HashMap and Heap 2

16 October 2022   14:52

Largest Positive Integer that exist with its negative

Set<int> St.

```
Input: nums = [-1,2,-3,3]   ✓
Output: 3
Explanation: 3 is the only valid
```

Example 2:

```
Input: nums = [-1,10,6,7,-7,1]  ✓
Output: 7
Explanation: Both 1 and 7 have the
```

+1   7

Example 3:

```
Input: nums = [-10,8,6,7,-2,-3]
Output: -1
Explanation: There is no a single
```

2   3   10

S: [2]

[-2, 2, 2]

```cpp
int findMaxK(vector<int>& arr)
{
    set<int> st ;
    for(auto x : arr)
    {
        if(x < 0)
        {
            st.insert(abs(x));
        }
    }

}
```

1 3

Contain duplicate II

$|i - j| \leq 3$ $n[i] == n[j]$

[1, 2, 3, 1]

1   2 3 4

K=3

$4 - 1 \leq K$

true

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

1 2 3 4 5 6

K=1

1-4 ≤ 4

3 ≤ 1

false

First Unique char in string

"d d d c c d b b a"

Lovel eet cod e

Remove all adjacent element II

D e e e d b b c c c b d a a
0 1 2 3 4 5 6 7 8 9 10 11 12 13

Stktop(). f == s[1]

[Stk top(1 s == k] → pop

a, 2
2
aa

Remove prefix

5
4
3 1 4 3
5
1 1 1 1 1 ✓
1 ✓
1
6
6 5 4 3 2 1 ✓
7
1 2 1 7 1 2 1 ✓

output
1
4
0
0
5

the minimum number of elements that must be removed from the beginning of the sequence so that all remaining elements are different.

$3 \quad 1 \quad 4 \quad 3 \qquad 4-3=1$

$1 \; 2 \; 1 \; 7 \; 1 \; 2 \; 1$

$1 2 7 8$
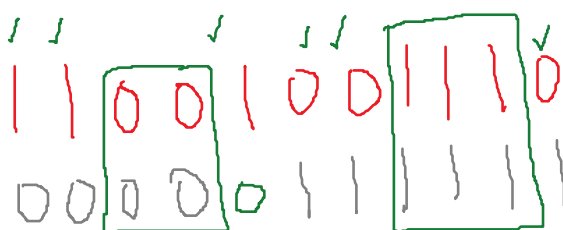
$7 - 3$
(4)
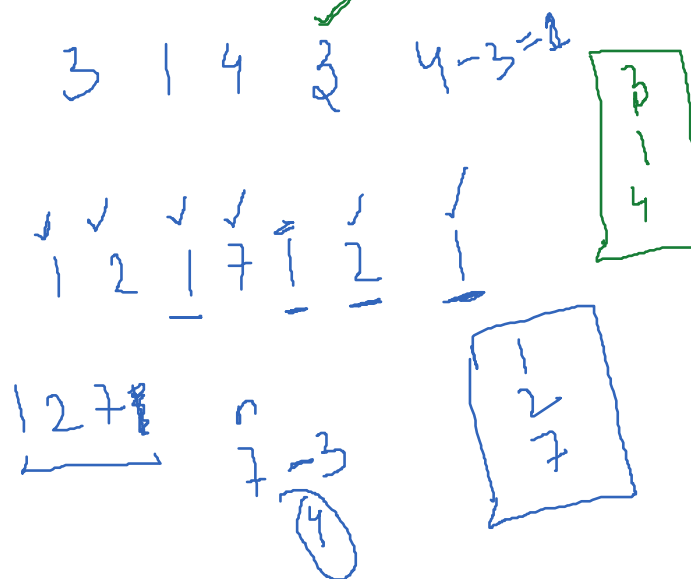
B. Rebellion

output: standard output

You have an array a of size n consisting only of zeroes and ones. You can do the following operation:

- choose two indices $1 \le i, j \le n, i \ne j$, ✓
- add a_i to a_j,
- remove a_i from a.

Note that elements of a can become bigger than 1 after performing some operations. Also note that n becomes 1 less after the operation.

What is the minimum number of operations needed to make a non-decreasing, i. e. that each element is not less than the previous element?

input
4
8
0 0 1 1 1 1 1 1
5
1 0 0 1 1
2
1 0
11
1 1 0 0 1 0 0 1 1 1 0

output
0
1
1
3

$1 \; 1 \; 0 \; 0 \; 1 \; 0 \; 0 \; 1 \; 1 \; 1 \; 0$

$\dfrac{6}{2} = 3$

Coprime

$1 \; 3 \; 5 \; 2 \; 4 \; 7 \; 7 \; 7 \; 7 \; 7 \; 7$
$0 \; 1 \; 2 \; 3 \; 4 \; 5 \; 6$

mp[arr[i]] + mp[arr[j]]

Brute

$i = 1 \quad \to \quad n$
$j = i \quad \to \quad n$

$1 : 4$
$j = 5$

$\gcd = 1$

$\log n \; -1$

15 15	13 X 1

5 X 3 X 1   ①

4	5

4	5	✓
1	1	
3	2	
5	3	
2	4	✓
7	7	

6

$|t| = 2$

$5t$

$7t \; s = 12$

iv) -1
ans $-1/0$ ✓

$-x \; 2 \; 12$

Password

```
2
8
0 1 2 4 5 6 8 9
1
8
output

6
216
```

✓   ✱ 3, 7

$0, 1, 2, 3, 4, 5, 6, 7, 9$

$$
\begin{array}{cccc}
3 & 3 & 7 & 7 \\
3 & 7 & 3 & 7 \\
3 & 7 & 7 & 3
\end{array}
\Big\} 6
$$

7 7 3 3
7 3 7 3
7 3 3 7

$2 \longrightarrow 6$

chuff ∿

$10 - 1 = 9 \to = 8$

$10 - 8 = 2 \to 1 = 1$

$8 \times 6 + 7 \times 6 + 6 \times 6 + 5 \times 6 + 4 \times 6 +$
$3 \times 6 + 2 \times 6 + 1 \times 6$

$0 + $
$1 + $

$6 \ast 1 \times 2 / \times$

$6 (8 + 7 + 6 + 5 + 4 + 3 + 2 + 1)$

$\underline{6}$

$6 \left(\dfrac{n \ast (n+1)}{2} \right) \implies 6 \ast 8 \times \dfrac{9}{2} = 24 \times 9 = 216$

$$
{}^{10-n}C_2 = \dfrac{10-n!}{(8-n)! \, 2!} \times \dfrac{4!}{2! \, 2!}
$$

$$
= \dfrac{(10-n)(9-n)(8-n)!}{(8-n)! \, 2!} \times \dfrac{4 \times 3 \times 2}{2! \times 1}
$$

$$
= 3 (10 - n)(9 - n)
$$

$1 = $

$3 (10 - 1)(9 - 1)$

$6 \times 9 \times 8 = 24 \times 9 = 216$

Longest Consecutive Sequence

```
Input: nums = [100,4,200,1,3,2]
Output: 4
```

1 2 3 4   diff = 1

Input: nums = [100,4,200,1,3,2]
Output: 4
Explanation: The longest consecutive elements sequence
is [1, 2, 3, 4]. Therefore its length is 4.

100 α   4 - 3 - 2 - 1 ✓   1 2 3 4   arg = 1
4 ✓   arr = 4
200 α   1 - 0 α   1 2 3 4 100 200
1 α   3 - 2 - 1   cnt = 1   1 2 3 4 cnt = 1
3 ✓   2 - 1
2

→ [0,3,7,2,5,8,4,6,0,1]   ans = 1   ans = Max(ans, cnt) ✓

0 0 1 2 3 4 5 6 7 8 14 15 16 19   cnt = 1 1 2 3 8
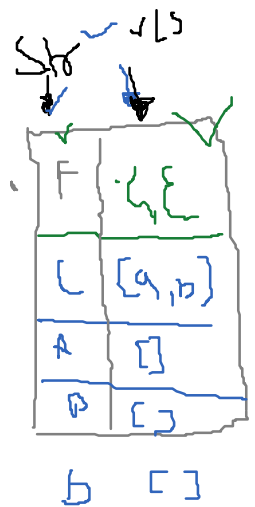   ↑ ↑   8 > ans   cnt = 3

Find number of Employees Under every Manager

e   M

{ "A", "C" },
{ "B", "C" },
{ "C", "F" },
{ "D", "E" },
{ "E", "F" },
{ "F", "F" }

A - 0
B - 0
C - 2
D - 0
E - 1
F - 5

F	C,E
C	[a,b]
A	[]
B	[]
E	[]

Check If Array Pairs Are Divisible by k

```
Input: arr = [1,2,3,4,5,10,6,7,8,9], k = 5
Output: true
Explanation: Pairs are (1,9),(2,8),(3,7),(4,6) and (5,10).
```

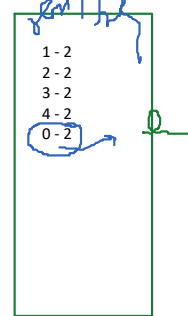1 - 1
2 - 2
3 - 3
4 - 4
5 - 0
6 - 1
7 - 2
8 - 3
9 - 4
10 - 0

[1,2,3,4,5,6], k = 7

[1,2,3,4,5,10,6,7,8,9]

1 — 4
2 - 3

K = 5

1 - 2
2 - 2
3 - 2
4 - 2
0 - 2

1 - 2
2 - 2
3 - 2
4 - 2
0 - 2

Max Sum Subarray

100 200 300 400 500

cn = x.

S = y

Remove all Duplicate

S = S + chg

S = cn + S

cn + S = x y

S + cn = y x

S. find (cn) != S : n pos.

S += cn.

= S + ch

geeksforgeeks

g	2
e	3
k	2
s	2

map

geks —

S += ch.   &   y ;

Divisibility by 2^n

$$6$$
$$1$$
$$2$$
$$2$$
$$3 \ 2$$
$$3$$
$$10 \ 6 \ 11$$
$$4$$
$$13 \ 17 \ 1 \ 1$$
$$5$$
$$1 \ 1 \ 12 \ 1 \ 1$$
$$6$$
$$20 \ 7 \ 14 \ 18 \ 3 \ 5$$

output

0
1 ✓
1
-1 ✓
2
1

n = 4

$[13, 17, 1, 1]$

power = 16;

$13 \times 17 \times 1 \times 1 =$

$221/16 = ?$

$[13, 17, 1, 1]$

Any no. → 2^n

$2^{n+1} → 2^n$

$1 → 2 \Rightarrow 2^1 = 2/2 = 1 . → 0$

$2 → 3 \ 2 \Rightarrow 6 \Rightarrow 2^2 = 6/4 =$

$→ [A_i → i * A_i]$

n = 2

3	2
1	2

$\Rightarrow 6/4$ power = $2^2 = 4$.

3    $2 \times 2 →$ (1 op) $\Rightarrow 12/4 = ✓$

---

20   7   14   18   3   5   n = 6.   max = 2^6
                                            = 64

→ the sum of power of all values is $\geq 2^n$ then
and is zero.

$20 → 2 \times 2 \times 5 → 2^2$

$7 → 2^0$

$14 → 2^1$

$18 → 2^1$

$3 → 2^0$

$5 → 2^0$

$C < (a \times b \times c \times d \times e)$

$lw → 2^n$,   ⊘ α

$= 2 + 0 + 1 + 1 + 0 + 0 = 4.$ $4 \geq 6$ $4 - 6 = 2^6$

$2^0 \ 2^1 \ 2^4 \ (2^2) \ 2^0 \ 2^1 → 4 + 2 \geq 6 → op : 1$

Algo

1. input with tc.
2. for each no. cal 2^n → sum.
3. sum ≥ n
4. sum < n
5. cal 2^n for each index

$op = 0$ → cout

(16)
2.

2 3 4 5
1 0 2 1

sum += 6
3   = d
opt + 5 7, 6
        6 7, 6 ✓

n idx = [0] → [0 0 0] D

2 1 [1 2]

Cnt = 6
4

12
1.,
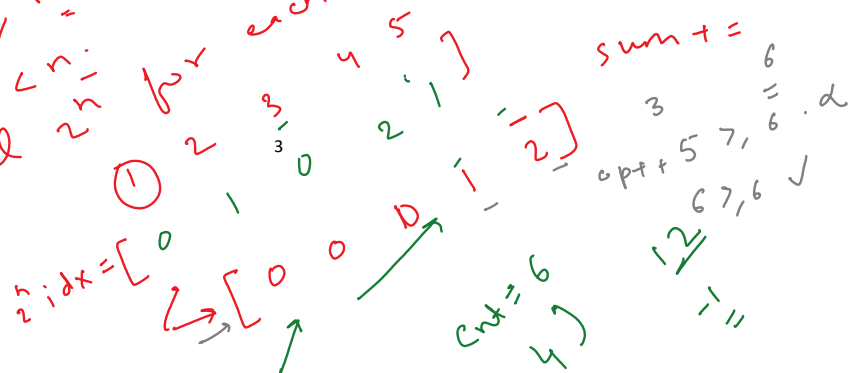
Minimise LCS

a b c d e f   ← subsequence

→ ab, ac, ad, ae, af →
→ abc, abd, abe,

[1,n#]
[3,4] → 1 2 3 4 ← [1]   ← subarray
                              [2]
[2,3] [12] [4]   [3]   =
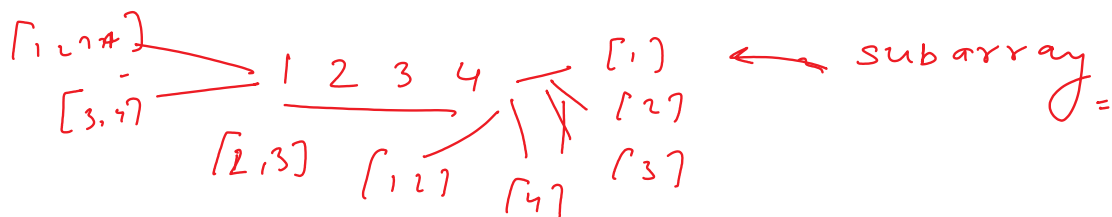
a a a b
a a a a] → min (LCS)
                   =
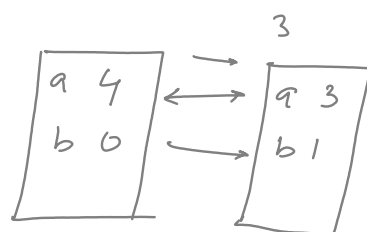
min length = 3.
                /
              a a a

ans = INT_MAX MIN

ans = max (ans, min (mp(a[i])
ans = 3   mp2(a[i]))
    = { 3, min { 0,1 } }

3
| a 4 | ←→ | a 3 |
| b 0 | → | b 1 |

Count Occurences of Anagrams

1. kmp
2. Rabin karp
3. slidin

txt = f o r x x o r f x d o f r

anagram = ?
              3!
         → abc —
         → bac } all
         c a b per

② Rabin karp

③ slidin

txt = f o r x x o r f x d o f r
pat = f o r

→ b a c } all
c a b pur

i=0, j=0
while(j<n)
{ cal
(j-i+1)=k
j++
↳ ==k
ans 3
3 j++
j++

→ ↓ ↑ ↓ ↑ ↑ ↓ ↓ ↓
a a b a a b a a .

↑ ↑ ↑ ↑ ↑

↗ +0+0

a a b a | 4 3 2 +0
          | b +0   :)4
          | 1   L

→ if (cnt == 0)
ans++ 2

Minimum Window (substr.)

$S =$ A D O B E C O D E (BANC)

$t :$ ABC

j

i i

D C AB j

string $ms;$

$j - i + 1 = 6$

$ans := INT\_MAX$

$\begin{bmatrix} j-i+1 < ans \\ \overline{ans} = j-i+1 \\ ms = s\ substr\ (i, j-i+1); \end{bmatrix}$

A D O B E C

① create Hm $= \beta$

$[j-i+1] = k$

② when mp.size()

$size = 3 \cancel{2} \cancel{1}$

$= 0$

$= 1$

a	$+\cancel{1}$ 0
b	$+0$
c	$+0$

$= = 0$ then all element is present

Continuous Subarray Sum

② a, b

$R = 6$

$(b+a) / k = 0$

$[\ 2\ 3\ ,\ 2\ ,\ 4\ ,\ 6\ ,\ 7\ ]$

$s := 0 =$ 23 25 29 35 42

$s /. k =$ 5 i 5 5 0

$i : 2$

$2 - 0 > 1$

not True

5	0
1	1

Intersection of array

$[x, y, z, a, b, a]$ $[x, y, z, d, c]$

$[x, y, z]$

x	1
y	1
z	1
a	2
b	1
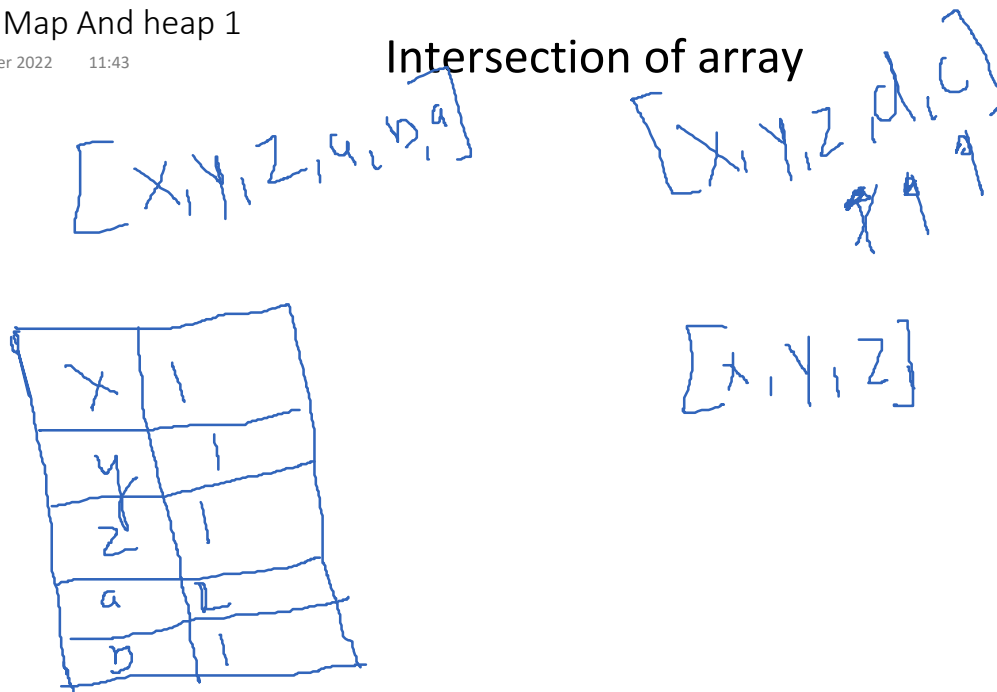
Find First Missing Numbers

$[-4, -6, 3] \rightarrow [-6, -4, 3) \; 1 \longrightarrow 12$

Input: nums = [1,2,0]
Output: 3
Explanation: The numbers in the range [1,2] are all in the array.

all -ive → 1
ℓ preual → m ✓
↳ 1

Example 2:

$[-5]$
↳ 1

Input: nums = [3,4,-1,1]
Output: 2
Explanation: 1 is in the array but 2 is missing.

① → all -ive → 1
② → ℓ preual → m ✓
↳ 1

Example 3:

$[-1, -2, -3, 0]$
↳ 1

Input: nums = [7,8,9,11,12]
Output: 1
Explanation: The smallest positive integer 1 is missing.
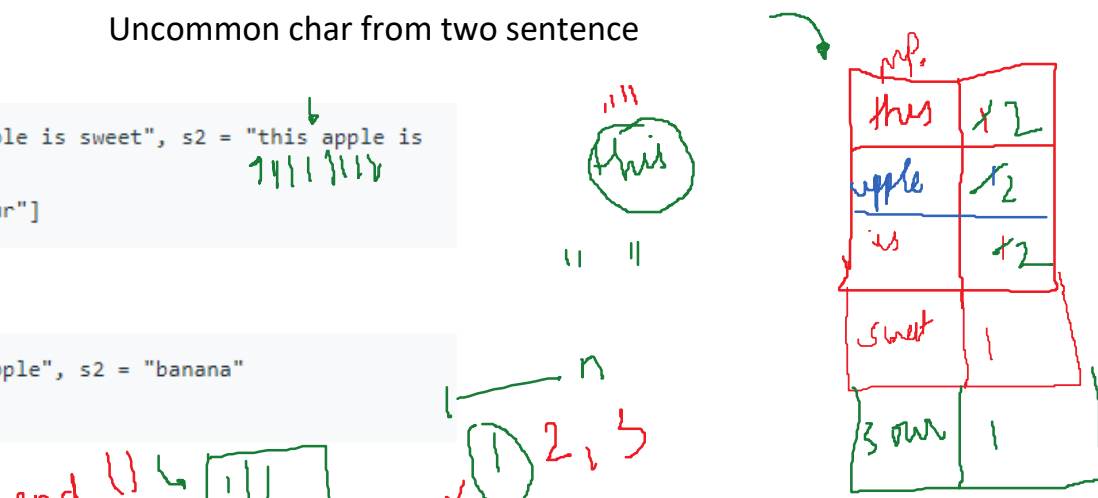
$-|ve \; 0 \; \& \; 0 \; \& \; [\_\_\_\_\_]$
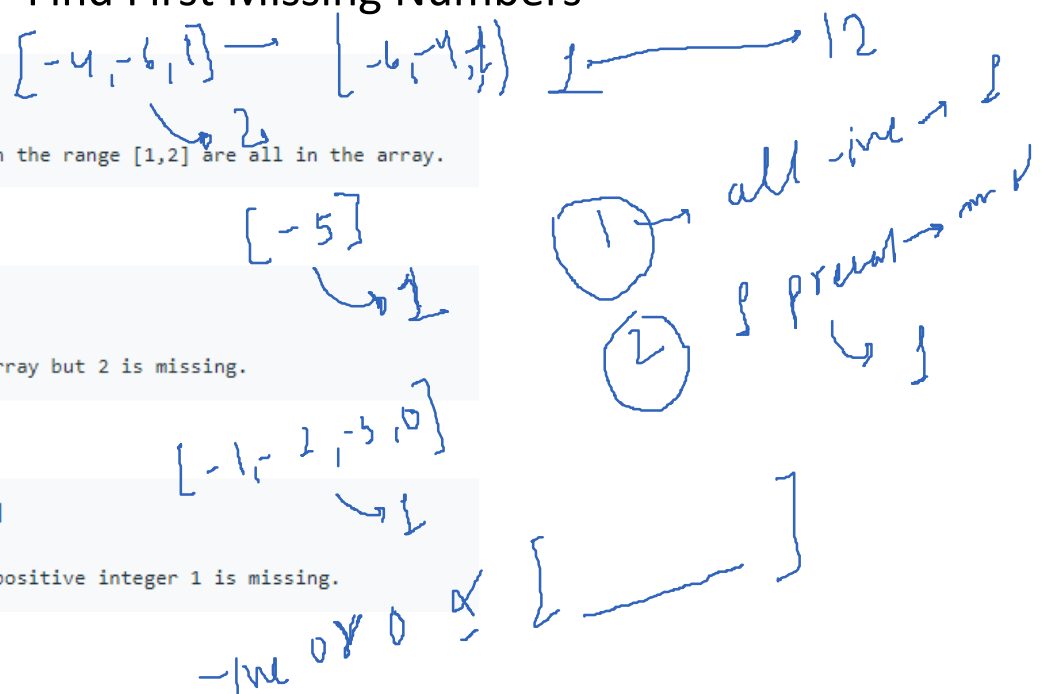
Uncommon char from two sentence

Input: s1 = "this apple is sweet", s2 = "this apple is sour"
Output: ["sweet","sour"]

Example 2:

Input: s1 = "apple apple", s2 = "banana"
Output: ["banana"]

mp.	
this	x2
apple	x2
is	x2
sweet	1
sour	1

$(1) \; 2, 3$
n

output: [banana]

mp f(i) ! = mp end !!

1	J
3	2

(1) 2, 3

1 = 1 ___ 1 < n

3 own	1

if i 5 = 2