

Class → ↘
n ↘

Date: 15
95/9/23

Agenda → Questions

① → Remove all Adjacent Duplicates in String

Input → a|z|x|x|z|y.

→ Traverse

a|z|x|y

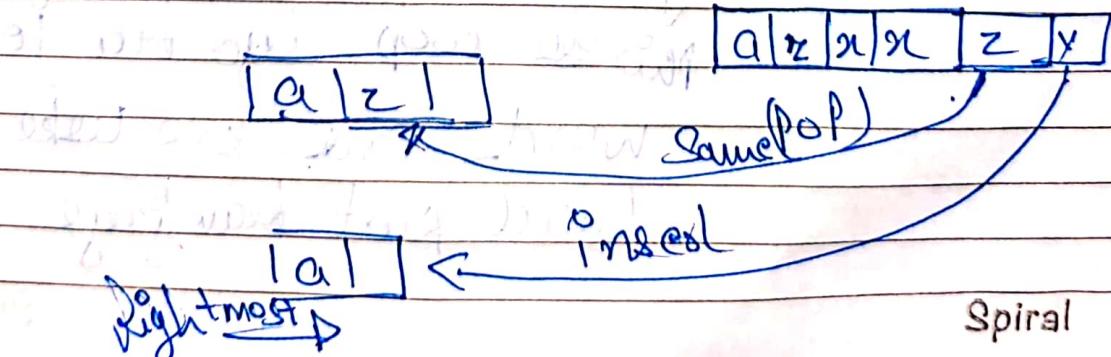
→ ↓

[aly]

Approach → String temp = " "; str → [a|z|x|x|z|y]
Right most
temp ← [a|z|x|x|z|y] Empty
Same (POP) Same Right most

→ If Right most char is Not Equal → Insert

→ If Right most char is equal → pop



25/9/23

Date 16

H/W-5 Remove All Adjacent Duplicate \rightarrow II

(2) \rightarrow Remove all occurrence of \sim in substring

i/p \rightarrow str \rightarrow "abbcbaadddcbabbbaace" part \rightarrow "cba" \downarrow find out this & remove all occurrence from str

o/p \rightarrow abbcbaadddbaace

while (Substring exist in str) {

y

ex \rightarrow abcckbabaddckaaace

abcbaadace

inner loop kya ita jo

words exale kare uske

baad kast ban jaye

Spiral

25/9/23

Date (17)

H/W → String ke under pattern find out
rone ke life named algo & their TC

→ Implement erase function & try yourself

(G) Valid Palindrome → T O(n)

if p → str = "abca" → Can Remove atmost
one element
to make it palindrome

Palindrome ex → noon
RACECAR
SAA

Test Case → aba → Removal → True

abxa → Removal → True

abc → ac → c → No Palindrome
bc → c → No Palindrome
cd → d → No Palindrome
bc → c → No Palindrome

Ex → [M A D H A M]
↓ ↓ ↑ ↑
| | | |
A D H A M

bre M = M

S++, E--

A = A S++ E --

[M A D H A M]

D + H → Removal

Done ko ek baar Remove kro & check

Printed

25/9/25

D remove

Date... (13)

en2s MAARRAACAM

~~MAARRAACAM~~ ~~M A R R A C A M~~

i) $M = M, S++, E--$

ii) $A = A \rightarrow$

(iii) $D \neq C \rightarrow$ only 1 Removal

No Remove

MAARRAACAM MAARRACAM \rightarrow false

false \rightarrow No Palindrome

Ex (3) \rightarrow | A | B | C | R | R | R | C | A |
~~|~~ \rightarrow ~~7~~ \rightarrow ~~C~~ \rightarrow ~~R~~ \rightarrow ~~R~~ \rightarrow ~~R~~ \rightarrow ~~C~~ \rightarrow ~~A~~

i) $s[0] == s[7] = True, S++, E--$

ii) $s[1] == s[6] \rightarrow$ false

B removed \rightarrow ACRRCRA \rightarrow True

OR

C removed \rightarrow ABCRRRA \rightarrow No

B remove OR C remove

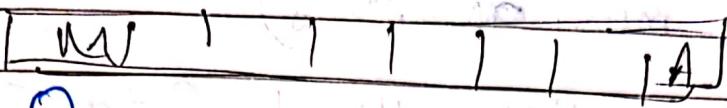
T	F	T
F	T	T
T	T	T
F	F	T
T	F	F

Spiral

25/9/23

Date. 19

$$TC \geq O(2n) = O(n)$$

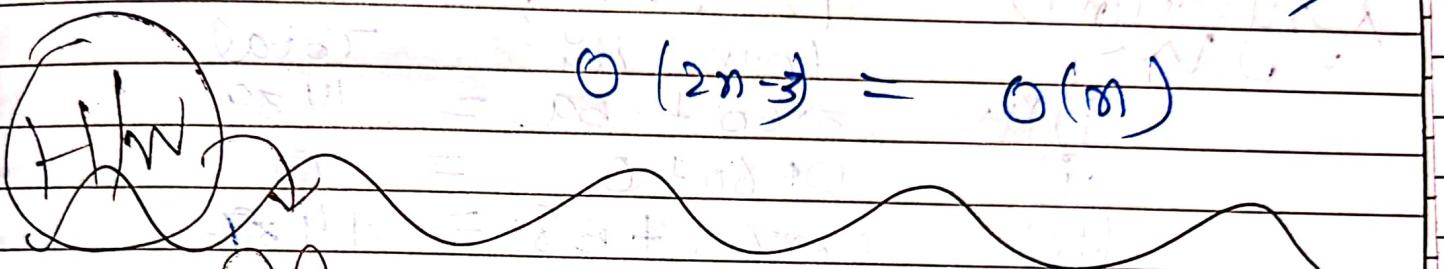


$n-1$

check Pal. ($1 \rightarrow n-1$) $O(n-3)$

check ($0 \rightarrow n-2$) $O(n-2)$

$$O(2n-3) = O(n)$$



* Q → Minimum Time Difference →

* [Medium] Hint → Convert Time into Minutes

i) Substring set Hours & Minute along
8 to i → String to int
sort & then plus Next with prev &
store min

ii) Catch case → 23:59, 00:00

vector<int> minutes
for (auto x : s) {
 int hour = stoi(str.substr(0, 2));
 int min = stoi(str.substr(3, 2));
 Total = hour * 60 + min
 minutes.push_back(total);

Sort (minutes.begin(), minutes.end());
int ans = INT_MAX;

Spiral

27/9/23 for ($i = 0 \rightarrow < \text{minutes.size} - 1$) Date 20
 $\text{diff} = \text{minutes}[i+1] - \text{minutes}[i]$;
 $\text{ans} = \min(\text{ans}, \text{diff})$

Catch/Corner $\rightarrow \text{last diff} = 1440 + \text{minutes}[0] - \text{minutes}[\text{last} - 1]$;

$\text{return min}(\text{last diff}, \text{ans})$;

Dry-Run

23°59' 00°00' 23°59'

hour Min Total

$$i) \text{Ans} = 23*60 + 59 = 1439$$

$$ii) 0*60 + 0 = 0$$

$$iii) 23*60 + 58 = 1438$$

Sort \rightarrow

0 | 1438 | 1439 | 23°59' clock

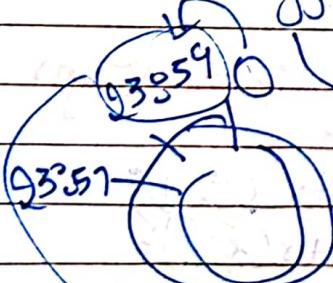
$$1438 - 0 = 1438 \leftarrow \text{min}$$

$$(ii) 1439 - 1438 = 1 \leftarrow \text{min hogya}$$

Without corner case we would have returned
 $\text{ans} = 2$ but now $\rightarrow \text{last diff} = 1440 + 0 - 1439 = 1$

Diff

$$\text{ans} = 1 \leftarrow \text{min}$$



So, $24*60 = 1440 + \text{min}(0)$

In short last

value dekh

because may we get 00:00 why this

like hh

min kore use
min a juge toh

$1440 \leftarrow 0$ like hogya
taking time extra doing a check that spiral

25/9/23

Date 21

24 hours \Rightarrow So, to check diff last & first element

$O = 24 \text{ hours because}$

~~$O - 1439 \rightarrow 1439 \text{ min or 1 hr}$~~
 $00:00 - 23:59 \rightarrow 1 \text{ min}$

because
if you are
on 0, it means
covered whole

Q) \rightarrow Palindromic String \rightarrow

i/p \rightarrow "aba"

Substrings

a	✓
b	✓
c	✓
ab	✗
ba	✗

$\rightarrow aba \checkmark \rightarrow$ This is not a substring

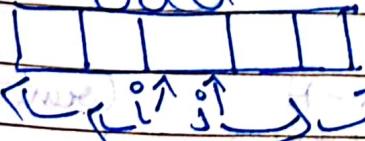
Approach \rightarrow i) Brute force

find all substrings & apply check

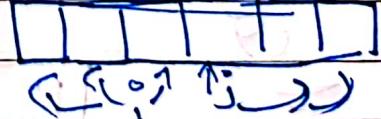
$O(n^2)$

ii) Best Approach \rightarrow Palindrome

Odd



Even



match \rightarrow count

not match \rightarrow no need

to compare

Spiral

25/9/23

Odd Length

Date 22

0 1 2

a b c

i j

Count = $j + 1$

+1

End $i = -1$

= 3

a b c

i j

b = 6

c ≠ a → stop

a b c

i j

c = c + 1

j = 4 → stop

Even →

a b c

Count = 0

a b c

Total = 3

Ex 2 →

At odd same location be $i=j$
then expand $i \rightarrow$ Left, $j \rightarrow$ Right

At even $i=0$ then $j=i+1$ then $i \leftarrow i+1$
 $j < \text{length}$ then expand $i \rightarrow$ Left & $j \rightarrow$ Right

Call

M A D A M

i j

a) M=M Count = 1

b) i=-1 → stop

Call

M A D A M

i j

a) A=A

b) M ≠ D → stop

Count = 1

Call

M A D A M

i j

a) D=D

b) A=A

C = 2/3

stop $i \leftarrow i+1$ $j \rightarrow j+1$ stop

$\Rightarrow M=M$ spiral

9/9/23

Date. 23

M|A|D|A|M
↑↑↓↓↑↑
(a) A=A c=1
b) D≠M → stop

M|A|D|A|M
↑↑↓↓↑↑
μ=M c=1
g > length → stop

$$\text{odd total} = 1 + 1 + 3 + 1 + 1 = 7$$

Even Cases M|A|D|A|M μ≠A c=0

M|A|D|A|M A≠D c=0

$$\text{even total}=0$$

M|A|D|A|M D≠A c=0

M|A|D|A|M A≠M c=0

$$\text{Total} = \text{odd} + \text{even} = 7 + 0 = 7$$

T.C =

Space = O(1)

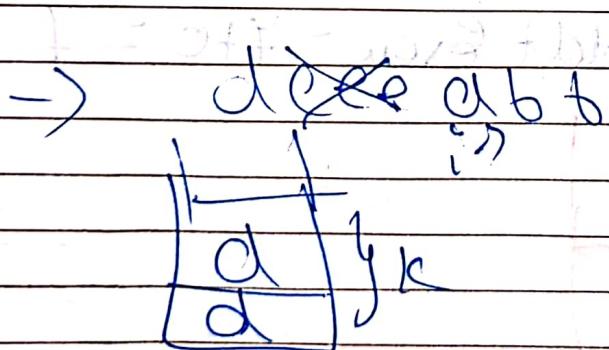
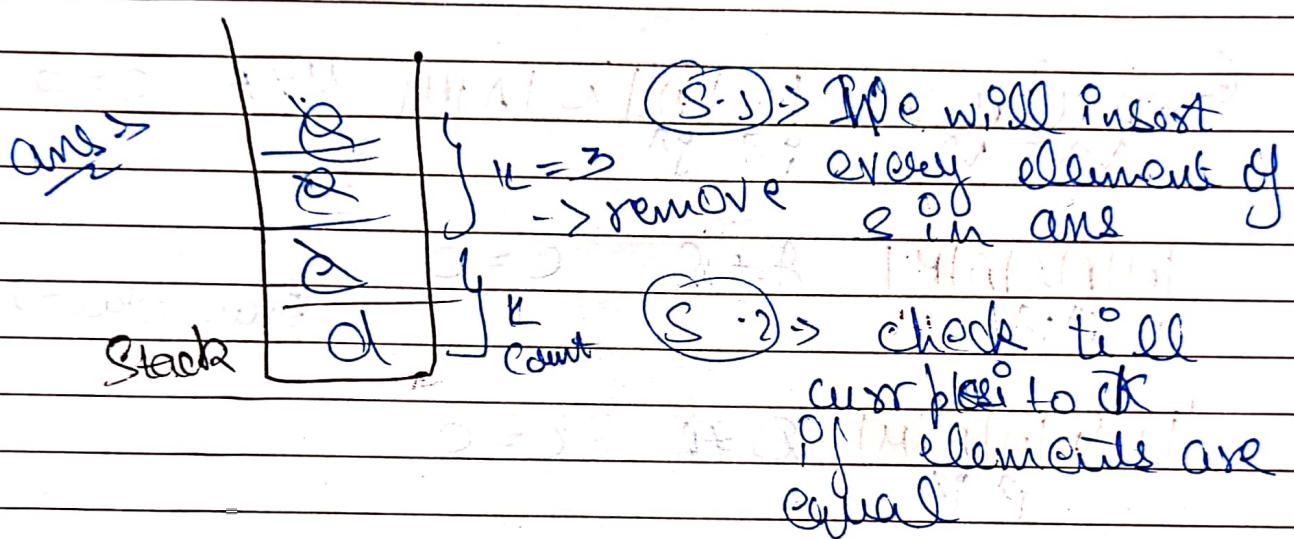
Spiral

H/W

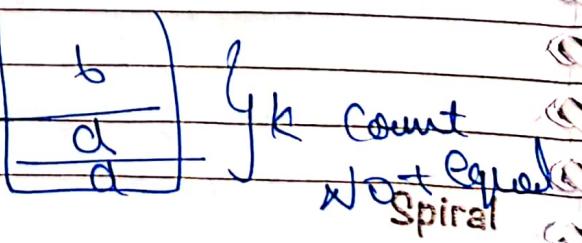
Date 24

→ Remove all adjacent duplicates → II

Ex: → d e e c d b b



→ d d b b



Date 25



b	
<u>b</u>	k
d	
d	

ddbb

k → are not equal

So, final ans → ddbb

(M →) → pairs → Data structure

ab bcccd, k=2

a b → remove
|
match

a c → remove

a cd → final ans

with Stack →

deedbbcccbda, k=

k	
match	
e	
e	
e	
d	

→ delete
k=3

c	k
e	k
b	k
b	k
d	k
c	k

If $i \neq i-1$ match
then go to k

Spiral

Date.....(26)

deeeedbbccc, bdaa

c removed
 $\begin{bmatrix} b \\ b \\ b \\ d \\ d \end{bmatrix}$ $\div k = 3 \rightarrow$ remove b

$\begin{bmatrix} d \\ d \\ d \end{bmatrix}$ $\div k = 3, \text{ remove } d$

$\begin{bmatrix} a \\ a \end{bmatrix} \quad \text{if } k \neq 3 \rightarrow \text{so final ans. } \rightarrow aa$

\Rightarrow vector<pair<char, int>> st;

for (auto c : s)
if (st.size() == 0) { st.back().first = c;
st.push_back({c, 1});
}
;

!

lo, l2/3

fd, sy

else {
st.back().second += 1;
}

if (st.back().second == 1) {
st.pop_back();
}

append (count, char)

Spiral