Stacks 4

Monday, June 20, 2022 3:29 PM

Find next min/max in an array.

Q. Given a array, find all the subarrays. Find the diff max & min of each subarray. Find the total sum of that diff.

A: [2, 5, 3]

	max	min	diff
[2]	2	2	0
[5]	5	5	0
[3]	3	3	0
[2,5]	5	2	3
[5,3]	5	3	2
[2,5,3]	5	2	3
			8

[a, b]

A: 10^5

max $\left(2*5+2*3+5*3\right)$ − min $\left(2*5+3*2+5*3\right)$

$\left[(2*5)+(2*3)+(5*3)\right] - \left[(2*2)+(5*2)+(3*3)\right]$

$= \left[(2+5)+(5+3)+(3+2)\right] - \left[(2+2)+(5+2)+(3+3)\right]$

$= 2\left[1-3\right] + 5\left[4-1\right] +$

B: Find elements all subarrays $O(n^2)$

2: Whole array subarray & find max & min $O(n)$ $\quad O(n^2)$

Optimized solution.

1: While generating find max & min.

→ $O(n^2)$

$O(n^2)$! $\sum_{i=1}^{n} A[i] * \left(\#\text{ of subarrays } A[i] \text{ as max} - \#\text{ of subarrays } A[i] \text{ as min}\right)$

2 13 8 5 4 7

5 → max → [5] [5,4]] 2

	0	1	2	3	4	5
	2	10	12	8	13	5
		-1	-1	2	-1	4

→ above. 1st left min & 1st right min.

L Max [-1 0 1 0 3 0]

L Min [-1 4 4 n n]

R Max [1 2 3 5 5 n]

R Min [n 3 3 5 n]

[8] [8,13] [12,8] , [12,8,13] [10,12,8] [10,12,8,13]

min = # of elements on left * # of elements on right

= 3 * 2

= 6

max = (3 − 2) * (1)

= 1 * 1 = 1

Q: [1 2 3] # A[i] * max.

[1] [1,2] [1,2,3] [2] [2,3] [3] → 5

[1] [2] [3] = 8

[2,1] [3,1] [1,2,1] [1,2,3]

?

[1 2 1 2]

? $i < j < k$.

$A[i] \geq A[j]$ $\quad A[k] > A[j]$

a → on top 1

0 → on top

	0	1	2	3	4	5
ex:	10	1	2	2	3	10

(2) (2)

[1,2,1] [1,2,2] } ? X

(a−b) * (a−c)

2 * 2

= 4

(3−2) * (4−3)

1 * 1

= 1

[2]

[1,2] [2,3]

[1,2,3]

4+1 = 5

Leetcode

abac3 → encrypted string

ababc ababc ababc → decrypted.

k = 8

Ans: 'a'

1 2 3 4 5 6 7 8

ababababab

(ab) ababc abc

(k % 3)

(10 % 3) = 1

abac3 → ababc ababc ababc.

ab abc, ababc, ababc

ababc 3

abab

ab 2

k = 8

(k % 5) = 8 % 5 = 3

(3 % 2) = 1

0

2* (ab) strings.

abc abcd c 2

abab c ababc c 2 9 9 9 9 d

1 2 3 4

d (2d)

a=1

b=2

c=3

d=4

cc

a b

4+11 = 44+1 = 45

lcm = 2*3*2 = 4*3*1 = 5*2*1 = 11*4*1 = 45*2 = 90

k = 45

45 % 45 = 3

3 % 11 = 3

3 % 5 = 3

3 % 2 = 1

3 % 1 = 0

a2

−1

39 % 2 ≠ 0

39 % 37

2 % 2 = 0

Amazon

Q: Remove duplicates from the string st. the string formed is lexographically smallest.

bcab

bca

cab

ca

cab

abc

bac

bac → freq.

1. If prev ele count ≥ 1

2. If prev element is greater than curr ele.

Read.

1. freq Array.

2. Stack.

3. Visited set / Array

ex: ab → ab

efa

efa e

e

f

a

e

f

a

abcebc

freq.

a → 1 0

b → 2 1

c → 1 0

e → 1 0

Visited

a → T

b → T

c → T

e → T

e

c

b

a

b a b e c

freq.

a → 1 0

b → 2 1 0

c → 1 0

e → 1 0

Visited

a → T

b → T

c → T

e → T

e

c

b

a

abce

A: [13, 16, 16, 15, 9, 16, 2, 7, 6, 17, 3, 9]

10^5

B = 45 = 12

P_1 P_1 P_1 P_1 P_1 $N/2$ $N/2$

P x Array [0, 13, 29, 45]

(N^2)

B or less than B

odd.

even.

even. length remains odd

odd. 1 2 2 3 3 4 5 5

even [1 2]

$N/2$

P_2

P_1

(N^2)

P_1

P_0

P_0

P_0

P_0

odd even

$\log N$

B + P_0

0, 13, 29, 45

$P_i \leq B$