

Approach / Rough Work

Additional Problems

(Introduction to Problem Solving - I)

Q2. Minimum Swaps </>

✓ Solved



Using hints except Complete Solution is Penalty free now

Use Hint

Problem Description

Given an array of integers **A** and an integer **B**, find and return the minimum number of swaps required to bring all the numbers less than or equal to **B** together.

Note: It is possible to swap any two elements, not necessarily consecutive.

Problem Constraints

$1 \leq \text{length of the array} \leq 100000$
 $-10^9 \leq A[i], B \leq 10^9$

Input Format

The first argument given is the integer array A.
The second argument given is the integer B.

Output Format

Return the minimum number of swaps.

Example Input

Input 1:

A = [1, 12, 10, 3, 14, 10, 5]
B = 8

Input 2:

A = [5, 17, 100, 11]
B = 20

Example Output

Output 1:

2

Output 2:

1

Explanation 1:

A = [1, 12, 10, 3, 14, 10, 5]

After swapping 12 and 3, A => [1, 3, 10, 12, 14, 10, 5].

After swapping the first occurrence of 10 and 5, A => [1, 3, 5, 12, 14, 10, 10].

Now, all elements less than or equal to 8 are together.

Explanation 2:

A = [5, 17, 100, 11]

After swapping 100 and 11, A => [5, 17, 11, 100].

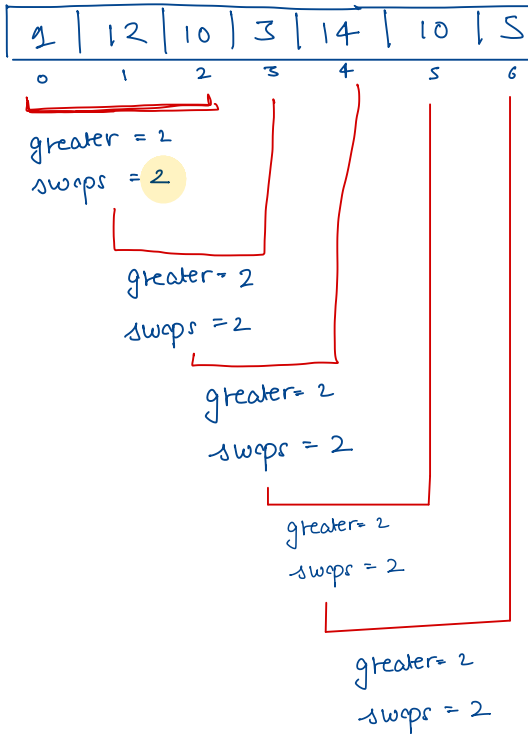
Now, all elements less than or equal to 20 are together.

Approach

- Count number of elements less than 'B'
- Configure a window of that size
- The number of swaps required for that particular window is the number of elements greater than 'B'
- Keep sliding the window, and see in which window the number of swaps was minimum

$$B = 8$$

$$\text{count} = 3$$



15	3	8	43	-2	10	12	6
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swaps = 2

swaps = 1

swaps = 2

... and so on

Let $B = 9$

$\Rightarrow \text{count} = 4$

Concept: Bad Numbers

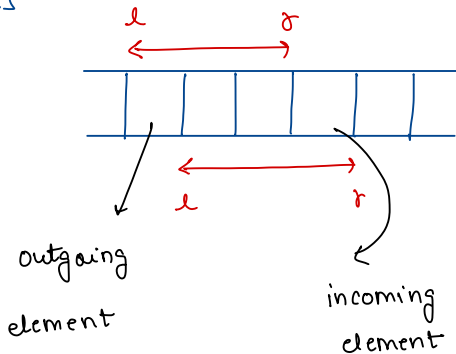
→ For a particular window, assume bad numbers to be the elements which are greater than ' B '

→ The window with the least bad numbers is the window which would require minimum Swaps

But, how to keep track of bad numbers in each window?

→ Firstly, calculate the count of bad numbers in first window.

→ AS we slide our window, check the incoming and outgoing elements



\Rightarrow Now if the outgoing number was 'bad' i.e. $> B$,

↳ decrement the count of bad numbers

\Rightarrow If the incoming element is bad, increment the count of bad numbers

⇒ Carry forward the least bad numbers found for all the windows. That will be the least numbers needing to be swapped.