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

<https://cutt.ly/WmIOf6O>

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 ($1 \leq n, m \leq 10^5$). The second line contains n integers a_i , elements of the first array, the third line contains m integers b_i , elements of the second array ($-10^9 \leq a_i, b_i \leq 10^9$).

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 m , the sizes of the arrays ($1 \leq n, m \leq 10^5$). The second line contains n integers a_i , elements of the first array, the third line contains m integers b_i , elements of the second array ($-10^9 \leq a_i, b_i \leq 10^9$).

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 $a_i = b_j$.

Input

The first line contains integers n and m , the sizes of the arrays ($1 \leq n, m \leq 10^5$). The second line contains n integers a_i , elements of the first array, the third line contains m integers b_i , elements of the second array ($-10^9 \leq a_i, b_i \leq 10^9$).

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 a_i . Let's say that the segment of this array $a[l..r]$ ($1 \leq l \leq r \leq n$) 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 n and s ($1 \leq n \leq 10^5$, $1 \leq s \leq 10^{18}$). The second line contains integers a_i ($1 \leq a_i \leq 10^9$).

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 a_i . Let's say that the segment of this array $a[l..r]$ ($1 \leq l \leq r \leq n$) 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 ($1 \leq n \leq 10^5$, $1 \leq s \leq 10^{18}$). The second line contains integers a_i ($1 \leq a_i \leq 10^9$).

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 a_i . Let's say that the segment of this array $a[l..r]$ ($1 \leq l \leq r \leq n$) 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 ($1 \leq n \leq 10^5$, $1 \leq s \leq 10^{18}$). The second line contains integers a_i ($1 \leq a_i \leq 10^9$).

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 a_i . Let's say that the segment of this array $a[l..r]$ ($1 \leq l \leq r \leq n$) 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 ($1 \leq n \leq 10^5$, $1 \leq s \leq 10^{18}$). The second line contains integers a_i ($1 \leq a_i \leq 10^9$).

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 a_i . Let's say that a segment of this array $a[l..r]$ ($1 \leq l \leq r \leq n$) 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 ($1 \leq n \leq 10^5$, $0 \leq k \leq n$). The second line contains integers a_i ($1 \leq a_i \leq 10^5$).

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 a_i . Let's say that a segment of this array $a[l..r]$ ($1 \leq l \leq r \leq n$) 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 ($1 \leq n \leq 10^5$, $0 \leq k \leq 10^{18}$). The second line contains integers a_i ($1 \leq a_i \leq 10^{18}$).

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/ZyVbAy2MjtAhtCDSqEjWah>

Độ phức tạp của code trên là $O(n \log n)$, 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

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