南方科技大学
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Lab 7 - OJ
Divide and Conquer

CS208 Algorithm Design and Analysis

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Q1: K-th element

Description

You are given two **non-decreasing** arrays A, B. Their length are both n. Now please output the kth element after combining the two subarray $A[l...r]$ and $B[l...r]$ and sorting the combined array in ascending order.

Sample Input 1

```
3 5
1 3 5 7 9
2 3 4 5 6
5 5 2
1 5 6
1 5 7
```

Sample Output 1

```
9
5
5
```

# of queries

Length of arrays, n

A = [1,3,5,7,9] => $A_{5\cdots5}$ = [9]

B = [2,3,4,5,6] => $B_{5\cdots5}$ = [6]

Sorting and combing $A_{5\cdots5}$ and $B_{5\cdots5}$ => [6, 9]

K = 2 => output 9

Q1: K-th element

Sample Input 1

```
3 5
1 3 5 7 9
2 3 4 5 6
5 5 2
1 5 6
1 5 7
```

Sample Output 1

```
9
5
5
```

A = [1,3,5,7,9] => $A_{1\cdots5}$ = A

B = [2,3,4,5,6] => $B_{1\cdots5}$ = B

Sorting and combing $A_{1\cdots5}$ and $B_{1\cdots5}$
=> [1,2,3,3,4,5,5,6,7,9]

K = 6 => output 5

Q2: Range sum

Description

You are given an array A and two integers L and R.

Let's define $S(l, r) = \sum_{i=l}^{r} A_i$ $(l \leq r)$.

Please calculate the numbers of pair (l, r) satisfying $L \leq S(l, r) \leq R$ and $l \leq r$.

Input Format

The first line contains three integers n, L, R, denoting the length of array and the two integers L, R.

The second line contains n integers A_i $(-10^4 \leq A_i \leq 10^4)$, denoting the elements of array A.

Output Format

One line, one integer indicating the answer.

Sample Input 1

```
7 -11 9
-3 9 -11 20 -4 -7 6
```

Sample Output 1

```
19
```

Q2: Range sum

Sample Input 1

```
7 -11 9
-3 9 -11 20 -4 -7 6
```

Sample Output 1

```
19
```

n = 7, L = -11, R = 9

A = [-3, 9, -11, 20, -4, -7, 6]

Sum(1, 1) = -3
Sum(1, 2) = -3 + 9 = 6
…
Sum(6, 7) = -7 + 6 = -1
Sum(7, 7) = 6

19 pairs satisfying $-11 \leq Sum(l, r) \leq 9$