lines contains two integers P and Q (0 <= P <= Q <= 100000) describing the query.

Output

For each query, print one line containing the dimension of the largest sub-matrix described above.

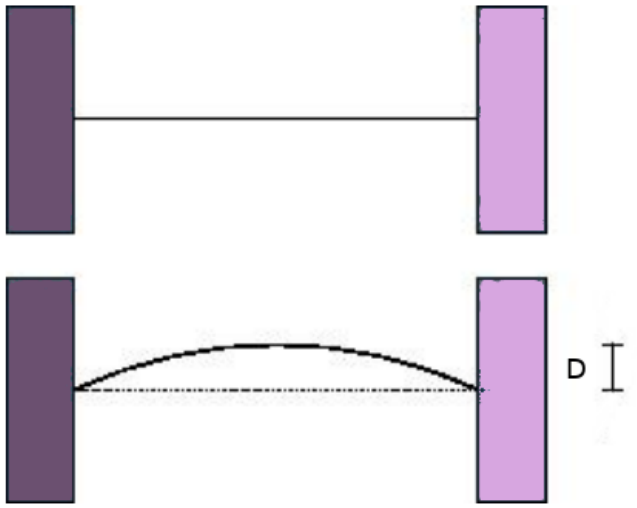
Example 1

```
Input:
4 5
13 21 25 33 34
16 21 33 35 35
16 33 33 45 50
23 51 66 83 93
3
22 90
33 35
20 100

Output:
3
2
4
```

Example 2

```
Input:
4 4
1 7 9 11
5 8 10 12
7 10 15 17
11 19 30 41
4
6 20
7 9
10 10
13 14

Output:
3
1
1
0
```

Heating Rod



There is a rod with length L mounted between two fixed walls. When the rod is heated, it will expand lengthwise according to the formula $L(1+\mathrm{T}C)$ where T is the temperature difference and C is the expansion coefficient of the metal from which the rod is made.

Your task is to calculate the displacement of the center of the rod from its original position.

Input

The input consists of only one line, containing three non-negative numbers: L, T and C, indicating the length of that rod, the temperature heated by and the expanding coefficient. It is guaranteed that the new length after expansion will be no more than 1.5*L.

Output

Print one line, containing a single number D, the displacement of the center of the rod. D should be rounded to 3 decimal places.

Example 1

```
Input:
1000 100 0.0001

Output:
61.329
```

Example 2

```
Input:
15000 10 0.00006

Output:
225.020
```

Example 3

```
Input:
10 0 0.001

Output:
0.000
```