Placement/Internship - Class 2

Prefix Sum,Searching and Sorting

Prefix Sum?

Question - 1(Standard)

Given array A of size n. Subarray with sum x.

1 <= n <= 1e5

Question - 2 (Standard)

Given array A of size n. Find subarray of xor value ‘x’.

1 <= n <= 1e5

On Matrix??

Question - 3 (Standard)

Given a matrix of dimension n x m. Find the sum of a certain submatrix.

$1 <= n \times m <= 1e5$

Question – 4

Prince Raj wants to save his princess from the monster, so he decides to build a wall between the monster and the princess across the field of length N. But the problem is, prince runs from position L and R at a time and drops bricks in the way (both L and R inclusive; i.e., he will drop brick on L and R also).

He needs your help to know the maximum height of wall built and any position with maximum height.

Input

First line contains 2 space separated integers Q ($1 \leq Q \leq 100,000$: Number of runs) and L ($1 \leq N \leq 100,000$: Length of field).

Each of the next Q lines have 2 space-separated integers L and R ($1 \leq L \leq R \leq N$) : starting and ending positions of brick fall in that run.

Output

Output 2 integers: the maximum height of the wall after all runs and any position of this maximum height separated by space on a new-line.

In case of multiple possible answers print any one of them.

Example

input Copy

```
5 10
1 3
3 7
2 8
7 10
8 9
```

output Copy

```
3 7
```

Binary Search??

Question - 5 (Standard)

You are given an array a of n integers a1,a2,...,an.

Your task is to response to the q queries like "How many numbers' values are between l and r?".

1 <= n <= 1e5

1 <= q <= 1e5

Binary Search on Answer

Question - 6 (Standard)

Find the side of the largest square where side is an integer, and area is less than ‘x’.

1 <= x <= 1e18

Question - 7 (Standard)

There are n ropes, you need to cut k pieces of the same length from them. Find the maximum length of pieces you can get.

Input

The first line contains two integers n and k ($1 \leq n, k \leq 10000$). Next n lines contain one number each, the length of the rope a_i ($1 \leq a_i \leq 10^7$).

Output

Output one real number, maximum length of pieces you can get. The answer will be considered correct if the relative or absolute error does not exceed 10^{-6}.

Example

input Copy

```
4 11
802
743
457
539
```

output Copy

```
200.5
```

Question - 8 (Asked in Uber)

Given two sorted arrays a and b, find the k-th element in the array you get when you merge a and b and sort it.

Question - 9

Given a nxm matrix where cell (i,j) has value aij, find the largest square submatrix where sum of all elements in submatrix <= size of square submatrix.

1 <= aij <= n * m

Question - 10

Suppose we have an array a=[a0,a1,…,an−1]. We need to find a segment [l,r] of length at least D such that average of al,al+1,..ar is maximized.

Question - 11 (Asked in Arcesium)

Given n string, each of size m. Find the longest substring which is common in all n strings.

$1 <= n * m <= 1e6$