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Các bạn có thể tham khảo video lời giải của mình tại

<https://cutt.ly/WmI0f6O>

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TWO POINTERS

## Problem A. Merging arrays

You are given two arrays, sorted in non-decreasing order. Merge them into one sorted array.

Input

The first line contains integers n and m, the sizes of the arrays (1≤n,m≤105). The second line contains n integers ai, elements of the first array, the third line contains m integers bi, elements of the second array (−109≤ai,bi≤109).

Output

Print n+m integers, the merged array.

Example

| Input | Output |
| --- | --- |
| 6 7  1 6 9 13 18 18  2 3 8 13 15 21 25 | 1 2 3 6 8 9 13 13 15 18 18 21 25 |

Source code tham khảo : <https://paste.ofcode.org/4kVdHF2m85ybSMUfDieuqH>

## Problem B. Number of smaller

You are given two arrays, sorted in non-decreasing order. For each element of the second array, find the number of elements in the first array strictly less than it.

Input

The first line contains integers n and mm, the sizes of the arrays (1≤n,m≤105). The second line contains n integers ai, elements of the first array, the third line contains m integers bi, elements of the second array (−109≤ai,bi≤109).

Output

Print m numbers, the number of elements of the first array less than each of the elements of the second array.

Example

| Input | Output |
| --- | --- |
| 6 7  1 6 9 13 18 18  2 3 8 13 15 21 25 | 1 1 2 3 4 6 6 |

Source code tham khảo : <https://paste.ofcode.org/3aAdGaTeyxTqSCznwbT5gNY>

## Problem C. Number of Equal

You are given two arrays aa and bb, sorted in non-decreasing order. Find the number of pairs (i,j) for which ai=bj.

**Input**

The first line contains integers nn and mm, the sizes of the arrays (1≤n,m≤105). The second line contains n integers ai, elements of the first array, the third line contains m integers bi, elements of the second array (−109≤ai,bi≤109).

**Output**

Print one number, the answer to the problem.

Example

| Input | Output |
| --- | --- |
| 8 7  1 1 3 3 3 5 8 8  1 3 3 4 5 5 5 | 11 |

Source code tham khảo : <https://paste.ofcode.org/37Qns7S7MHjSWNKvL66grw6>

## Problem D. Segment With Small Sum

Given an array of n integers ai. Let's say that the segment of this array a[l..r] (1≤l≤r≤n) is good if the sum of elements on this segment is at most s. Your task is to find the longest good segment.

**Input**The first line contains integers nn and s (1≤n≤105, 1≤s≤1018). The second line contains integers ai (1≤ai≤109).

**Output**

Print one integer, the length of the longest good segment. If there are no such segments, print -1.

Example

| Input | Output |
| --- | --- |
| 7 20  2 6 4 3 6 8 9 | 4 |

Source code tham khảo : <https://paste.ofcode.org/cgsbXv8b7mRkAUCmJusfW3>

## Problem E. Segment With big Sum

Given an array of n integers aiai. Let's say that the segment of this array a[l..r] (1≤l≤r≤n) is good if the sum of elements on this segment is at least s. Your task is to find the shortest good segment.

**Input**

The first line contains integers n and s (1≤n≤105, 1≤s≤1018). The second line contains integers ai (1≤ai≤109).

**Output**

Print one integer, the length of the shortest good segment. If there are no such segments, print −1.

Example

| Input | Output |
| --- | --- |
| 7 20  2 6 4 3 6 8 9 | 3 |

Source code tham khảo : <https://paste.ofcode.org/ibyJ3WWcUgCgegVhSEuPdv>

## Problem F. Number of Segments with small sum

Given an array of n integers ai. Let's say that the segment of this array a[l..r] (1≤l≤r≤n) is good if the sum of elements on this segment is at most s. Your task is to find the number of good segments.

Input

The first line contains integers n and s (1≤n≤105, 1≤s≤1018). The second line contains integers ai (1≤ai≤109).

Output

Print one integer, the number of good segments.

Example

| Input | Output |
| --- | --- |
| 7 20  2 6 4 3 6 8 9 | 19 |

Source code tham khảo : <https://paste.ofcode.org/BbjqZCju7Si8g6yzXxLWCg>

## Problem G. Number of Segments with big sum

Given an array of n integers ai. Let's say that the segment of this array a[l..r] (1≤l≤r≤n) is good if the sum of elements on this segment is at least s. Your task is to find the number of good segments.

Input

The first line contains integers n and s (1≤n≤105, 1≤s≤1018). The second line contains integers ai (1≤ai≤109).

Output

Print one integer, the number of good segments.

Example

| Input | Output |
| --- | --- |
| 7 20  2 6 4 3 6 8 9 | 9 |

Source code tham khảo : <https://paste.ofcode.org/MZzU5VWvq3YckUKDqwSTUE>

## Problem H. Segments with small set

Given an array of n integers ai. Let's say that a segment of this array a[l..r] (1≤l≤r≤n) is good if there are no more than k unique elements on this segment. Your task is to find the number of different good segments.

Input

The first line contains integers n and k (1≤n≤105, 0≤k≤n). The second line contains integers ai (1≤ai≤105).

Output

Print one integer, the number of good segments.

Example

| Input | Output |
| --- | --- |
| 7 3  2 6 4 3 6 8 3 | 20 |

Source code tham khảo : <https://paste.ofcode.org/ULHPishdrHuxbgFWHerNrG>

## Problem I. Segment with small Spread

Given an array of n integers ai. Let's say that a segment of this array a[l..r] (1≤l≤r≤n) is good if the difference between the maximum and minimum elements on this segment is at most k. Your task is to find the number of different good segments.

Input

The first line contains integers n and k (1≤n≤105, 0≤k≤1018). The second line contains integers ai (1≤ai≤1018).

Output

Print the number of good segments.

Example

| Input | Output |
| --- | --- |
| 7 3  2 6 4 3 6 8 9 | 16 |

Source code tham khảo : <https://paste.ofcode.org/ZvVbAy2MjtAhtCDSqEjWah>

Độ phức tạp của code trên là O(nlogn), dễ tiếp cận hơn, các bạn có thể tham khảo cách sử dụng minimum queue để độ phức tạp là O(n).

Link tham khảo Minimum Stack/ Minimum Queue :

<https://cp-algorithms.com/data_structures/stack_queue_modification.html>