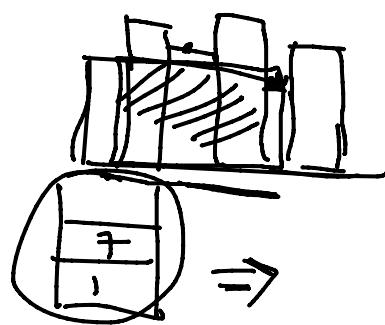
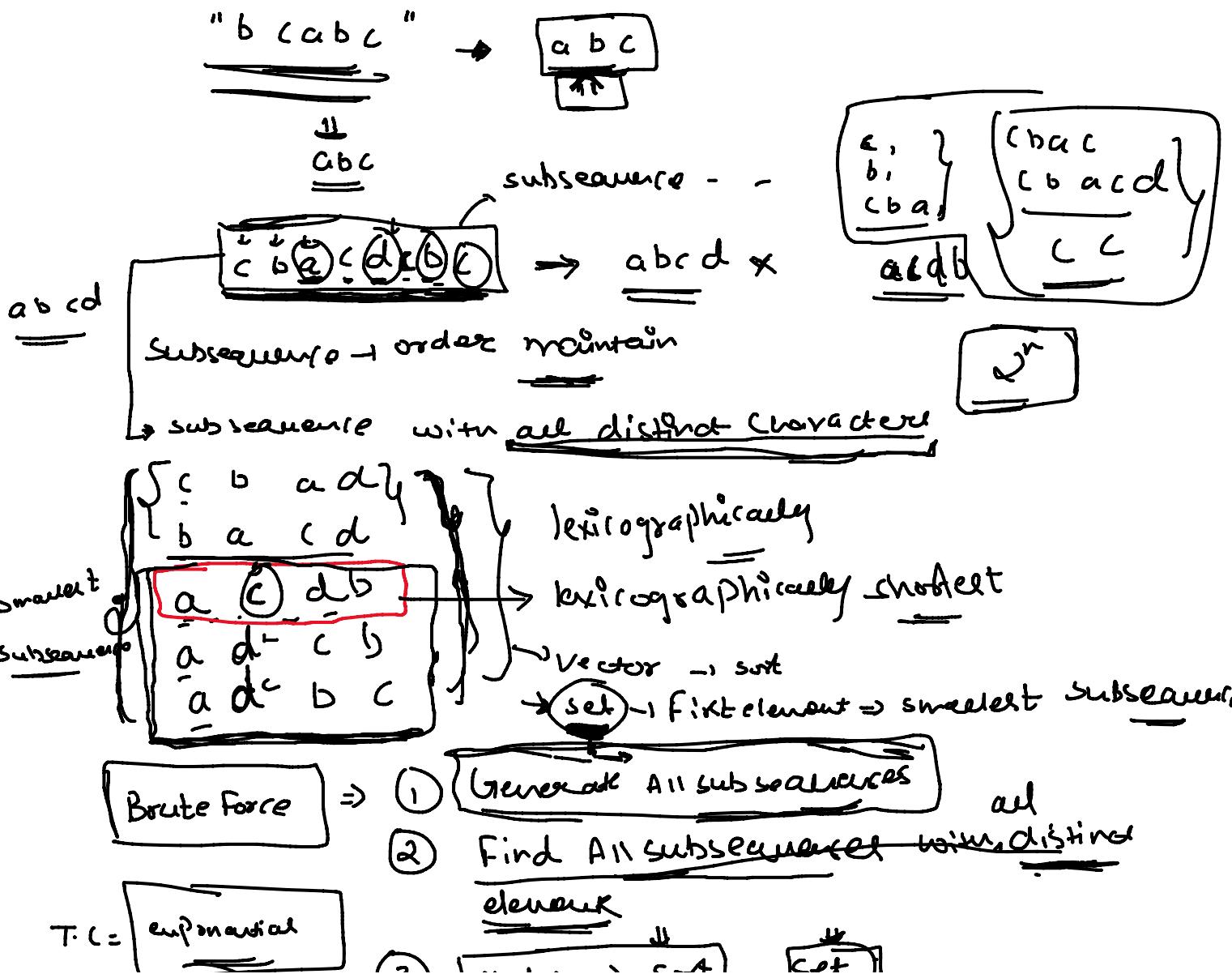


CLASS - 29

~~left small~~ Next Smaller - Prev smaller - 1

Smallest Subsequence of Distinct Characters

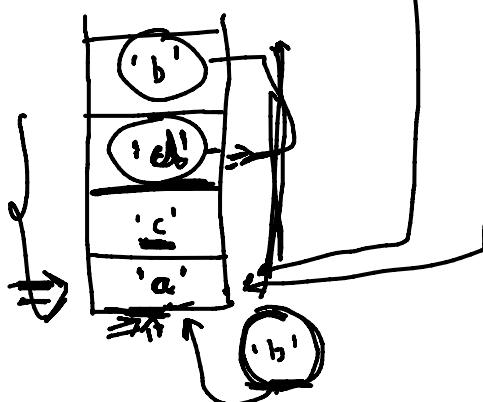
$T.C = \text{exponential}$

③ element
 Vector → Sort, Set

Optimized = ?

Distinct

Stack (cursor)



ch < st.top() and
 $map[st.top()]++$

a < cb

Map

c	-	3
b	-	1
-	-	0
a	-	0
d	-	0

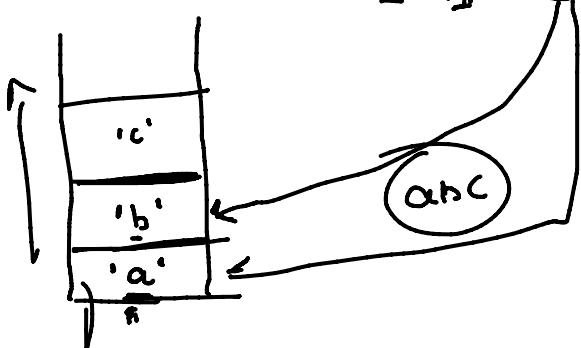
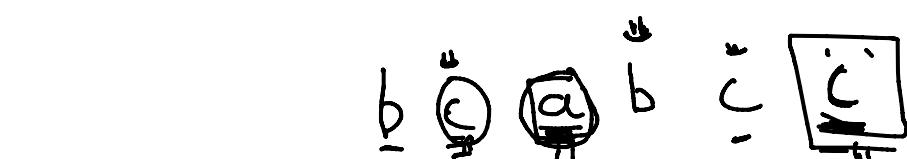
lexicographical smallest

map used?

char array

dbca

abbc
abca



b	-	\$
c	-	1
a	-	0

CODE

map<char, int> ma;
 Given string

For (auto c : s)

{ ma[c] ++ ; }

~

L ↴ $\text{ma}[c]++;$

↷

map<(char, bool> vis; [" which elements present in stack]

Stack<(char> st;

for (auto c : s)

↳ ↴ $\text{ma}[c]--;$

if (vis[c])

continue;

while (!st.empty())

↳ ↴ $\text{vis}[\text{st.top}()] = 0;$

↳ ↴ st.pop();

↳ ↴ st.push(c)

↳ ↴ vis[c] = 1;

↷

String ans = ""

while (!st.empty())

↳ ↴ ans.push(st.top());

↳ ↴ st.pop();

↳ ↴ reverse(ans.begin(), ans.end());

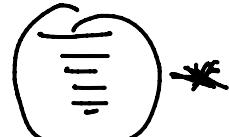
↳ ↴ return ans;

↷

for (i = 0; i < n; i++)

↳ ↴ continue;

(i=1)



↷

and ~~st.top() \Rightarrow (i)~~ and
~~ma[st.top()] \Rightarrow (i)~~

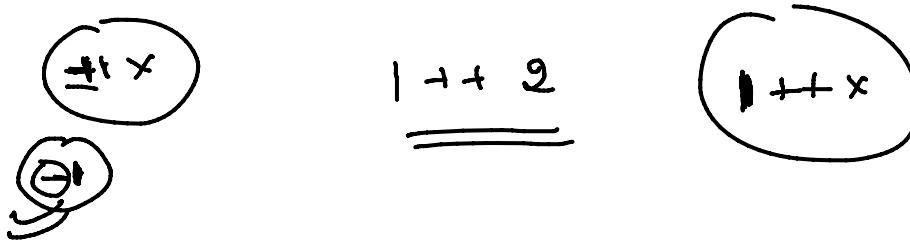


ans = "bacd"

Basic calculator

String = " expression" (evaluate)

↓
digits
, +, -, ., :, ;,)



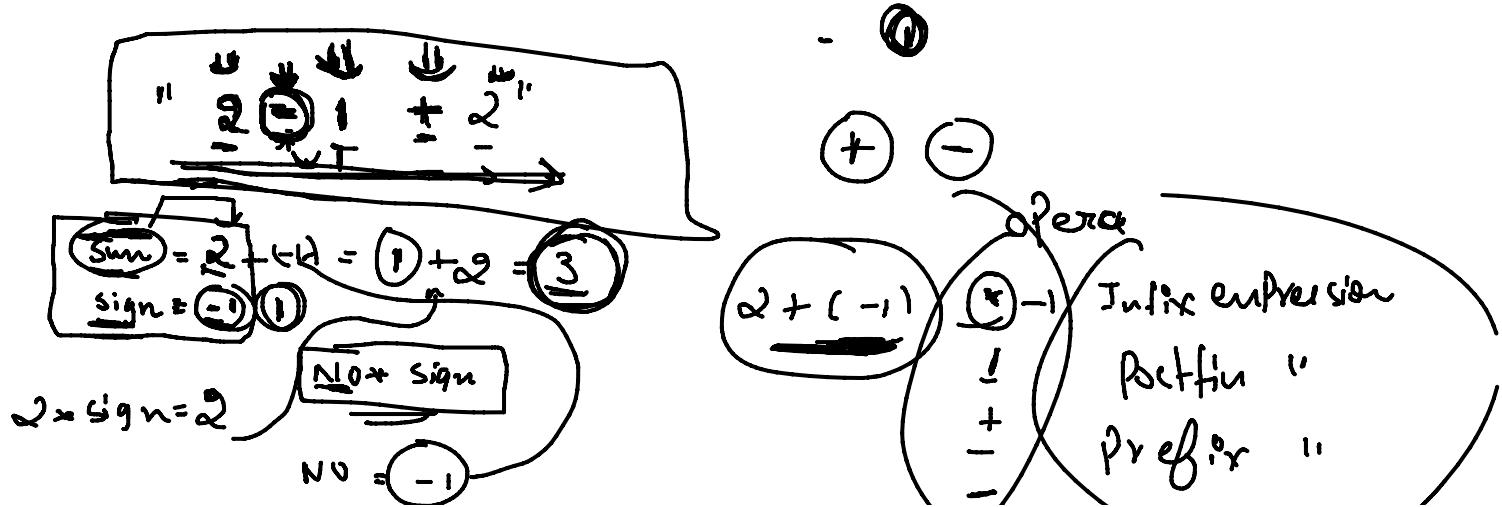
$$S = " \underline{1} \underline{-} \underline{+} \underline{2} " \Rightarrow 2$$

$$S = " \underline{2} \underline{-} \underline{1} \underline{+} \underline{2} " \Rightarrow " 1 + 2 " = \underline{\underline{3}}$$

$$\frac{(1 + (4 + 5 + 2)) - 3) + (6 + 8)}{(1 + 11 - 3) + (6 + 8)}$$

$$9 + (14) \Rightarrow \underline{\underline{23}}$$

$$(1 + (4 + 5 + 2))$$



$\alpha \times \text{sgn} = \alpha$

$$NO = -1$$

$\begin{array}{c} + \\ - \\ - \end{array}$ Prefix "

$$\boxed{5 + 7 - 6 + 1 - 10}$$

$$\begin{aligned} \text{Sum} &= 5 + 7 = 12 - 6 = 6 + 1 = 7 - 10 = -3 \\ \text{Sign} &= \underline{\underline{-}} \end{aligned}$$

$$S \times 1 = 5 \quad NO = 7 \times 1 = \underline{\underline{2}}$$

$$6 \times (-1) = -6$$

$$10 \times (-1) = -10$$

$$\boxed{0 + (1 + (4 + 5 + 2) - 3) + (6 + 8)}$$

$$\text{Sum} = \underline{\underline{-1}} + 4 = 4 + 5 = 9 + 2 = 11 \Rightarrow$$

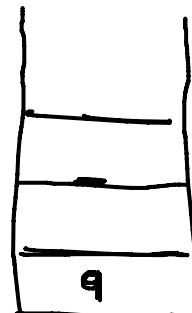
$$\text{Sign} = \underline{\underline{-}}$$

$$4 \times 1 = 4 \quad S \times 1 = 5 \quad 2 \times 1 = 2$$

$$1 \times 1 = 1$$

$$\boxed{0 + (1 + (4 + 5 + 2) - 3) + (6 + 8)} -$$

$$\text{Sum} = S \cdot \text{top}(1) = 11$$



$$14 \times 1 = 14$$

$$9 + 14 = 23$$

$$\text{Sign} = \underline{\underline{-1}} \quad \text{Total sum } \underline{\underline{23}}$$

$$110 = 3 \times (-1) = -3$$

$$\text{Sum} += S \cdot \text{top}(1)$$

$$\text{Total Sum} = 19 - 3 = \underline{\underline{16}}$$

$$9 \times 1 = 9$$

$$\text{Sum} = 9$$

$$9 + 0 = \underline{\underline{9}}$$

$$\text{Sign} = \underline{\underline{-1}}$$

$$9 + (6 + 8)$$

$$\text{Sum} = 6 + 8 \quad \text{Final}$$

$$NO = 6 \times 1 = 6$$

$$8 \times 1 = \underline{\underline{8}}$$

$$\text{Sign} = 1$$

$$\left(1 + (4 + 5 + 2) - 3 \right) \Rightarrow \text{function}$$

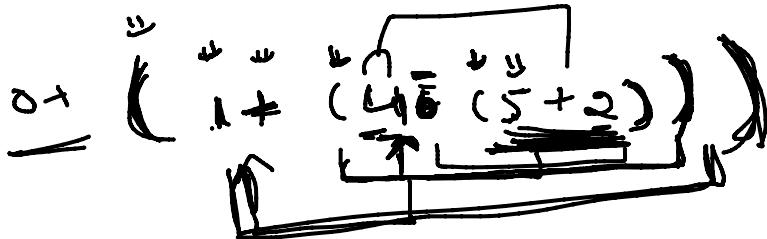
$$1 + 4 + 5 + 2 - 3 = \underline{\underline{9}}$$

..... - - - - -

$$(1 + \underbrace{(4+5+2)}_{\text{function}} - 3) \Rightarrow 1 + 4 + 5 + 2 - 3 = 11$$

$$1 - \cancel{(4+5+2)}^{\cancel{-3}} = 1 - 11 + 3 = -11$$

$$1 - (11) - 3 \Rightarrow (-11)$$



$$\text{sum} = 0 + 1 = 1$$

sign = 1

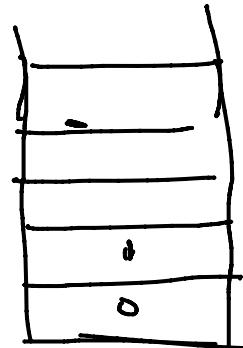
$$\text{sum} = 0 + 4 = 4$$

sign = 1

$$\text{sum} = 0 + 5 = 5$$

sign = 1

$$\text{sum} = 7$$



num = 1

$$7 + (-1) = -7 + 4 = -3$$

$$-3 + 1 = -2 \Rightarrow -2$$

Stack < long long > st;
i = 0;

long long sum = 0;

long long sign = 1;

while (i < n)

{ if (s[i] >= '0' and s[i] <= '9')

{ long long nu = 0;

int j = i;

while (j < n and s[j] >= '0' and s[j] <= '9')

{ nu = nu * 10 + s[j] - '0'
j++;



i++

y

$i = j - 1;$

sum = sum + sign * no;

y

else if ($s[i] == '+'$)

{ sign = 1;

else if ($s[i] == '-'$)

sign = -1;

else if ($s[i] == '*' || s[i] == '/'$)

{ st.push(sum);

st.push(sign);

sum = 0; sign = 1;

else if ($s[i] == ')'$)

{ sum = st.top() * sign;

st.pop();

sum = st.top();

st.pop();

if (i++);

y

①

if ($s[i] \geq '0'$ and $s[i] \leq '9'$)
 int g = $s[i]$; int no = 0;
 {
 while ($s[g] \geq '0'$ and $s[g] \leq '9'$)
 no = no * 10 + s[g] - '0';
 g++;
 }
 n0 = 25 * 10 + 6 = 256
 256 * 10 + 9 = 255

Infix, Prefix, Postfix

Expression $(2 + (3 * 5)) + 6$

Postfix $2 3 5 * +$

$(2+3)*5$

Eval (calculate)
 $(2+3)$

Prefix

$4 13 5 + \Rightarrow (4 + (13/5))$

Prefix

$+ 3 * 5$

13

$$S = 2 \\ = 10$$

$+,-,*,/$

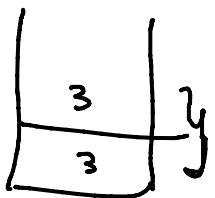
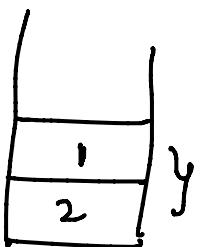
$3 + (5 * 2)$

$$10 + 3 = 13$$

$2 1 + 3 *$

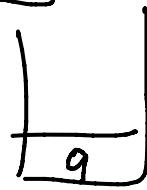
$(2+1) * 3$

$$\boxed{1 \ 2} \cdot \boxed{3} - \boxed{1} = \boxed{(2+1) \times 3}$$

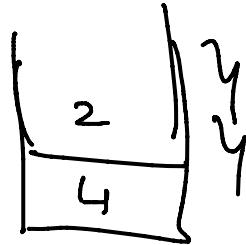


\ast
 $3 \times 3 = 9$

$2+1=3$



$$4 \ 1 \ 3 \ 5 \quad \boxed{1} \quad +$$



$\boxed{5} \quad \boxed{13}$
 $\underline{\quad}$

$13 \ 15$

Postfix
Prefix

Infix to Postfix to Prefix

$1+2=\underline{3}$
 $C \rightarrow O$