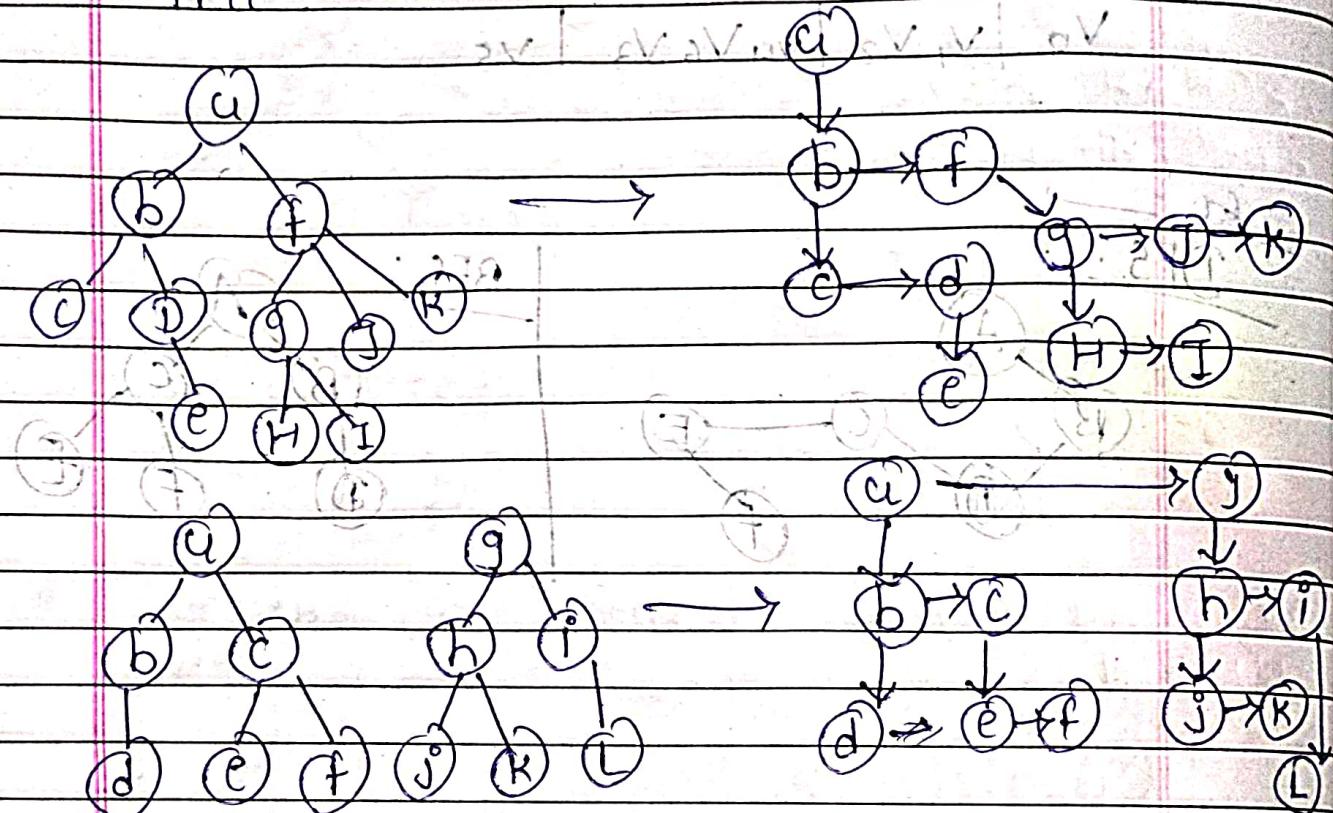
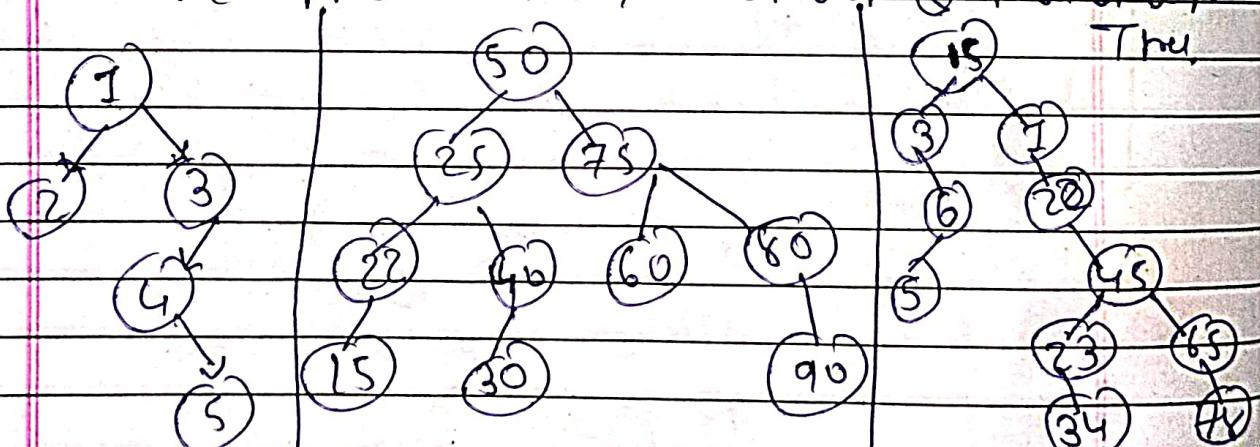


Assiment

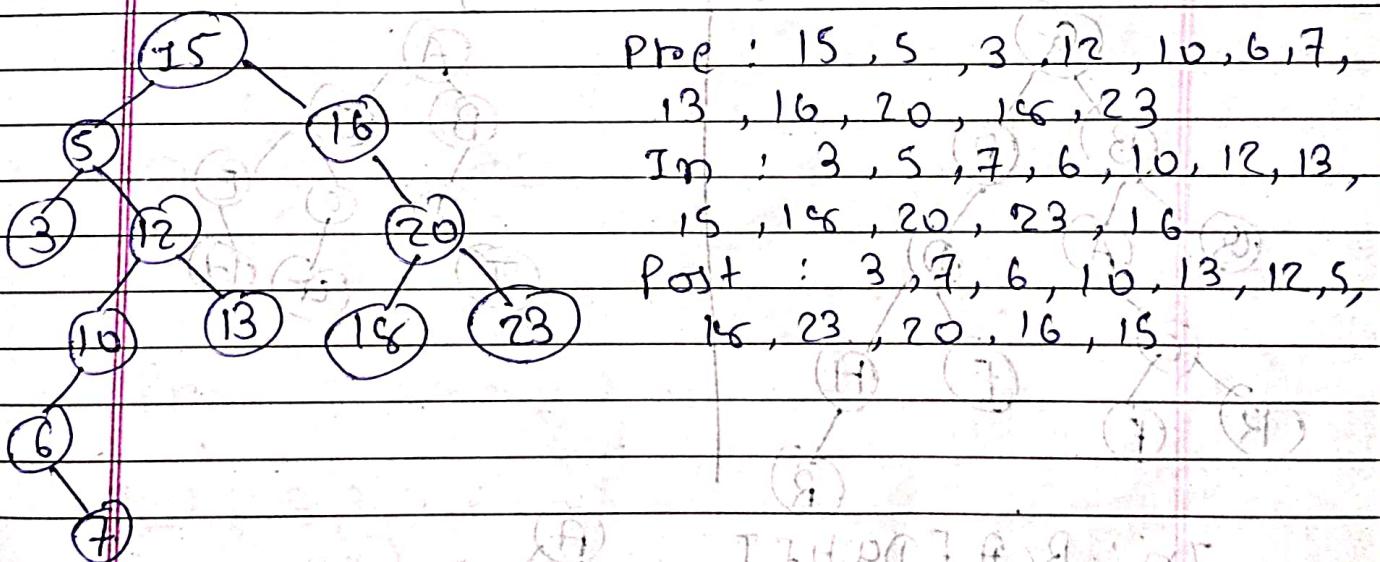
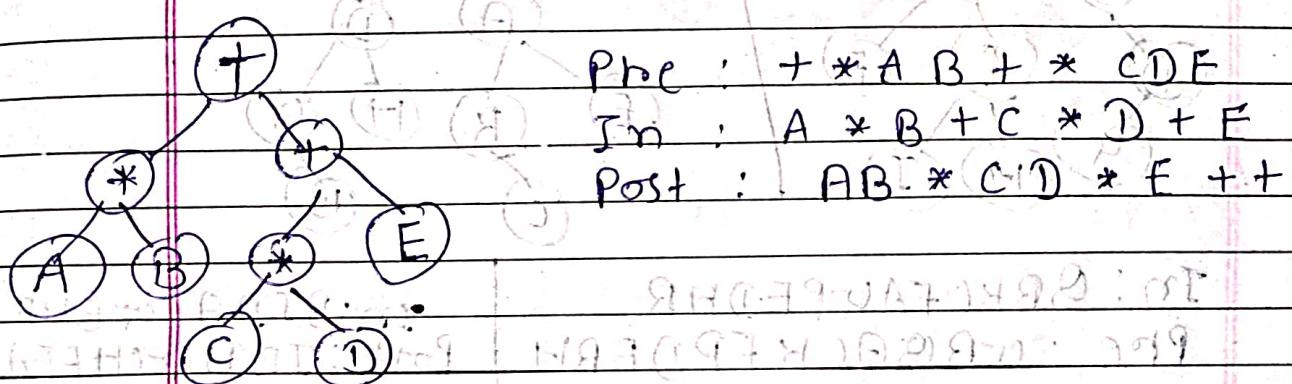
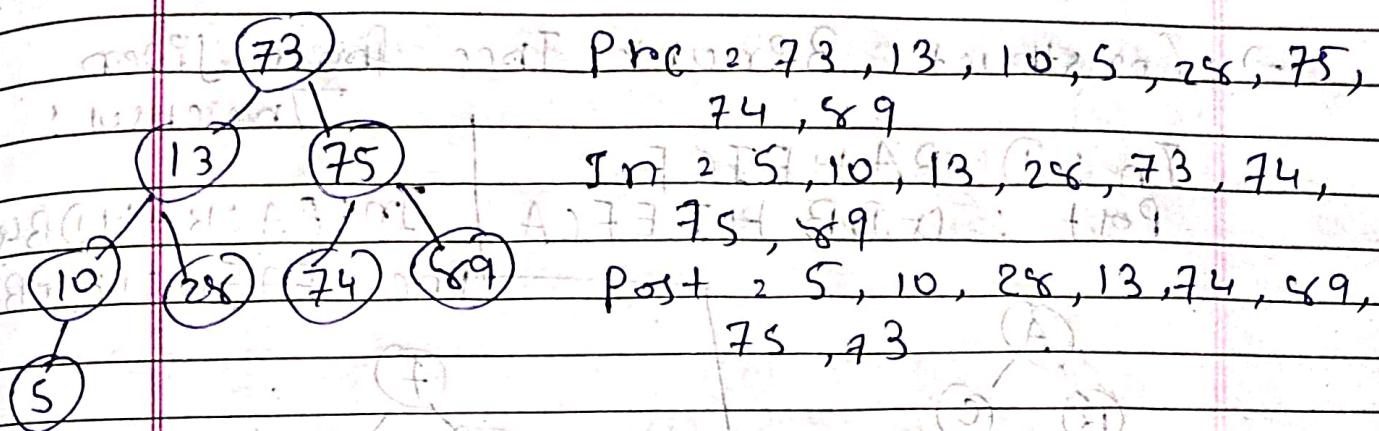
→ Convert given tree & forecast to Binary Tree.



→ Write preoder, Inorder & Postorder Thru.



Pre: 1, 2, 3, 4, 5	Pre: 50, 25, 22, 15, 40	Pre: 15, 3, 6, 5, 1, 2
In: 2, 1, 4, 5, 3	30, 75, 60, 80, 90	45, 23, 34, 65, 78
Post: 2, 5, 4, 3, 1	15, 22, 25, 30, 40	23, 34, 45, 65, 78
	50, 60, 75, 90, 40	23, 34, 45, 65, 78
	Post: 15, 22, 30, 40, 25	Post: 5, 6, 3, 34, 23
	60, 90, 75, 50	78, 65, 23, 1, 15

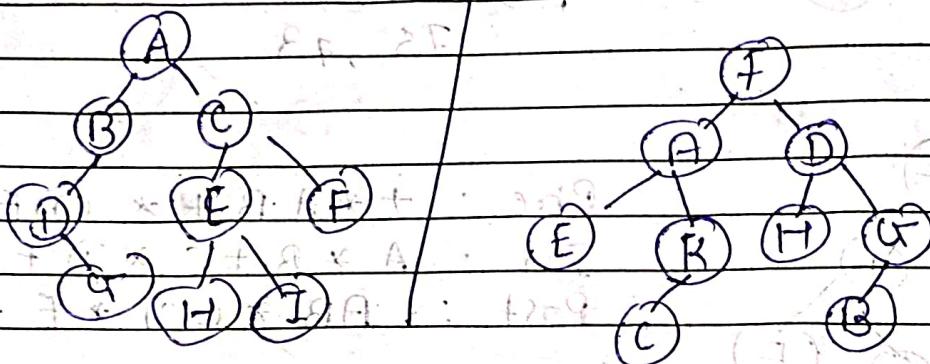


→ Construct Binary Tree from Given Preorder & Inorder Traversal

In : D G B A H E I C F P

Post : C-FDB HT-EFCA

In: E A C K F H D B G  
Out: F A E K C D H G B

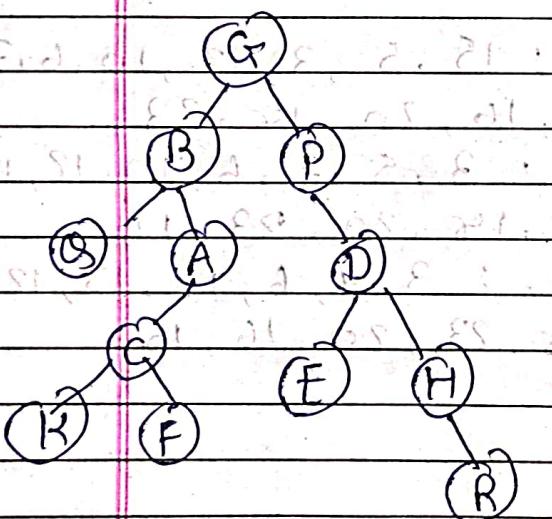


In: QBKCFALWPEFHRS

Pre : CRB BACK FPJ ERH

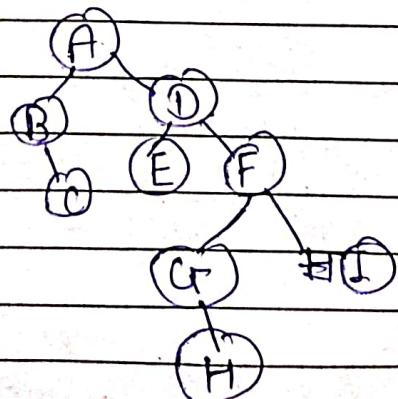
IN: BTDACUEHF

Post : JD BUCHFELD

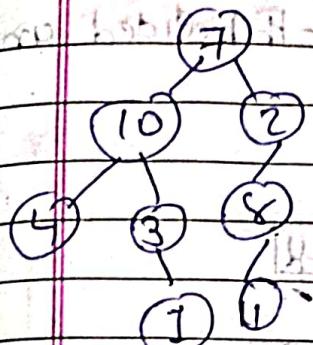


Tm: BCA E①GHI

Post : CBE HATIFDA

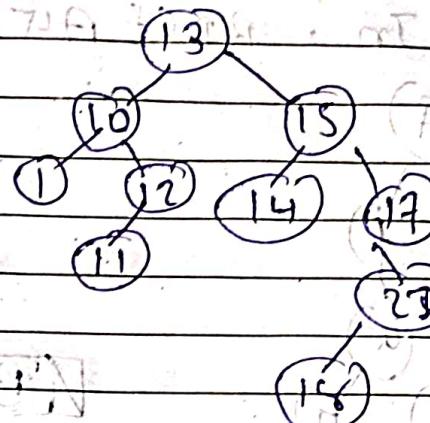


In : H b e c f c g F  
 Pre : u b d e c f g



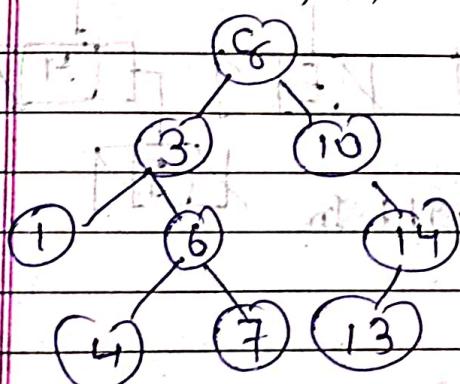
in : 7, 1, 10, 11, 12, 13, 14,  
 25, 17, 15, 21

Post : 11, 12, 10, 14, 15,  
 21, 17, 13, 15, 2



- In : 1, 3, 4, 6, 7, 5, 10, 13, 14

Pre : 4, 3, 1, 6, 4, 7, 10, 14, 13

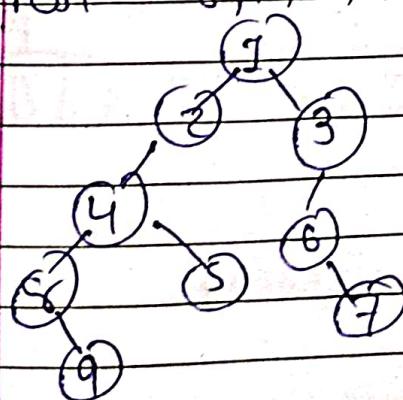


pre, in : 1, 2, 4, 5, 3, 6, 7

Post : 4, 5, 2, 6, 7, 3, 1

- Pre : 1, 2, 4, 5, 9, 5, 3,  
 6, 7

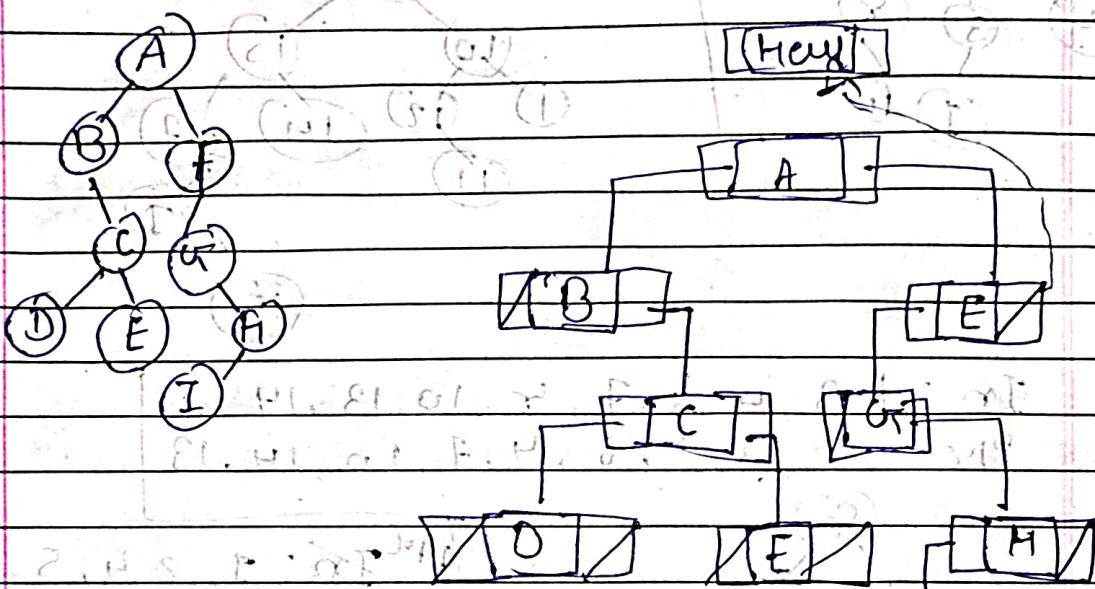
Post : 8, 9, 4, 5, 2, 6, 7, 3, 1



## Threaded Binary Tree (Inorder):

Right In-threaded, Left In-threaded and fully In-threaded.

In, BDCEA<sub>1</sub>FHGF



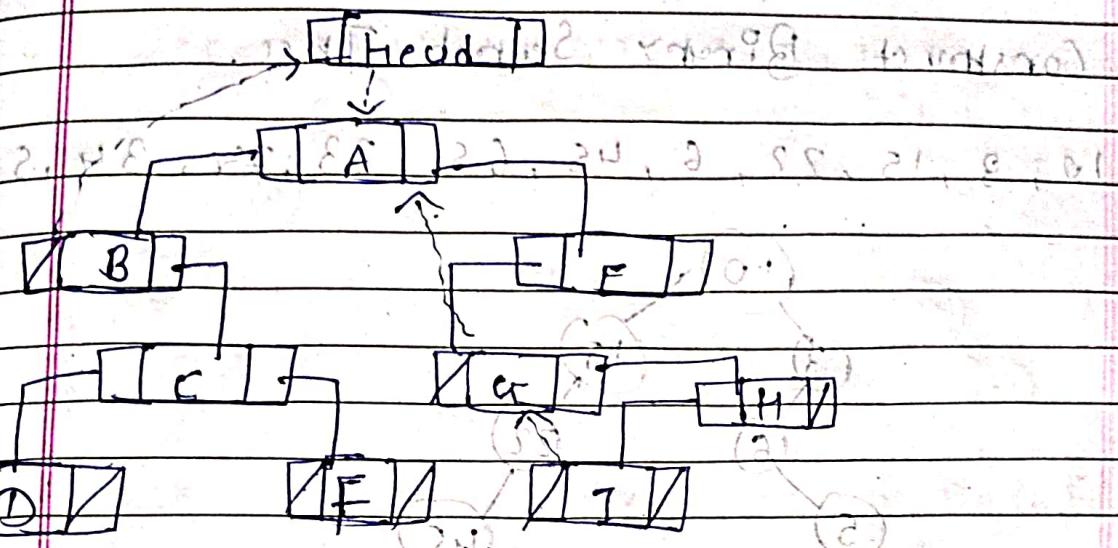
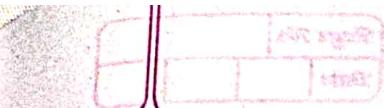
→ Head ←

Right-In

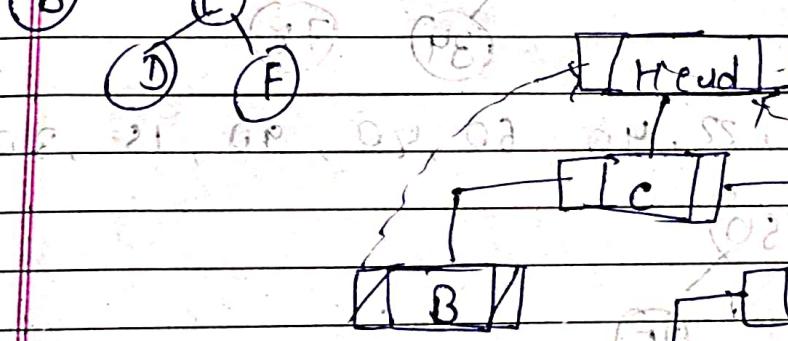


→ Head ←

full-in



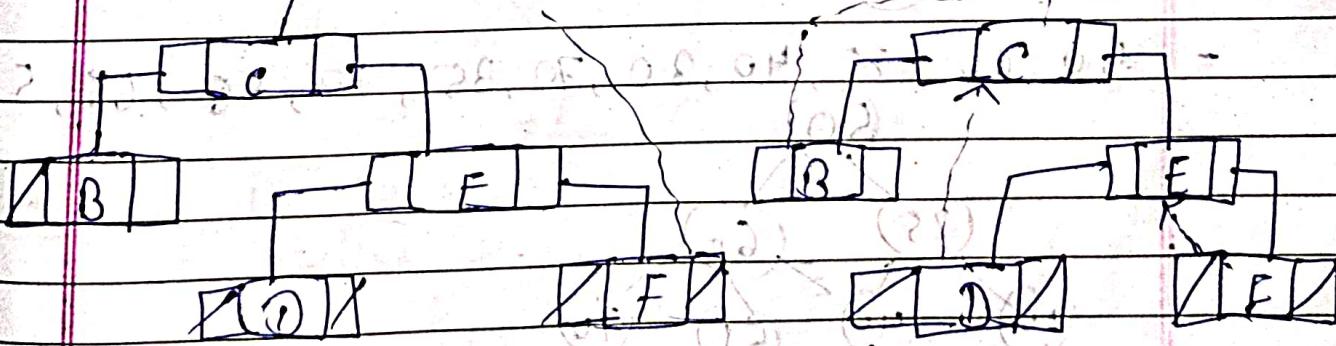
In : B C D E F



full-in

Head

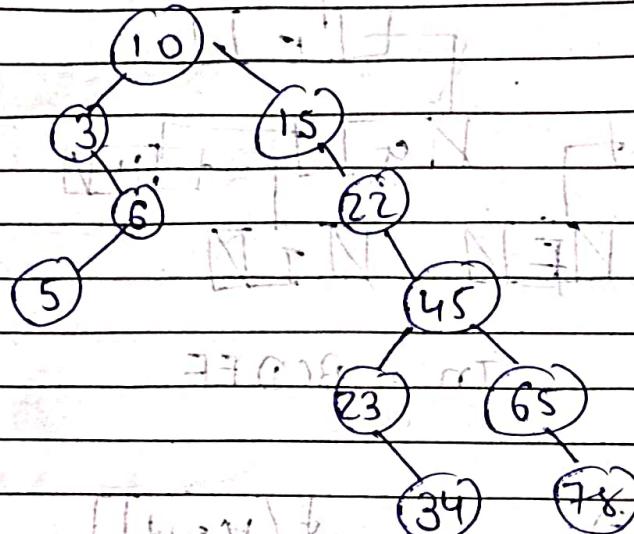
Head



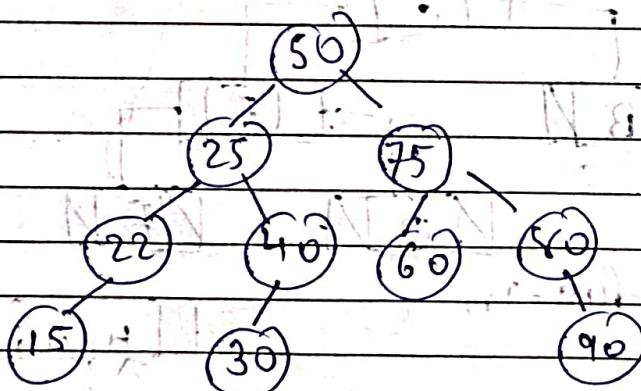
Right In

\* Construct Binary Search Tree.

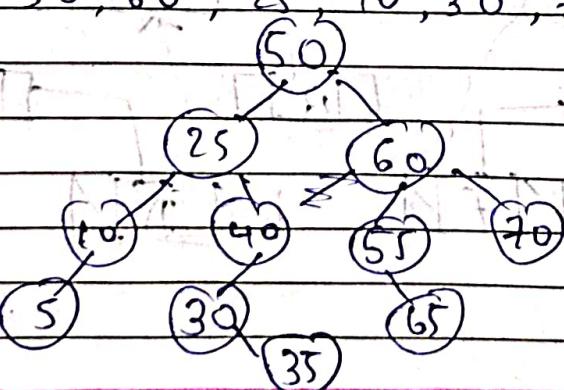
- 10, 3, 15, 22, 6, 45, 65, 23, 74, 34, 5



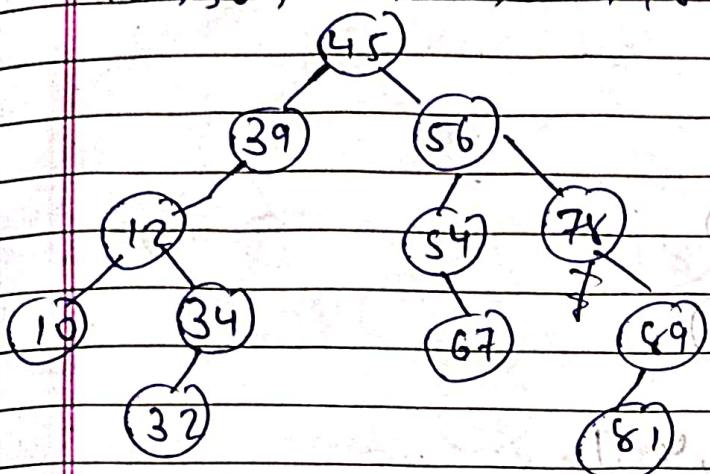
- 50, 25, 75, 22, 40, 60, 40, 90, 15, 30



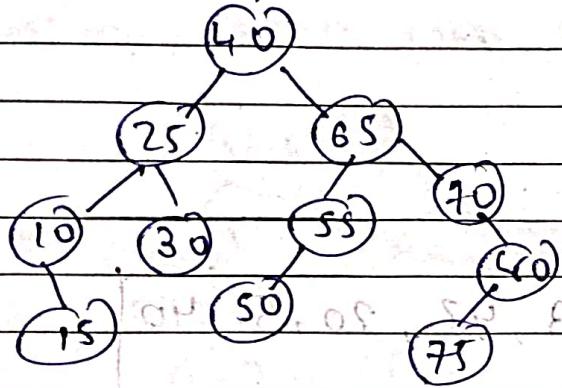
- 50, 60, 25, 40, 30, 70, 35, 10, 55, 65, 5



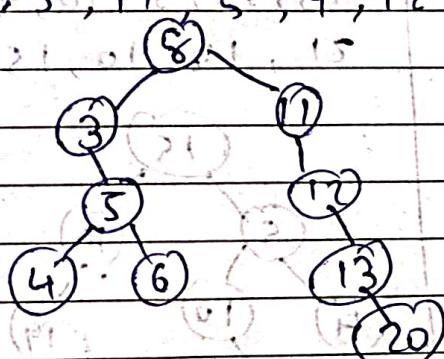
- 45, 56, 39, 12, 34, 78, 54, 67, 10, 32, 49, 81



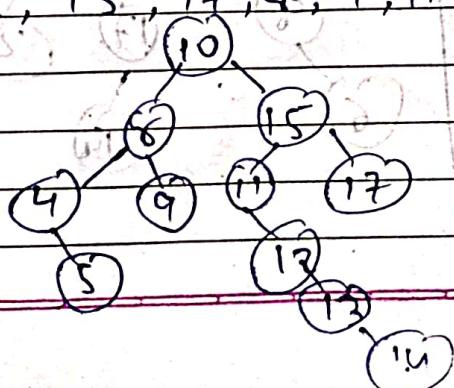
- 40, 65, 25, 55, 10, 70, 30, 50, 15, 80, 75



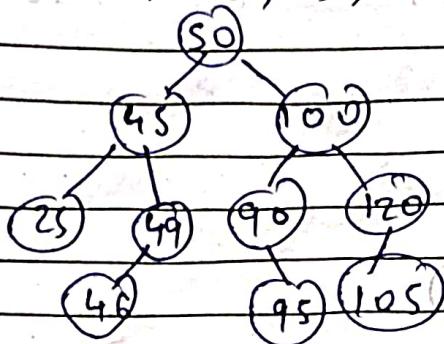
- 8, 3, 11, 5, 9, 12, 13, 4, 6, 20



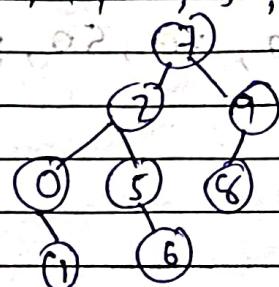
- 10, 15, 17, 4, 9, 11, 12, 13, 4, 14, 5



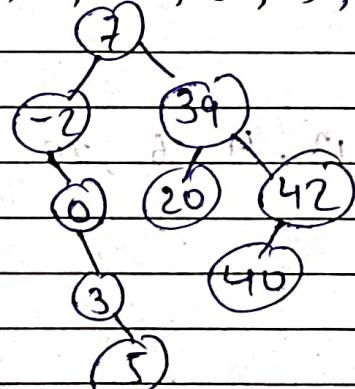
18-P 50, 45, 100, 25, 49, 120, 105; 46, 90, 29 52H



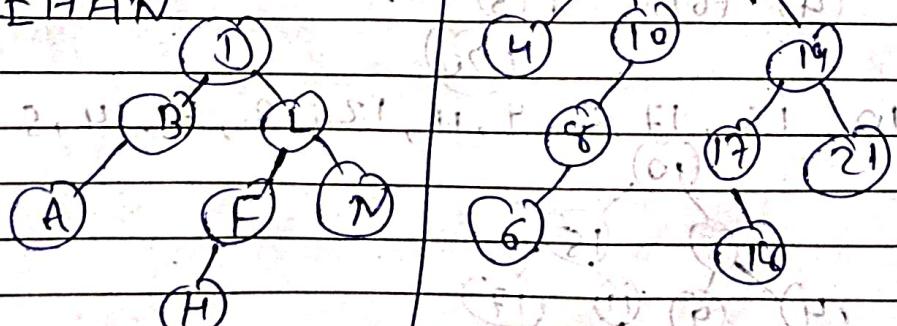
- 7, 2, 9, 0, 5, 6, 4, 1



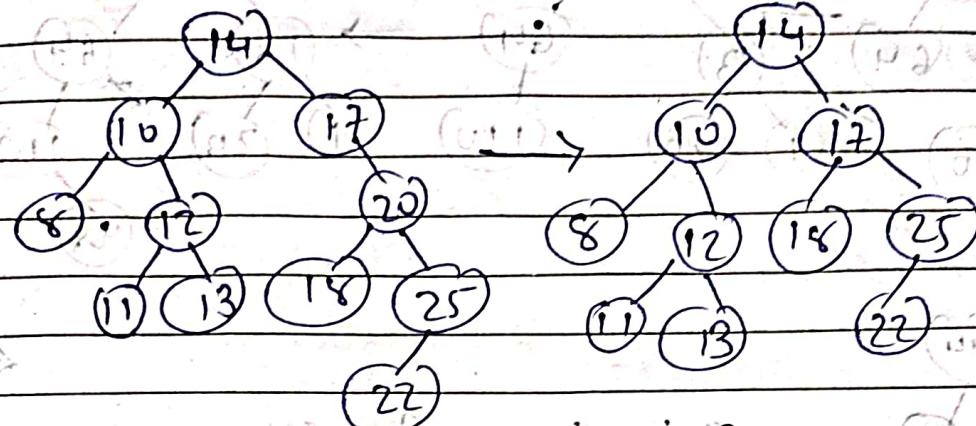
- 7, 3, 9, -2, 0, 3, 42, 20, 5, 40



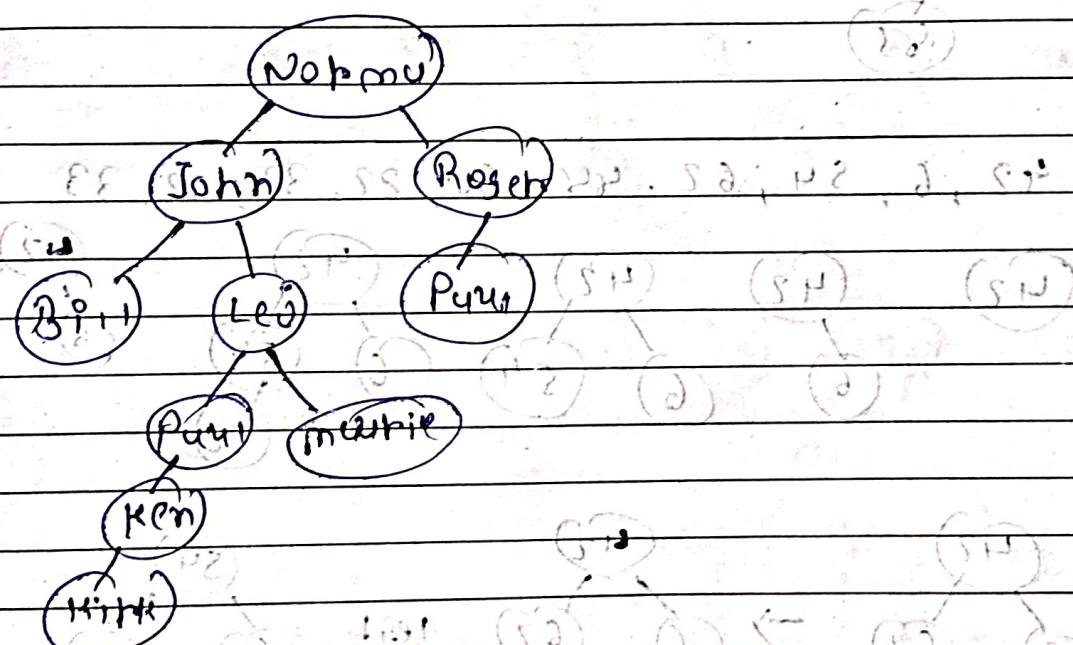
- DBLE HAN



- 14, 10, 17, 12, 10, 11, 20, 12, 15, 25, 20, 4, 22, 11, 13

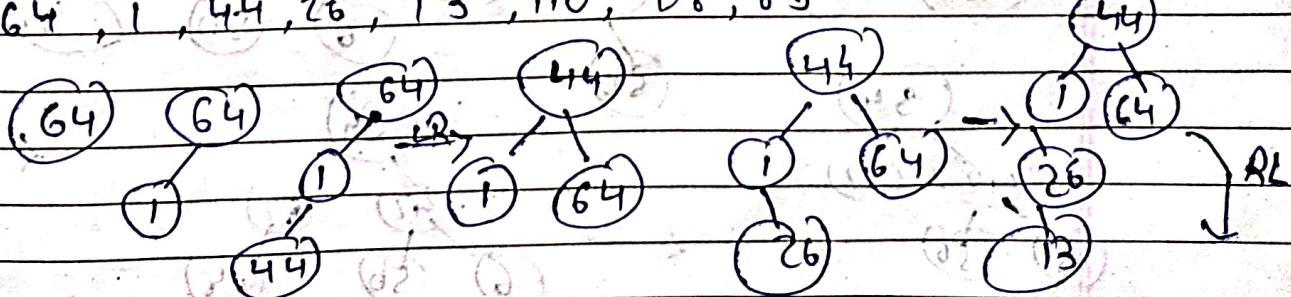


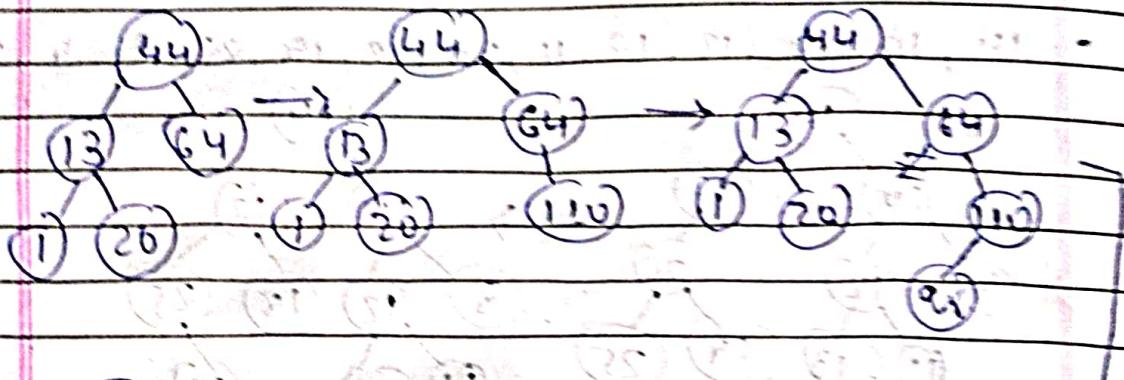
- Normu, Roger, John, Bill, Leo, Paul, Ken, Maurice



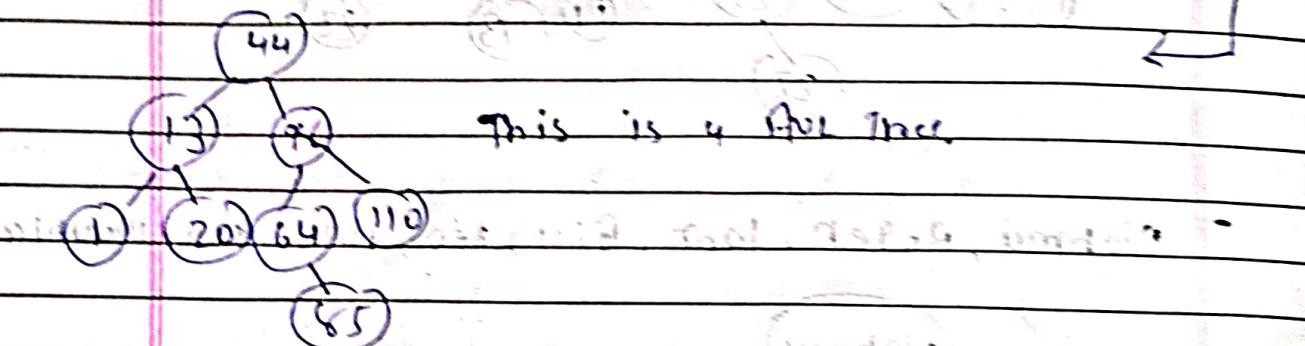
- AVL :

- 64, 1, 44, 26, 13, 110, 98, 85

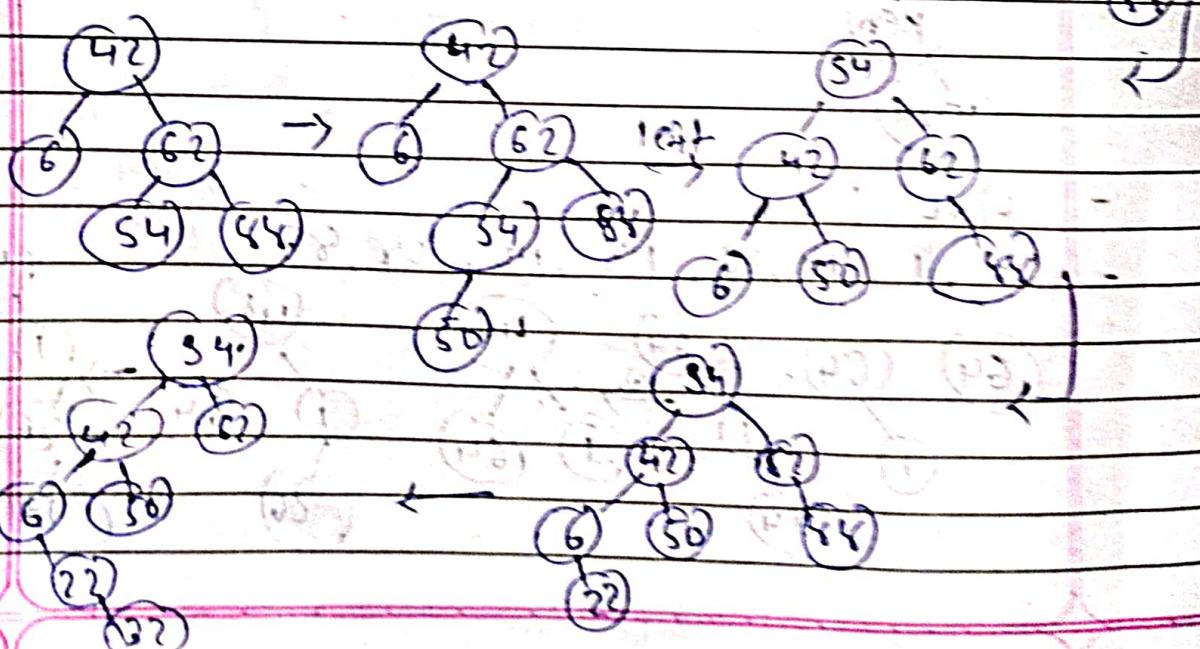
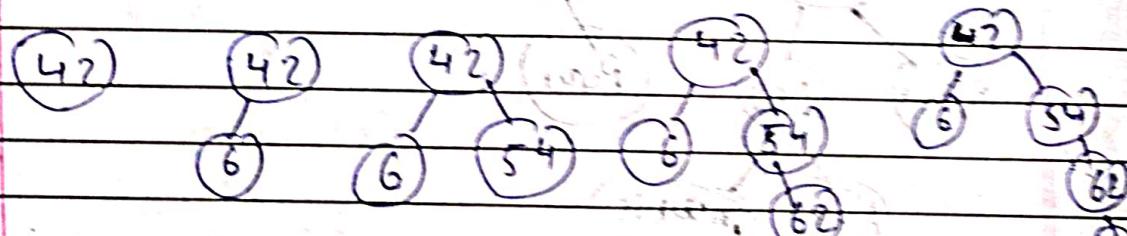


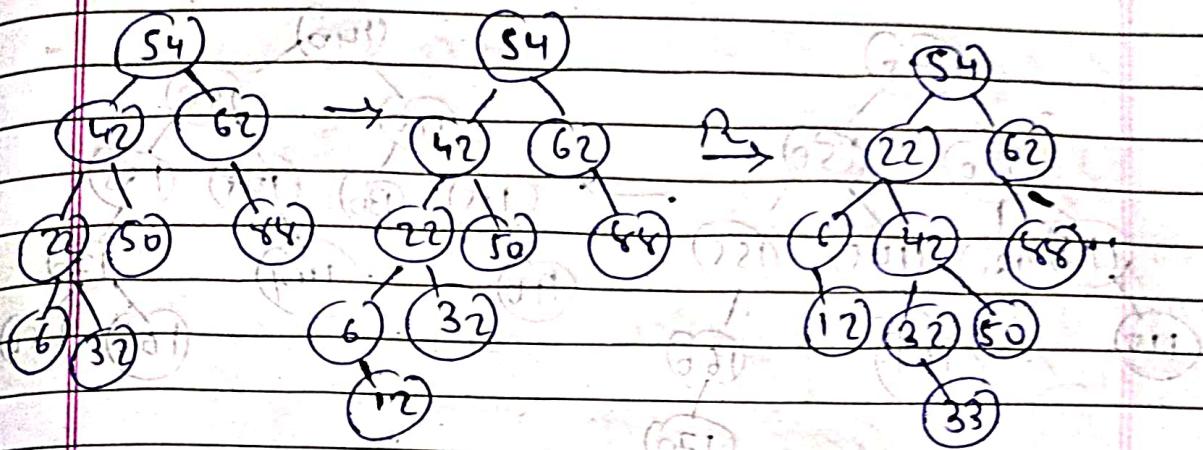


This is 4 AVL tree.

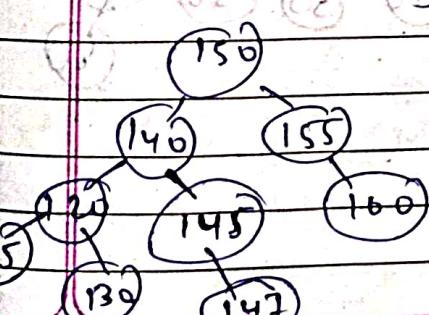
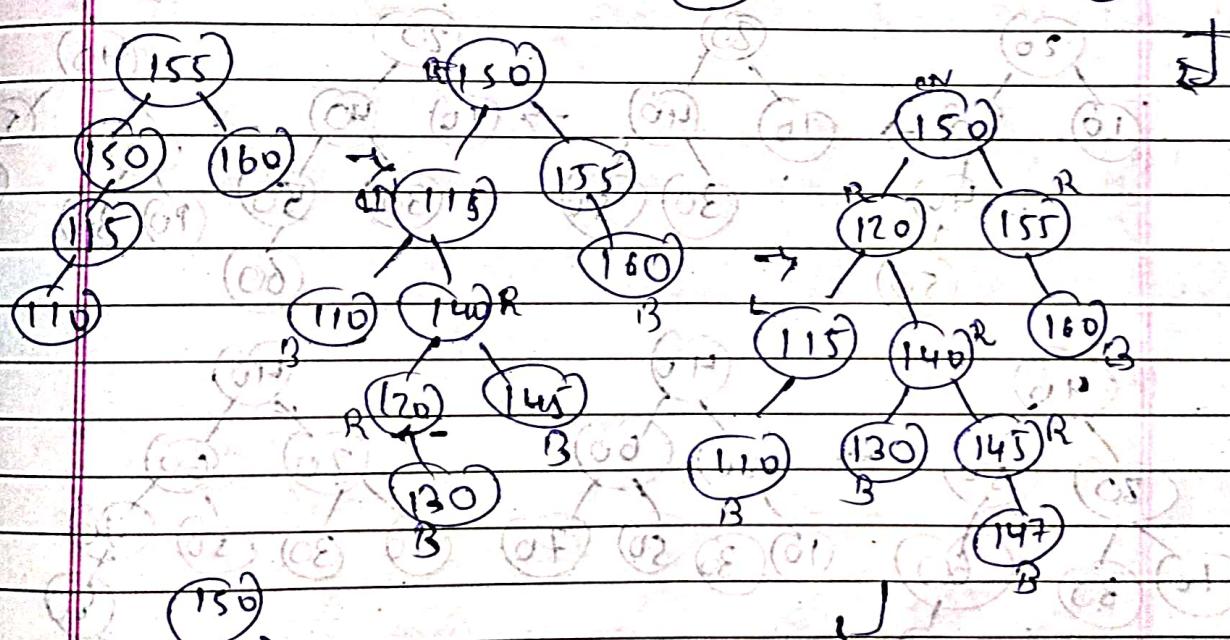
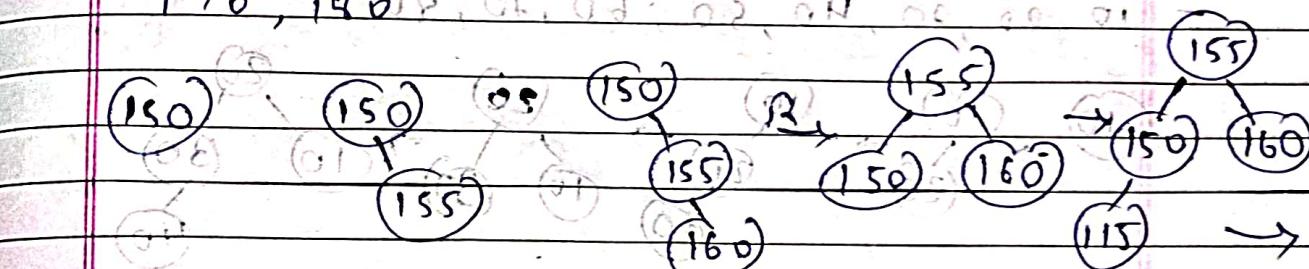


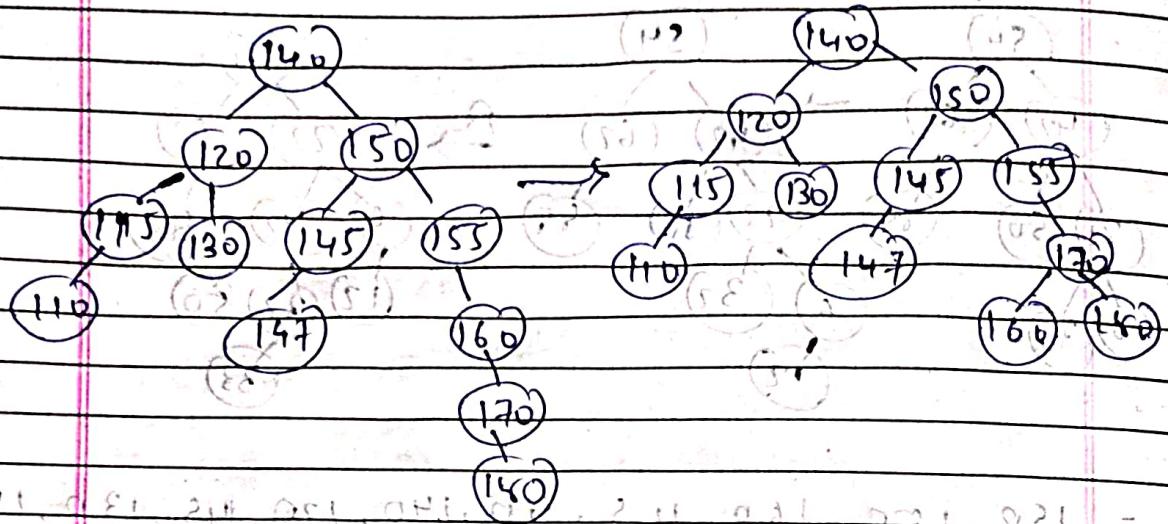
- 42, 6, 54, 62, 44, 50, 22, 32, 12, 33



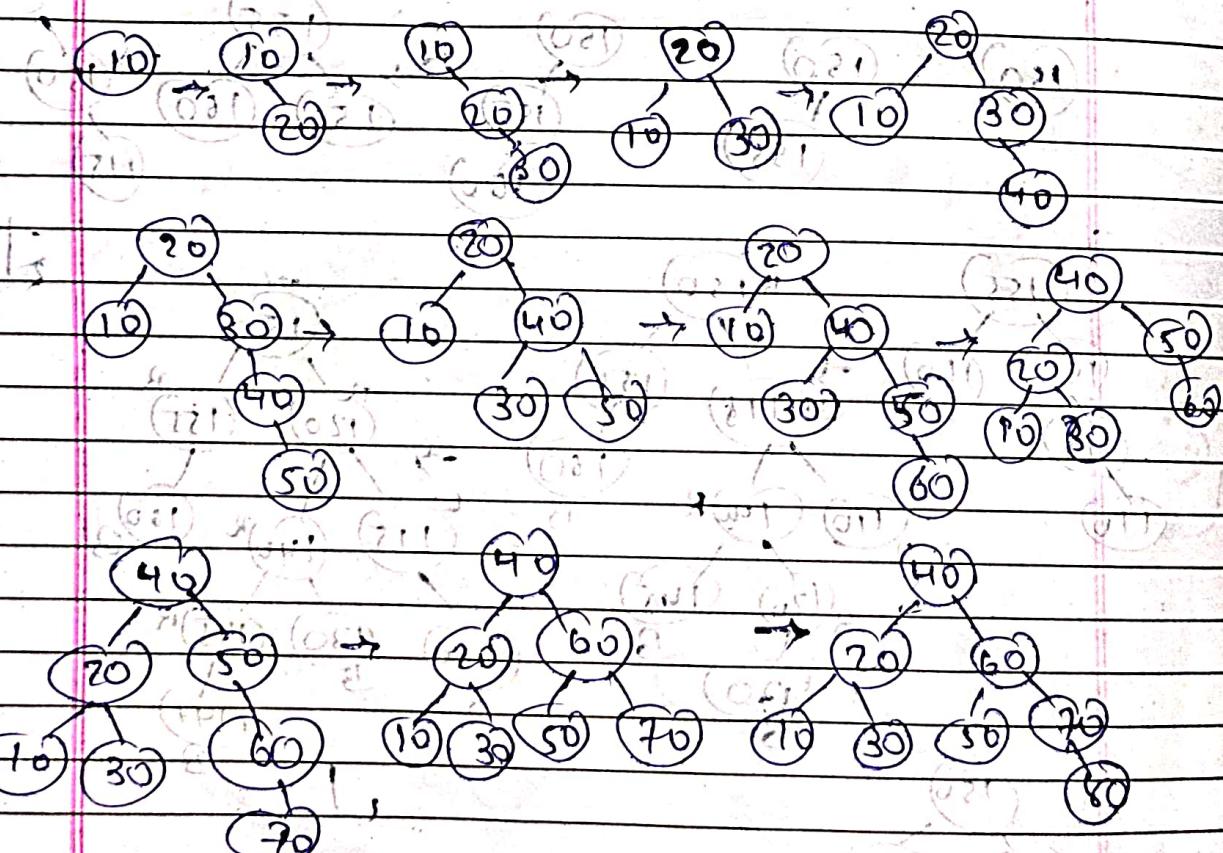


- 150, 155, 160, 115, 110, 140, 120, 145, 130, 147,  
 170, 140 R, 15, 90, 20, 24, 35, 40, 21

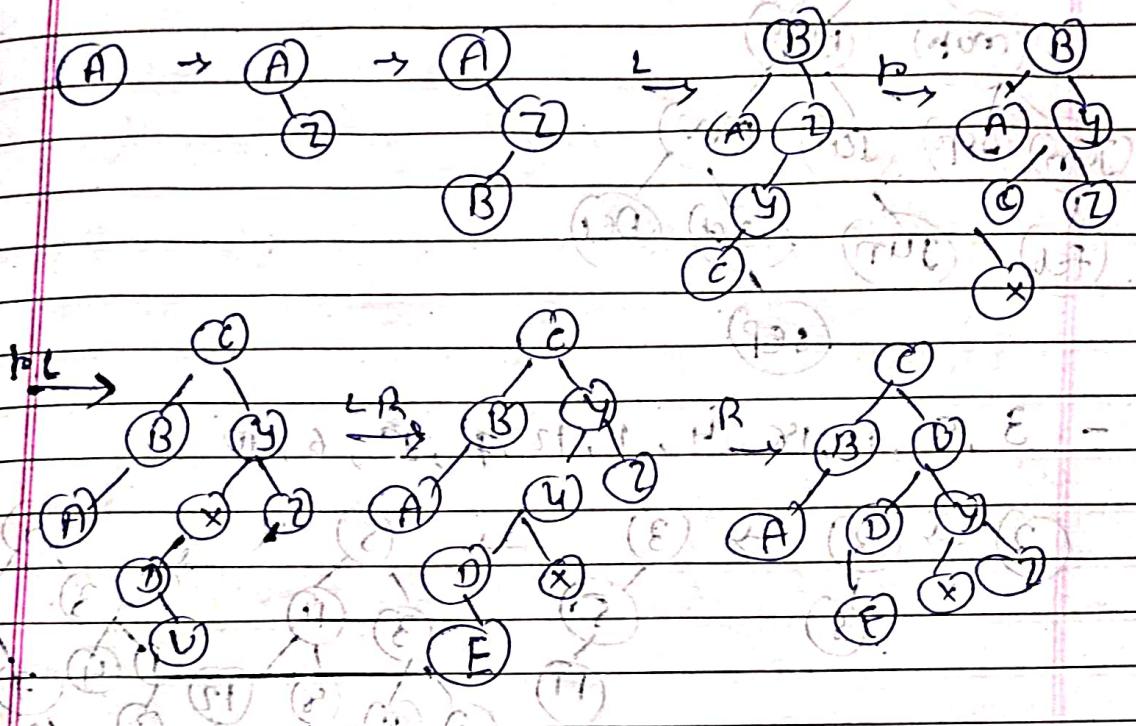




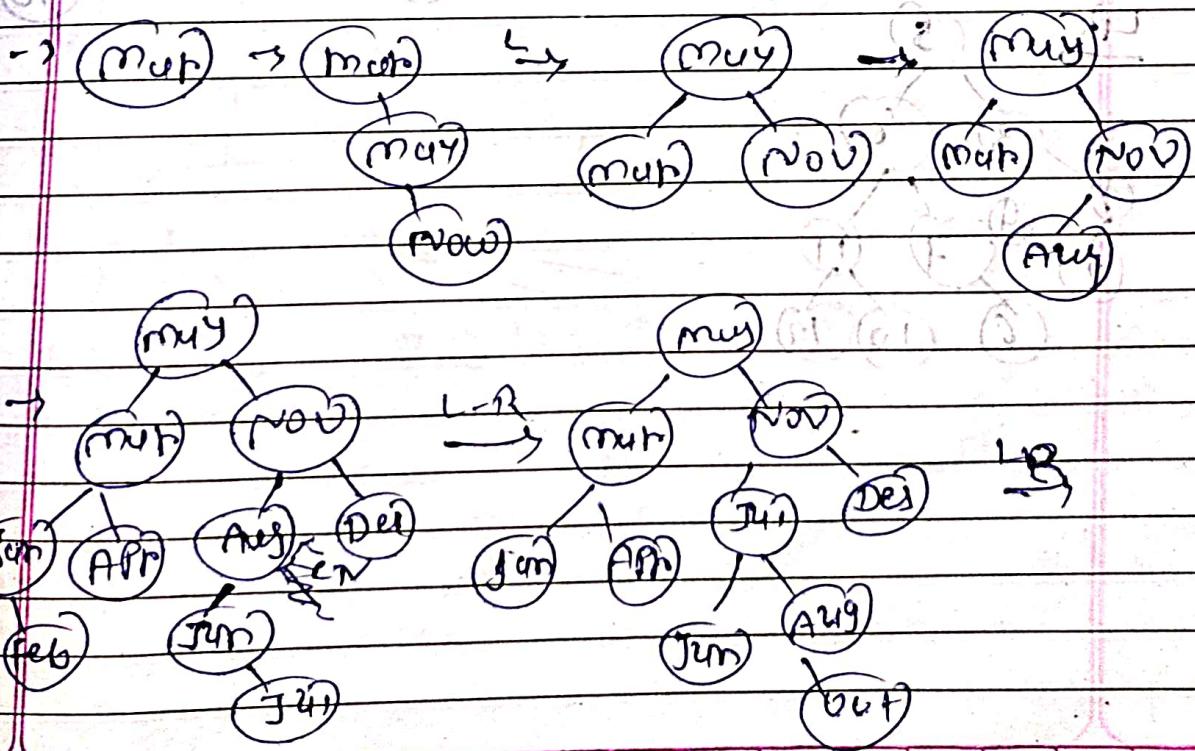
10, 20, 30, 40, 50, 60, 70, 80

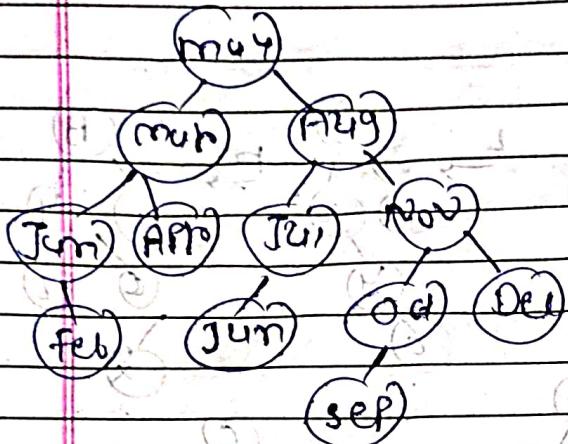


- A Z B Y C X D U E

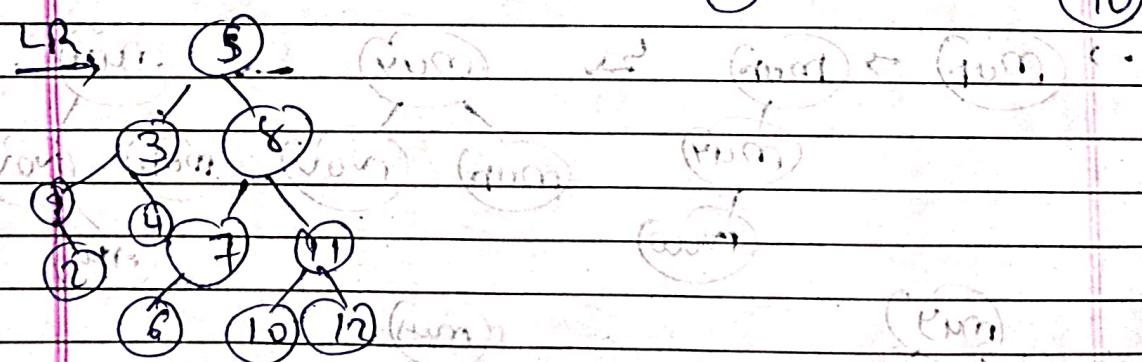
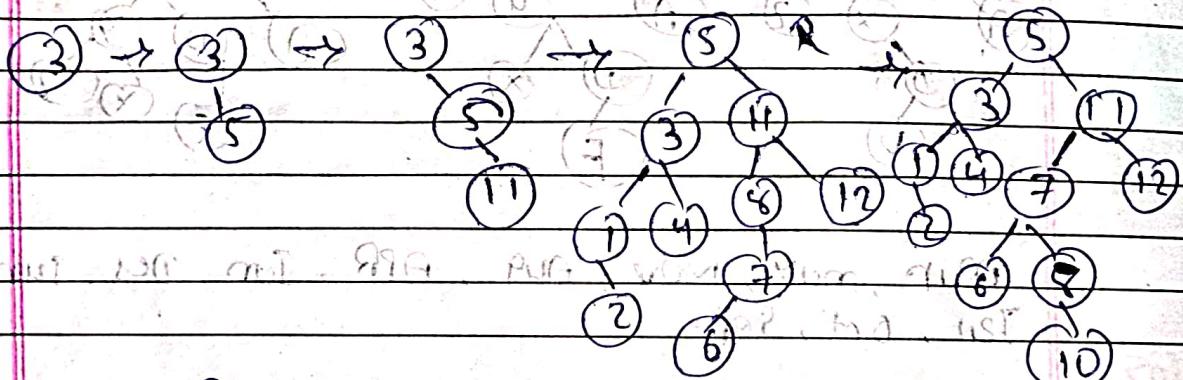


- Mar, may, Nov, Aug, APR, Jan, Des, Jun, Feb, J21, Oct, Sop.



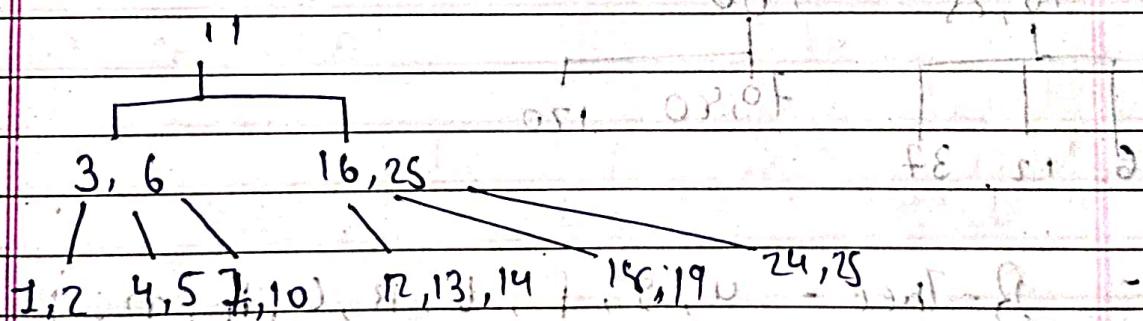
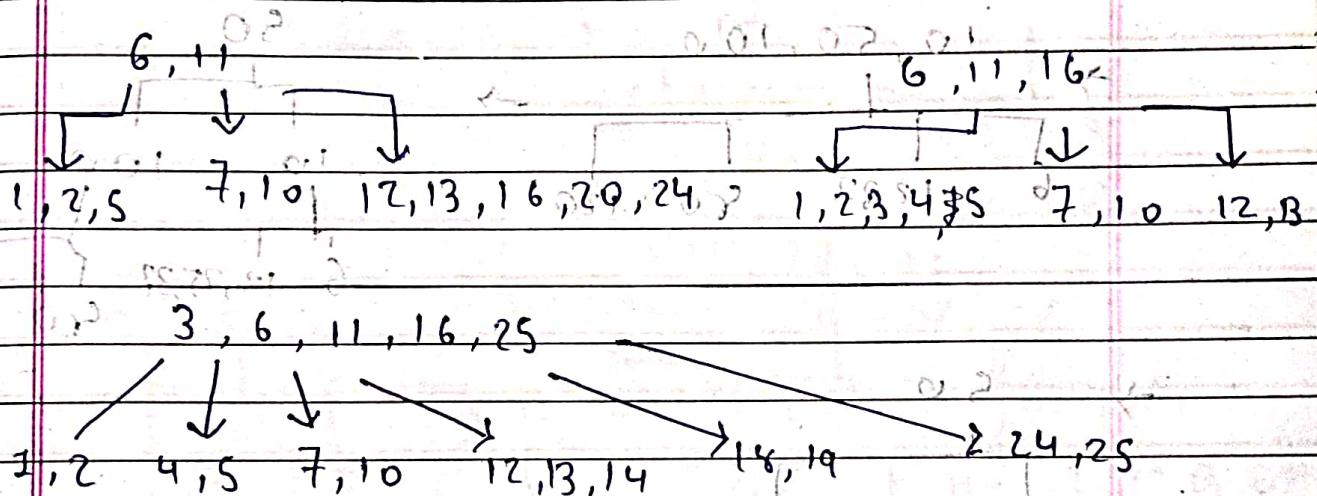
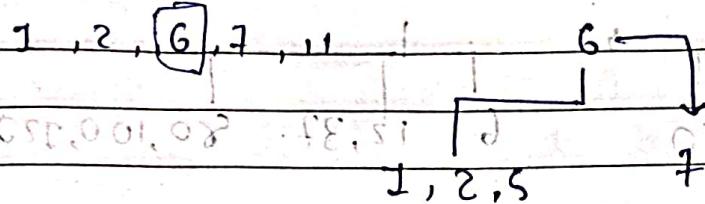


- 3, 5, 11, 18, 4, 1, 12, 7, 2, 6, 10



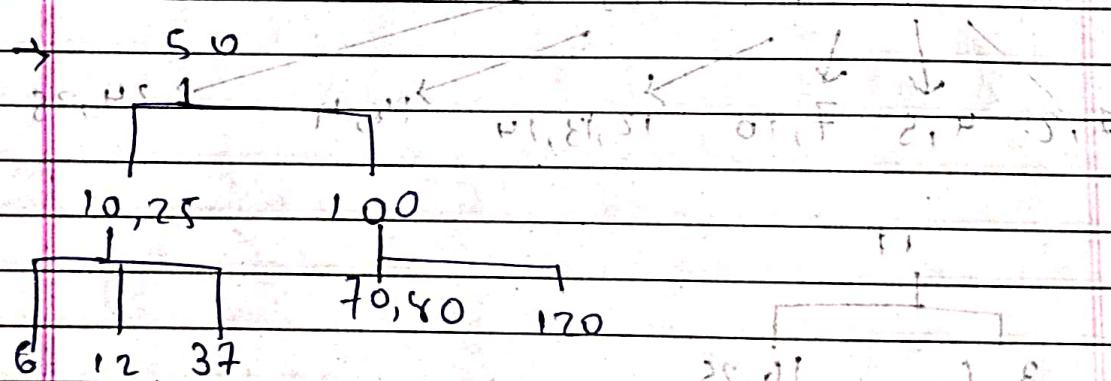
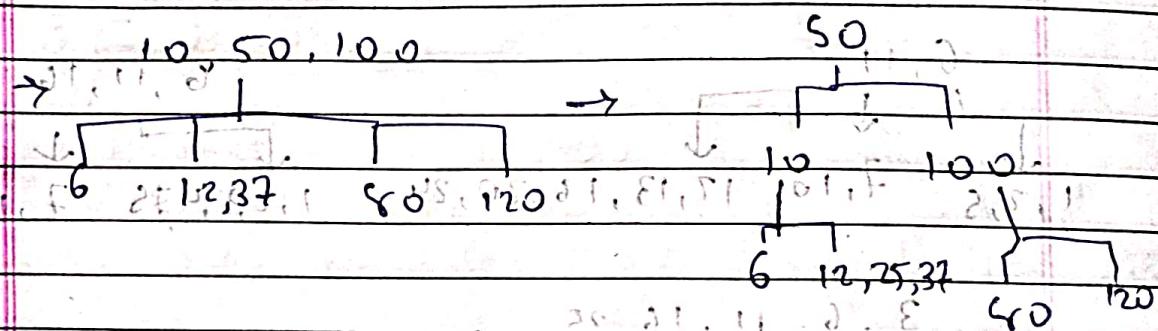
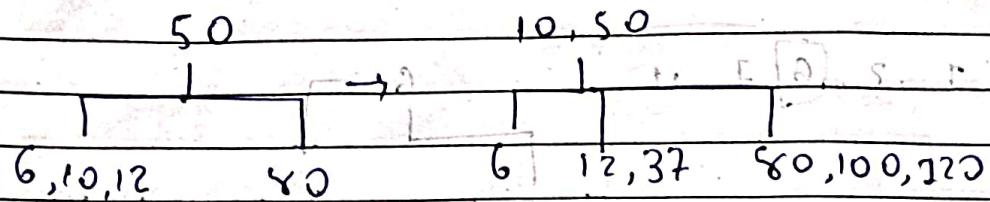
B Three Ex: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25

Order: 1, 7, 6, 2, 11, 5, 10, 13, 12, 70, 16, 24, 3, 4, 14, 19, 14, 25

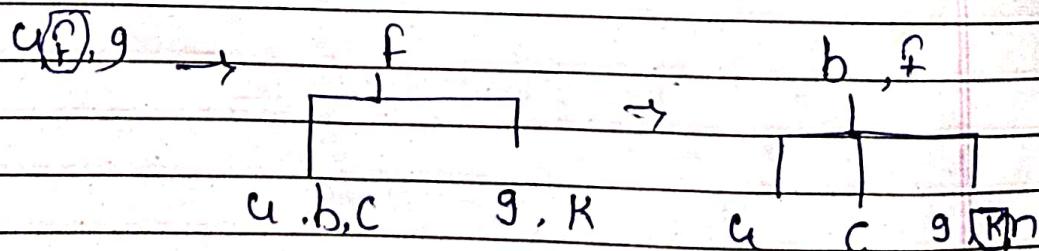


1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25

2,3 Tree: 12, 50, 85, 6, 10, 37, 150, 120, 25, 70



- 3-Tree - u,f,g, f, b, r, c, h, i, j, l



b J, K

b J, K

Page 10 of 10

Established 1875. A. H. E. & M. F. W.

- Objekt 25 | C, N, Cr, A, H, E, K, Q, M, F, W, L  
T, Z, D P R x Y, S

1, L, 2, P, R, x, 4, 5  
0 21 22 23

$$A, C, \{c\}, H, N \rightarrow \vdash c$$

1. What is the difference between a primary and secondary consumer?

1028.005.001 0012122 1028.005.001

$A, C \in E$        $H, K \in \{N, M, Q\}$

$\rightarrow$   $G \times N$

021.665.061-00 2F, 2d 52,02 05

A,C,E H,K M,Q A,C,E H,K L,M,Q,W

1981-02-05

$\rightarrow$  Cf., N.D.

100-124823 18202 28.08.01

A, C, D, E H, K L, M, P R, T, w, x, Z

Page 1 of 1

→ G.N.O.W. 21.02.78

10. *Leptothrix* *leptothrix* (L.) C. Nees von Esenbeck  
Basionym: *Leptothrix* *leptothrix* L.

~~Acid~~ Ethyl Kt MP Resin MZ

~~A, C, D, E, G, H, K L, M, P, S, R, T, Y, Z~~

- Order 4: 100, 150, 50, 55, 250, 200, 170, 65,  
75, 20, 30, 52, 10, 25, 180, 190, 300, 5

50 [55], 100, 150 → 155

50 100, 150, 200, 250

→ 55, 150

20 [30, 50, 52] 65, 75, 100 170, 200, 250  
20, 30, 50, 52 65, 75, 100 170, 200, 250

30, 55, 150

20 50, 52 65, 75, 100 170, 200, 250

20, 50, 52 65, 75, 100 170, 200, 250

30, 55, 150

10, 20, 25 50, 52 65, 75, 100 170, 180, 200, 250

10, 20, 25 50, 52 65, 75, 100 170, 180, 200, 250

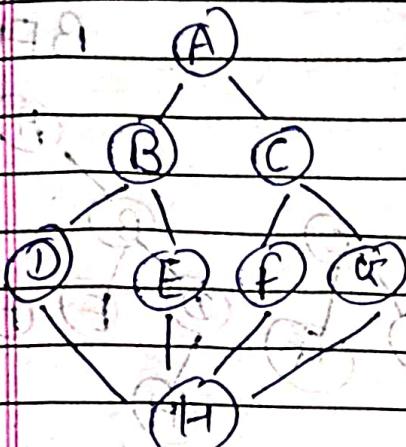
→ 30 [55], 150, 180, 200, 250, 300

50 150, 180, 200, 250, 300

50, 52 150, 180, 200, 250, 300

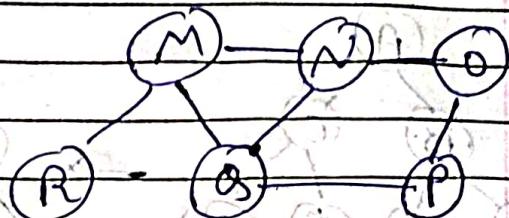
10, 20, 25 50, 52 65, 75, 100 170, 190, 200, 250, 300

- write DFS & BFS of following graphs



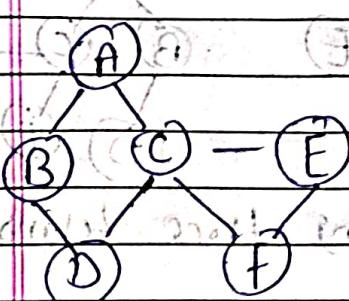
DFS : ABDHEFCG

BFS : ABCDEFHG



DFS : RMNOPO

BFS : MRNQPO

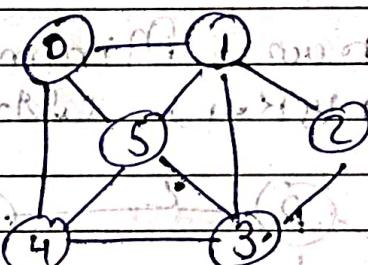


DFS : ABCDEF

BFS : ABCFE

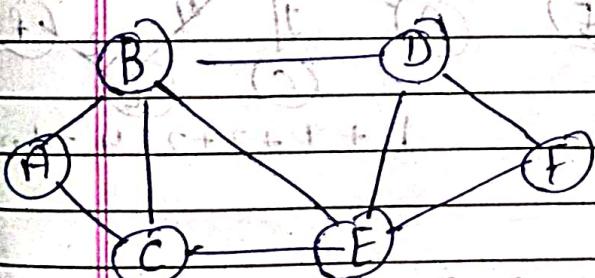
DFS : 124356

BFS : 126435



DFS : 12345

BFS : 14523

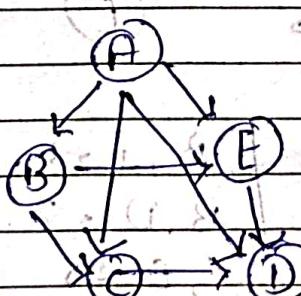


DFS : ABCDEF

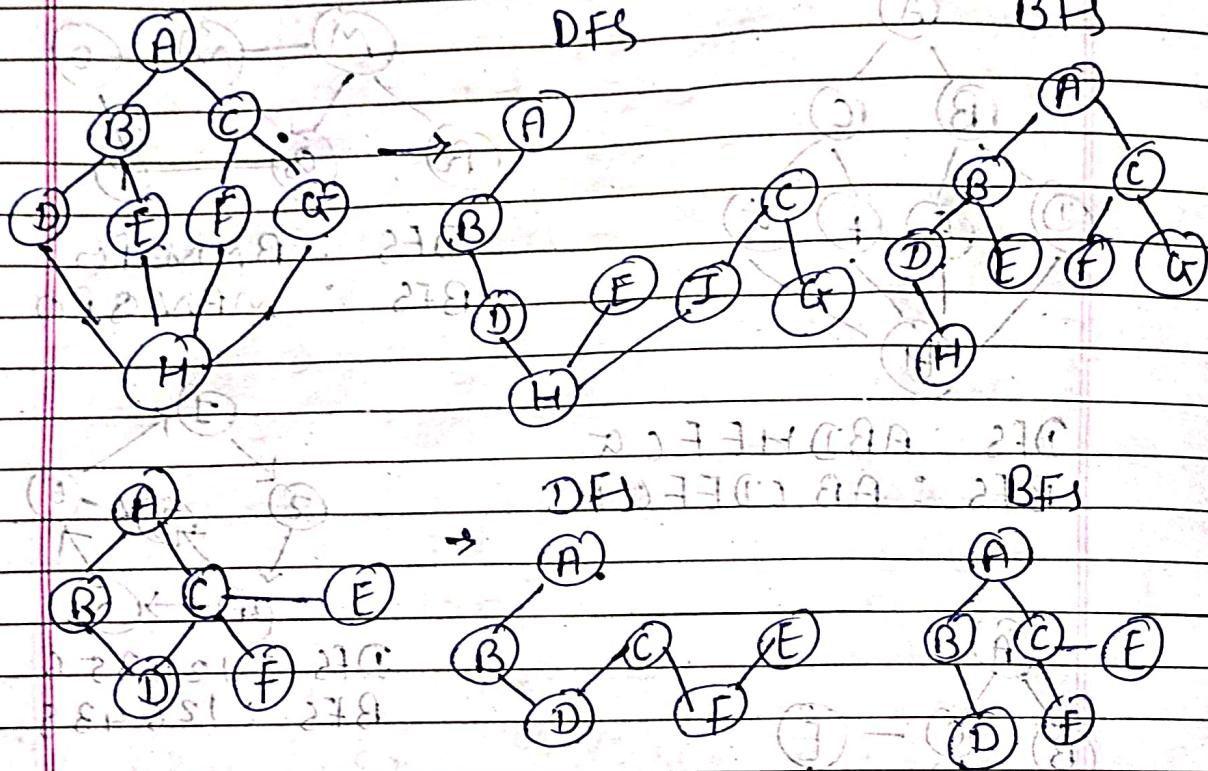
BFS : BACDEF

DFS : ABCDE

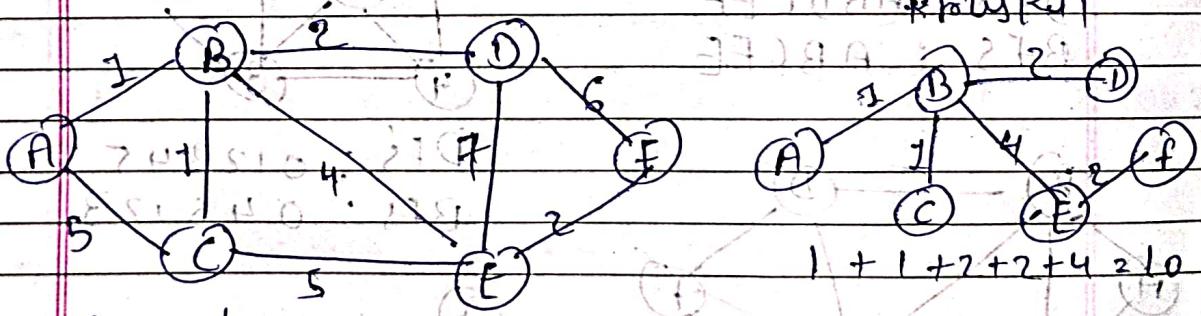
BFS : ABCDEF



→ Construct Spanning Tree :



- Know Minimum Spanning tree using Prim's algorithm



Prim's

$$A, B \rightarrow 1$$

$$A, C \rightarrow 5$$

$$B, C \rightarrow 5$$

$$B, E \rightarrow 4$$

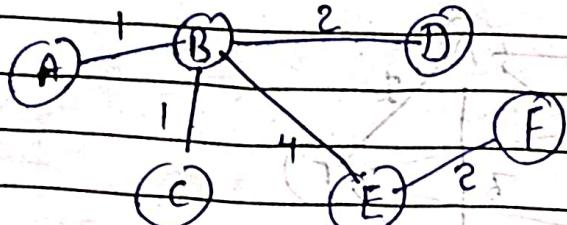
$$B, D \rightarrow 2$$

$$C, E \rightarrow 2$$

$$D, E \rightarrow 7$$

$$D, F \rightarrow 6$$

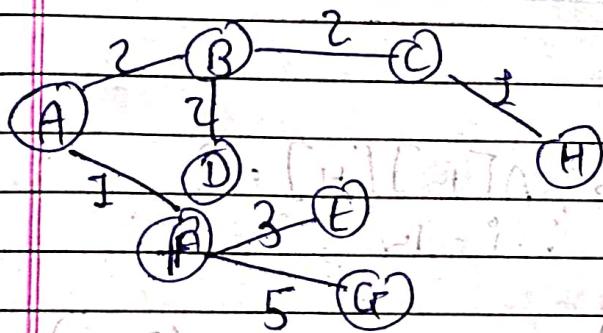
$$E, F \rightarrow 2$$



Kruskals

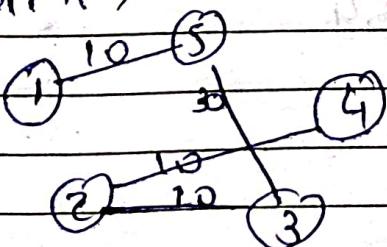
Optim's

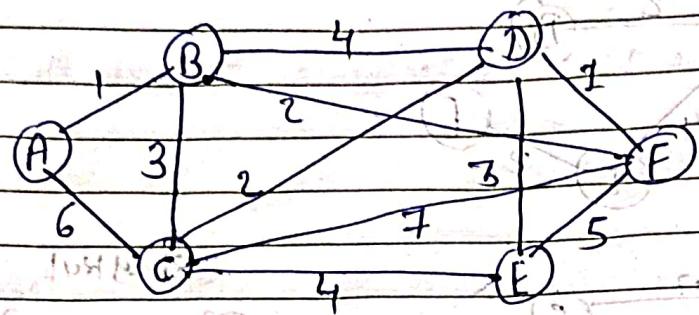
- $A, B = 2$     $B, C = 2$     $C, E = 5$     $D, F = 3$     $F, H = 6$   
 $A, D = 3$     $B, D = 2$     $C, H = 1$     $E, F = 3$     $F, G = 5$   
 $A, F = 7$     $B, E = 4$     $D, F = 4$     $E, G = 7$



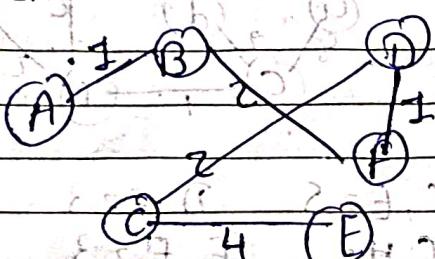
Kruskals

Optim's





Chim's



Kruskal



P-1

~~$$92 - 1] L_0 = 1000, c = 2, A[14][4] = 0 \\ LB[i] = LB[i-1] : i = 14, j = 4$$~~

$$\text{Loc}[A[i], [j]) = L_0 + c * [m(i-1) + (j-1)] \\ = 1000 + 2 * [5(17) + 3] \\ = 1000 + 2(44) = 1176$$

Row-major order

In column-major order:

$$\text{Loc}[A[i, j]) = L_0 + c * (i-1) + r * (j-1) \\ = 1000 + 154 \\ = 1154$$

Ex : 2) Address calculation of 2-D Array

$15 \times 20$  : 2D Array  
 $(n \times m)$

$n = 15, m = 20, L_0 = 4000, c = 4$   
 $A[i][j] = ?$ ,  $i = 10, j = 10, LB = LB + 1$

In - Row - major order :

$$\text{Loc}(A[i][j]) = L_0 + c * [m(i-1) + (j-1)] \\ = 4000 + 4[150 + 9] \\ = 4756$$

In (Column - major) order :

$$\text{Loc}[A[i][j]] = L_0 + c * [(p-1) + n(j-1)] \\ = 4000 + 4[9 + 135] \\ = 4576$$

Infix to Postfix

$$I) a + b * c - d / e * h$$

Infix to Postfix

infix	stack	Postfix
a		a
+	(+)	a
b	(+)	ab
*	(+*)	(abc)
c	(+*)	abc*
-	(-)	abc*
d	(-)	abc*-d
/	(-)	abc*-d
e	(-)	abc*-de
*	(-*)	abc*-de)
h	(-*)	abc*-de/h
*	(mpy)	abc*-de/h*-

2)  $A \wedge B - C * D + E \wedge F$  / Prefix, Postfix  
Infix      Punkt, Stich      (max) empty

~~total area of all four triangles~~  $\triangle ABC$

$$B \wedge C \rightarrow A \wedge B \wedge C \rightarrow (A \wedge B) \wedge C \rightarrow A \wedge (B \wedge C)$$

$$\text{① } \quad \text{12} (+) \quad AB \wedge CD$$

$$+ \frac{1}{2} \partial_{\mu} \partial_{\nu} g_{\alpha\beta} (i + i \omega_m - \omega_m) A^{\alpha} B^{\beta} C^{\gamma} D^{\delta} =$$

$E = \{E_1, E_2, \dots, E_n\}$   $\cup$   $\{A, B, C, D, F\}$

$$AB^T CD * E$$

$$F \rightarrow C + A \quad AB \overset{C}{\rightarrow} CD * EF$$

$$(+)\quad AB^7CD^*F^+$$

(+) Hg<sup>2+</sup> + Br<sup>-</sup> → HgBr<sup>2-</sup> + E<sup>-</sup>

~~(+) H13 (C) \* EF  
empty AB^CD \* EE'~~

empty  $AB^*CD^*EF^*$

3) A + B - C \* D \* E ^ F ^ G infix:  
Infix                  Prefix                  Postfix

11 10713 31905 2017-01-01

④  $\frac{1}{2} \times 2 = 1$  (t)  $\frac{1}{2} \times 2 = 1$  (t)

$\text{Voll} \neq \emptyset$        $\{ \neq \}$        $\Omega^3$

$\text{Ball} + \text{Racket} \rightarrow \text{Hit}$  AB

~~4~~ F B (+) AB+

$$f(x) = \frac{1}{2}x^2 - 2x + 3$$

$$AB + C$$

$$AB + CD$$

$$(\bar{A} + \bar{B}) = (\bar{A} + \bar{C}) + (\bar{C} + \bar{B})$$

$$A \cdot B + C \cdot D = A \cdot (B + C) + D$$

$$AB + CD * E$$

$$A \oplus B = A + B - AB$$

$$F \quad G = \begin{pmatrix} * & * \\ * & * \end{pmatrix} \quad AB + CD = E$$

ABT ④ \* EFW

4)	$2^* 3 / ((-1) + 5 * 3)$	Infix	Stack	Postfix
			)	empty
	A 2		1 1 1	2
	A *		1 1 *	2
	8 3		1 1 3 *	2
	+ 8 1		1 1 3 +	23
	+ 8 0 1		1 1 3 + 1	0 23 *
	0 + 8 0 2		1 1 3 + 1 0	( 23 *
	* + 8 0 2		1 1 3 + 1 0 *	23 * 2
	((+ 8 0 2) + 8 0 1)		1 1 3 + 1 0 *	23 * 2 -
	((+ 8 0 2) + 8 0 1) + 8 0 1		1 1 3 + 1 0 *	+ 23 * 2 -
	((+ 8 0 2) + 8 0 1) + 8 0 1 + 8 0 1		1 1 3 + 1 0 *	23 * 2 - 1 - 1
	((+ 8 0 2) + 8 0 1) + 8 0 1 + 8 0 1 + 5 0 1		1 1 3 + 1 0 *	23 * 2 - 1 - 1 +
	((+ 8 0 2) + 8 0 1) + 8 0 1 + 8 0 1 + 5 0 1 + 8 0 1		1 1 3 + 1 0 *	23 * 2 - 1 - 1 + 5
	((+ 8 0 2) + 8 0 1) + 8 0 1 + 8 0 1 + 5 0 1 + 8 0 1 + 3 0 1		1 1 3 + 1 0 *	23 * 2 - 1 - 1 + 5 3
	((+ 8 0 2) + 8 0 1) + 8 0 1 + 8 0 1 + 5 0 1 + 8 0 1 + 3 0 1 + 8 0 1		1 1 3 + 1 0 *	23 * 2 - 1 - 1 + 5 3 * 2

5)	$A + B * ((C + D) / E)$	Infix	Stack	Postfix
			)	empty
	A + B *		+	A
	A + B * C + D / E		+(C)	A
	A + B * C + D / E		+(C)	A
	C		+(C)	A
	B		+(C)	AB
	*		+(C *)	AB
	C		+(C *)	ABC
	-		+(C *) -	ABC
	D		+(C *) -	ABCD
	)		+	ABCD - *
	/		+( / )	ABCD - * E
	E		+( / )	ABCD - * E / +
	9		empty	

6

$$6) \quad (\underline{A+B})^* C + \underline{D} / (\underline{B+A}^* C) + \underline{D}$$

Infisc

## Stück

Postfix

empty

1

A

AB

AB+

H13+

13 + L

131

3.1.6 x ①

+ (\*)

$$\beta + \gamma \neq \beta$$

$$\beta + c \times DB$$

$B + C * DBA$

$$B + C * D B$$

15 \* DSA

$\beta + \gamma^* D D$

R + C \* DRAC

C\*DBA(\*+/-

C \*DBAC\* +

卷之三

*W. H. G.*

卷之三

— 1 —

(A) 100% (B) 50%

1. *Leucosia* *leucostoma* *leucostoma*  
2. *Leucosia* *leucostoma* *leucostoma*

卷之三

2

7)  $((a+b^c)d)* + (e+fd^*)$

Infix

Stack

Postfix

$a+b^c$

) (

empty

$a+b^c d$

) (

empty

$a+b^c d e$

) ( (

empty

$a+b^c d e f$

) ( ( (

+ a

$a+b^c d e f g$

) ( ( ( (

+ b

$a+b^c d e f g h$

) ( ( ( ( (

\* c

$a+b^c d e f g h i$

) ( ( ( ( ( (

+ d

$a+b^c d e f g h i j$

) ( ( ( ( ( ( (

+ e

$a+b^c d e f g h i j k$

) ( ( ( ( ( ( ( (

+ f

$a+b^c d e f g h i j k l$

) ( ( ( ( ( ( ( ( (

+ g

$a+b^c d e f g h i j k l m$

) ( ( ( ( ( ( ( ( ( (

+ h

$a+b^c d e f g h i j k l m n$

) ( ( ( ( ( ( ( ( ( ( (

+ i

$a+b^c d e f g h i j k l m n o$

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+ j

$a+b^c d e f g h i j k l m n o p$

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$a+b^c d e f g h i j k l m n o p q$

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$a+b^c d e f g h i j k l m n o p q r$

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$a+b^c d e f g h i j k l m n o p q r s u w y z ^ * ^ *$

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$a+b^c d e f g h i j k l m n o p q r s u w y z ^ * ^ *$

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$a+b^c d e f g h i j k l m n o p q r s u w y z ^ * ^ *$

) (

+ ^\*

$a+b^c d e f g h i j k l m n o p q r s u w y z ^ * ^ *$

) (

+ ^\*

Q)  $(A+B * C / D - E) + F / G / (H+I))$

Infix

Stack

Postfix

$A$

$)$

$\text{empty}$

$B$

$)$

$\text{empty}$

$*$

$)$

$) A$

$D$

$)$

$\text{NA}$

$E$

$)$

$+AB$

$*$

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$+AB$

$C$

$)$

$+ABC$

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$)$

$+ABC*$

$D$

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$+ABC*D$

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$+ABC*D/+$

$E$

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$+ABC*D/+E$

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$+ABC*D/+E-F$

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$+ABC*D/+E-F+$

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$+ABC*D/+E-F-G$

$I$

$)$

$+ABC*D/+E-F-G-F$

$J$

$)$

$+ABC*D/+E-F-G-F-H$

$K$

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$+ABC*D/+E-F-G-F-H-I$

$L$

$)$

$+ABC*D/+E-F-G-F-H-I-J$

$M$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K$

$N$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L$

$O$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M$

$P$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N$

$Q$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O$

$R$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P$

$S$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q$

$T$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R$

$U$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R-S$

$V$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R-S-T$

$W$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R-S-T-U$

$X$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R-S-T-U-V$

$Y$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R-S-T-U-V-W$

$Z$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R-S-T-U-V-W-X$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R-S-T-U-V-W-X-Y$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R-S-T-U-V-W-X-Y-Z$

$)$

$+ABC*D/+E-F-G-F-H-I-J-K-L-M-N-O-P-Q-R-S-T-U-V-W-X-Y-Z-CmpTy$

9)  $a + ((b * c) / (d - e))$

Infix	Stack	Postfix
$a$	$\{\$	$a$
$*$	$\{\ * \}$	$b * c$
$d - e$	$\{\ * \} / \{ - \}$	$d - e$
$=$	$\{\ * \} / \{ - \} + \{ \}$	$=$
$+ a$	$\{\ * \} / \{ - \} + \{ \} + \{ \}$	$+ a$
$=$	$\{\ * \} / \{ - \} + \{ \} + \{ \} + \{ \}$	$=$
$b$	$\{\ * \} / \{ - \} + \{ \} + \{ \} + \{ b \}$	$b$
$*$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ \}$	$b * c$
$c$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \}$	$abc$
$/$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ \}$	$abc*$
$-$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \}$	$abc*$
$e$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \}$	$abc*d e$
$=$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \} = \{ \}$	$=$
$a$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \} = \{ a \}$	$a$
$=$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \} = \{ a \} = \{ \}$	$=$
$b$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \} = \{ a \} = \{ b \}$	$b$
$c$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \} = \{ a \} = \{ b \} = \{ c \}$	$abc$
$d$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \} = \{ a \} = \{ b \} = \{ c \} = \{ d \}$	$abc*$
$-$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \} = \{ a \} = \{ b \} = \{ c \} = \{ d \} - \{ e \}$	$abc*$
$e$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \} = \{ a \} = \{ b \} = \{ c \} = \{ d \} - \{ e \} = \{ e \}$	$abc*$
$=$	$\{\ * \} / \{ - \} + \{ \} + \{ b \} * \{ c \} / \{ d \} - \{ e \} = \{ a \} = \{ b \} = \{ c \} = \{ d \} - \{ e \} = \{ e \} = \{ \}$	$=$

10)  $A + (B * C - (D / E - F) * G) * H$

Infix	Stack	Postfix
$A$	$\{\$	$A$
$*$	$\{\ * \}$	$B * C$
$-$	$\{\ * \} - \{ \}$	$D - E$
$*$	$\{\ * \} - \{ \} * \{ \}$	$F * G$
$=$	$\{\ * \} - \{ \} * \{ \} + \{ \}$	$=$
$H$	$\{\ * \} - \{ \} * \{ \} + \{ \} * \{ H \}$	$H$
$=$	$\{\ * \} - \{ \} * \{ \} + \{ \} * \{ H \} = \{ \}$	$=$
$D$	$\{\ * \} - \{ \} * \{ \} + \{ \} * \{ H \} = \{ D \}$	$D$
$/$	$\{\ * \} - \{ \} * \{ \} + \{ \} * \{ H \} = \{ D \} / \{ \}$	$D$
$E$	$\{\ * \} - \{ \} * \{ \} + \{ \} * \{ H \} = \{ D \} / \{ E \}$	$DE$
$-$	$\{\ * \} - \{ \} * \{ \} + \{ \} * \{ H \} = \{ D \} / \{ E \} - \{ \}$	$-$
$F$	$\{\ * \} - \{ \} * \{ \} + \{ \} * \{ H \} = \{ D \} / \{ E \} - \{ F \}$	$DEF$
$*$	$\{\ * \} - \{ \} * \{ \} + \{ \} * \{ H \} = \{ D \} / \{ E \} - \{ F \} * \{ \}$	$*G$
$=$	$\{\ * \} - \{ \} * \{ \} + \{ \} * \{ H \} = \{ D \} / \{ E \} - \{ F \} * \{ G \}$	$=$



Tags No. \_\_\_\_\_  
Date \_\_\_\_\_

2)  $A^B - C * D + E^F / G$

Reverse  $\rightarrow C/F^E * D * C - B^A$

Infix

- Stuck

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C

3)  $A^B - C * D * E)^F / G$

Reverse :  $C/F^E * D * C - B + A$

Infix

- Stuck

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x

$$x \quad ( * + 0 ) - E^D \rightarrow G F^E E^D$$

$$C A - 2 * 0 \rightarrow C * D - E^D \rightarrow G F^E E^D C$$

$$x \quad C - \rightarrow G F^E E^D C **$$

+ 9. B

$$i - \rightarrow G F^E E^D C ** B$$

70 +

$$0 - + \rightarrow G F^E E^D C ** B A$$

A

$$1 C - + \rightarrow G F^E E^D C ** B A +$$

)

$$1 C m P t Y \rightarrow G F^E E^D C ** B A + -$$

70

$$P r e : - + A B * * C D ^ E ^ F G .$$

$$4) 2 * 3 / (2 - 1) + 5 * 3$$

$$Rev : 3 * 5 + (1 - 2) / 3 * 2$$

Infix Stuck

Postfix

+ 3 5 \* 2

cmptY

\* 3 5 + 2

3

\* 2 3 \* 5

3

\* 3 5 + 2

3 5

\* 3 5 + 2

35 \*

\* 3 5 + 2

35 \*

1 7 1 3 4 1 1 0 7 4 ( + + - )

35 \*

- ( + ( - )

35 \*

2 1 7 1 3 4 ( + ( - ) \* )

35 \* 12

\* 3 5 \* 12 -

\* 3 5 \* 12 -

35 \* 12 -

3 5 \* 12 - 3

35 \* 12 - 3

\* 3 5 \* 12 - 3

35 \* 12 - 3

2 1 7 1 3 4 ( + ) ( + / \* )

35 \* 12 - 3 2

\* 3 5 \* 12 - 3 2 \* / +

35 \* 12 - 3 2 \* / +

3 5 \* 12 - 3 2 \* / +

35 \* 12 - 3 2 \* / +

P r e : + / \* 2 3 - 2 1 \* 5 3

35 \* 12 - 3 2 \* / +



B	$(C + (C \cdot A))^* B$	$DCA^* B$
)	$A + (B + (C + (A \cdot B)))$	$DCA^* B +$
Set 1/9	$\vdash G + /$	$DCA^* B +$
ME D.	$C + /$	$DCA^* B + D$
Set 9/10	$C + +$	$DCA^* B + D /$
C	$C + +$	$DCA^* B + D / C$
*	$C + + *$	$DCA^* B + D / C$
C	$C + + * C$	$DCA^* B + D / C$
(B	$C + + * ($	$DCA^* B + D / CB$
C +	$- C + + * ( +$	$DCA^* B + D / CB$
A	$- (C + + * ( +$	$DCA^* B + D / CRA$
- 10)	$(C + + *$	$DCA^* B + D / CBA +$
- 10)	empty	$DCA^* B + D / CBA + * +$

Pre :  $+ + * + ABC / D + B * A C D$

$$(7) - ((c + b^c \cdot d)^* + (e + f / d))$$

Rev :  $((d / f + e) * (d^c \cdot c^b + u))$

Infix      Postfix

	$HON = 8 (= 14 + 3)$	empty
C	$CC$	empty
f	$((c + b^c \cdot d)^* + (e + f / d))$	empty
(	$(c + d)^*$	$d$
+	$CC /$	$d$
e	$CC /$	$df$
)	$CC +$	$df /$
*	$+ ) (CC +$	$df / e$
(	$+ ) + CC$	$df / e +$
d	$* ) + CC * C$	$df / e + d$
^	$+ ) + CC * C^$	$df / e + d$



$C(+ -) *$	IH + UF // EDC
$C(+ -) *$	IH + UF // EDCB
$C(+ -) - +$	IH + UF // EDB*
$+ C(+ -) +$	IH + UF // EDCB*/A
$+ (-) +$	IH + UF // EDCB*/A+
$+ (empty)$	IH + UF // EDCB*/A+ +
$* + (empty)$	Prie = ; \ + - + A / * B C D E // F G + H J

$$9) \quad u + \left( \frac{(b_i^*(c))}{b(d-e)} \right) + 4$$

Rev :  $\left( \frac{(e-d)}{(c^* b)} \right) + 4$

Infix ((1+2)) n Stück + - \* / \* Postfix 8

$$(a+g)^{1/2}(c-3+4\ln(1/(H+1))) \approx \text{cmpt}$$

( ) empty

15. *Leucosia* *leucostoma* *leucostoma* *leucostoma* *leucostoma*

空氣淨化器  
淨化率：99.97%  
淨化能力：100m³/h  
適用面積：15-20m²

CCC e

*and* *in* *the* *—* *ed*

11/11/16 - 11/11/16

Ed =

~~HIC~~ + C/C/C Red -

100/100

中華書局影印  
卷之三

CC/C\* Ed-

b)  $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

111001 100

11. *What is the difference between a primary and a secondary market?*

*cd -*

ed - C

*negative*   *negative*   *negative*

Play and ...

Company ed -

Phie : + u / \* bc - de

392+11 = 403 + 11 = 414

卷之三十一

10)  $A + (B * C - (D / E - F) * G) * H$

Rev:  $H * (G * (F - E / D) - ( * B)) + A$

Infix -> Stack H R T S Postfix

$\leftarrow$  empty

H  $\leftarrow$  empty

$\rightarrow$  H

(  $\leftarrow$  H

F G S  $\leftarrow$  ( \* C \* C F F H G

\* F  $\leftarrow$  ( \* C \* C P A H G

C  $\leftarrow$  ( \* C \* C P A H G

F  $\leftarrow$  ( \* C \* C P A H G F

-  $\leftarrow$  ( \* C \* C - P A H G F

S E  $\leftarrow$  ( \* C \* C S - H G F E

I S  $\leftarrow$  ( \* C \* C - P A H G F E

D S  $\leftarrow$  ( \* C \* C - P A H G F E D

)  $\leftarrow$  ( \* C \* C - P A H G F E D / -

-  $\leftarrow$  ( \* C - P A H G F E D / - \*

C F \* + . 2 . C \* C - 1 3 + . 8 . H G F E D / - \* C

\* 5-90 ( \* C - \* H G F E D / - \* C

B C \* S I H G F E D / - \* C B \* -

) C + E S I H G F E D / - \* C B \* - \*

+ C + E S I H G F E D / - \* C B \* - \*

A C + E S I H G F E D / - \* C B \* - \*

Pre: + A \* - \* B C \* . S / D E F G H S

## \* Evaluation of Postfix Expression

$$1) \quad 752 + *418191 -$$

	char	stuck	OP-1	OP-2	Value
1)	7 5 2 + * 4 1 8 1 0 + / -				
	7	7			1
	5	7, 5			
	2	7, 5, 2			
	+	7, 7	7, 5	2	7
*	H	49	7, 7	7	49
	4	49, 4	7, 7		
3	N	49, 4, 1	7, 7		
	H	49, 4, -1	7, 7		
4	+N	49, 4, -2	7, 7	1	2
	H	49, 2 -	7, 4	2	2
	H+N	47	7, 49	2	47
	Any :	47	7, 49		

2) -12, -7, 3, -1, 2, 1, 5, +, \*, +

chan stuck op-1 op-2 2414

3)  $2, 3, 1, *, +, 9, -$   
 char stuck OP-1 OP-2 write  
 $\begin{array}{r} 2 \\ \times 2 \\ \hline 2 \end{array}$        $\begin{array}{r} 2 \\ \times 2 \\ \hline 2 \end{array}$        $\begin{array}{r} 2, 3 \\ \times 2 \\ \hline 2, 3 \end{array}$        $\begin{array}{r} 2, 3, 1 \\ \times 2 \\ \hline 2, 3, 1 \end{array}$   
 $\begin{array}{r} + \\ 3 \\ \hline 5 \end{array}$        $\begin{array}{r} + \\ 1 \\ \hline 5 \end{array}$        $\begin{array}{r} + \\ 9 \\ \hline 14 \end{array}$        $\begin{array}{r} - \\ 4 \\ \hline 5 \end{array}$   
 $\begin{array}{r} - \\ 9 \\ \hline 5 \end{array}$        $\begin{array}{r} - \\ 4 \\ \hline 5 \end{array}$        $\begin{array}{r} - \\ 9 \\ \hline 4 \end{array}$   
 Ans :  $1 = 4$

4)  $5, 6, 2, +, *, 12, 4, /, -$   
 char stuck OP-1 OP-2 write  
 $\begin{array}{r} 5 \\ \times 5 \\ \hline 5 \end{array}$        $\begin{array}{r} 5 \\ \times 5 \\ \hline 5 \end{array}$        $\begin{array}{r} 5, 6, 2, 1 \\ \times 5, 6, 2 \\ \hline 5, 6, 2 \end{array}$        $\begin{array}{r} 5, 6, 2, 1 \\ \times 5, 6, 2 \\ \hline 5, 6, 2 \end{array}$   
 $\begin{array}{r} + \\ 6 \\ \hline 12 \end{array}$        $\begin{array}{r} + \\ 2 \\ \hline 4 \end{array}$        $\begin{array}{r} + \\ 12 \\ \hline 12 \end{array}$        $\begin{array}{r} + \\ 4 \\ \hline 4 \end{array}$   
 $\begin{array}{r} * \\ 5 \\ \hline 25 \end{array}$        $\begin{array}{r} * \\ 5 \\ \hline 25 \end{array}$        $\begin{array}{r} * \\ 5 \\ \hline 25 \end{array}$        $\begin{array}{r} * \\ 5 \\ \hline 25 \end{array}$   
 $\begin{array}{r} / \\ 12 \\ \hline 4 \end{array}$        $\begin{array}{r} / \\ 4 \\ \hline 1 \end{array}$        $\begin{array}{r} / \\ 12 \\ \hline 4 \end{array}$        $\begin{array}{r} / \\ 4 \\ \hline 1 \end{array}$   
 $\begin{array}{r} - \\ 4 \\ \hline 0 \end{array}$        $\begin{array}{r} - \\ 1 \\ \hline 3 \end{array}$        $\begin{array}{r} - \\ 4 \\ \hline 0 \end{array}$        $\begin{array}{r} - \\ 1 \\ \hline 3 \end{array}$   
 $\begin{array}{r} - \\ 12 \\ \hline 37 \end{array}$        $\begin{array}{r} - \\ 12 \\ \hline 37 \end{array}$        $\begin{array}{r} - \\ 12 \\ \hline 37 \end{array}$        $\begin{array}{r} - \\ 12 \\ \hline 37 \end{array}$

5)  $12, 2, 1, 34, 20, -1, +, 5, +$   
 char stuck OP-1 OP-2 write  
 $\begin{array}{r} 12 \\ \times 1 \\ \hline 12 \end{array}$        $\begin{array}{r} 12 \\ \times 2 \\ \hline 12, 2 \end{array}$        $\begin{array}{r} 12 \\ \times 6 \\ \hline 12, 2 \\ 12, 2 \\ \hline 6 \end{array}$        $\begin{array}{r} 12 \\ \times 6 \\ \hline 12, 2 \\ 12, 2 \\ \hline 6 \end{array}$   
 $\begin{array}{r} + \\ 34 \\ \hline 34 \end{array}$        $\begin{array}{r} + \\ 20 \\ \hline 20 \end{array}$        $\begin{array}{r} + \\ 6, 34 \\ \hline 6, 34, 20 \end{array}$        $\begin{array}{r} + \\ 6, 14 \\ \hline 6, 14 \end{array}$   
 $\begin{array}{r} - \\ 1 \\ \hline 34 \end{array}$        $\begin{array}{r} - \\ 1 \\ \hline 21 \end{array}$        $\begin{array}{r} - \\ 21 \\ \hline 34 \end{array}$        $\begin{array}{r} - \\ 21 \\ \hline 34 \end{array}$   
 $\begin{array}{r} - \\ 1 \\ \hline 34 \end{array}$        $\begin{array}{r} - \\ 1 \\ \hline 34 \end{array}$        $\begin{array}{r} - \\ 1 \\ \hline 34 \end{array}$        $\begin{array}{r} - \\ 1 \\ \hline 34 \end{array}$

$$+ \quad 20 \quad - \quad 6 \quad 14 \quad 1 \quad 8.20$$

$$5 \quad 5.10 \quad 20,5.10 \quad 20.5.10$$

$$+ \quad 25 \quad - \quad 20 \quad 5 \quad - \quad 25$$

$$\text{Ans} \rightarrow 25$$

### \* Evaluation of Prefix Expression

1) +, \*, 2, +, /, 14, 12, 5, 1

char      stuck      OP-1 : OP-2      value

1      1      1

5      - : 1, 5 = 5      \* , + , 5 , 2 , 2      ( )

14      1, 5, 2, 14      2

1      1, 5, 7      14      2      2      7

+      1, 12      12      5      12

2      1, 12, 2      2.2      +

\*      1, 24      20      12      \* 24

+      25      24      1      25

Ans : 25

2) - , \*, 6, 3, -4, 1      F.E

char      stuck      OP-1 : OP-2      value

14, 2, +, 1 -      14, 2, +, 1 - 14, 2, +, 1 -

4      1 - 14      1 - 14

-      3      4      1 - 3

3      3, 3      3, 3

6      3, 3, 6      3

\*      3, 18      3, 18

-      15      3, 15

Ans : 15

3) +, +, 2, 6, +, -, 11, 3; 2, 8

char - stuck op-1 op-2 value

-	4	4	3	3
-	2	4, 2	5, 2	5, 2
8	13	4, 2, 13	5, 2, 6, 13	5, 2, 6, 13
-	-	4, 11	23, 8, 5	2
+	15	15	11, 5, 5	4
+	6	15, 6	15, 5	+
-	2	15, 6, 2	15, 5, 2	8
+	+	15, 8	8	42, 8
+	+	23	12, 8	52, 8
			15	- 23

Ans : 23

4) -, 1, \*, 2, \*, 5, +, 3, 6, 5, 2

char stuck op-1 op-2 value

-	2	2	2	2
1	2	2	2	2
2	6	2, 5, 6	2, 5, 6	2, 5, 6
3	3	2, 5, 6, 3	2, 5, 6, 3	2, 5, 6, 3
+	+	2, 5, 9	(8, 3)	6
5	5	2, 5, 9, 5	2, 5, 9, 5	2, 5, 9, 5
*	*	2, 5, 9, 5, 10	2, 5, 9, 5, 10	9
2	2	2, 5, 9, 5, 2	2, 5, 9, 5, 2	45
1	1	2, 5, 9, 5, 2, 2	2, 5, 9, 5, 2, 2	45
5	1	2, 5, 9, 5, 2, 2, 5	2, 5, 9, 5, 2, 2, 5	90
5	-	1, 16, 8, 8, 15, 15, 15, 15, 15, 15	1, 16, 8, 8, 15, 15, 15, 15, 15, 15	16

Ans : 116

5)  $- , * , 3 , + , 8 , 16 , 2 , 14 , 12 , 6 , 5 , 7 , 11 , 18$

char  $\sim 90$  STICK  $\sim 90$  op = 12 op = 21 value

6 6

12 6, 12

1 2 12 8, 5, 16

11 2 5 2, 2, 85

16 1 2, 2, 16

+ 2, 14 16 2, 21 2 21

3 2, 14, 3 5, 3, 21 18

\* 2 2, 54 3 3 2, 21 18 + 54

80 - 21 8, 52 8 54 85 2 + 52

Ans : 52

\* Searching + 2, 5, 8, \* 1 - (L)

Binary Search (L+R)

[2, 5, 8, 12, 16, 23, 34, 56, 72, 91]

$\downarrow$  2, 5  $\downarrow$

L 8 R

MID =  $(L+R)/2$  P, A, S

2, 5 2, 2, 8

curr [5] < 23

2, 5 2, 2, 8

Ans : [2, 5, 8, 12, 16, 23, 34, 56, 72, 91]

$\downarrow$  R

curr [6] = 23 > 1

element found at 6.

- Sorting :

A [45, 20, 25, 10, 55, 60, 16, 5, 32, 49, 11]

→ Selection Sort : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-1 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-2 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-3 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-4 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-5 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-6 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-7 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-8 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-9 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-10 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-11 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-12 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-13 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-14 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-15 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-16 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-17 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-18 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-19 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-20 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-21 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-22 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-23 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-24 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-25 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-26 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-27 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-28 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-29 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-30 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-31 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-32 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-33 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-34 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-35 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-36 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-37 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

S-38 : 5, 10, 20, 25, 45, 55, 60, 16, 32, 49, 11

Bubble Sort :

S-1 : 20, 25, 10, 5, 45, 60, 32, 65, 11, 89  
 S-2 : 20, 10, 5, 25, 45, 32, 60, 11, 65, 89  
 S-3 : 10, 5, 20, 25, 32, 45, 11, 60, 65, 89  
 S-4 : 5, 10, 20, 25, 32, 11, 45, 60, 65, 89  
 S-5 : 5, 10, 4, 20, 25, 32, 45, 60, 65, 89

Insertion Sort :

S-1 : 20, 45, 25, 10, 5, 60, 65, 32, 89, 11  
 S-2 : 5, 20, 45, 25, 10, 60, 65, 32, 89, 11  
 S-3 : 5, 20, 11, 20, 25, 45, 60, 65, 32, 89  
 S-4 : 5, 10, 11, 20, 25, 32, 45, 60, 65, 89

Shell Sort :

S-1 : 45, 20, 25, 10, 5, 60, 65, 32, 89, 11

*not sweep*

S-2 : 45, 20, 25, 10, 5, 11, 65, 32, 89, 60

*sweep*

S-3 : 5, 11, 25, 10, 45, 20, 65, 32, 89, 60

S-4 : 5, 11, 25, 10, 45, 20, 65, 32, 89, 60

S-5 : 5, 10, 11, 25, 20, 45, 65, 60, 32, 89

S-6 : 5, 10, 11, 20, 25, 32, 45, 60, 65, 89

merge sort :

A : 45, 20, 25, 10, 5, 60, 65, 32, 89, 11

45, 10, 25, 10, 5, 60, 65, 32, 89, 11

45, 20, 25, 10, 5, 60, 65, 32, 89, 11

now sorting

10, 45, 5, 10, 25, 60, 65, 11, 32, 89

5, 10, 20, 25, 45, 11, 32, 60, 65, 89

5, 10, 11, 20, 25, 32, 45, 60, 65, 89

\* Quick Sort :

A [45, 20, 25, 10, 5, 60, 65, 32, 89, 11]

(Pivot) LB UB

Pivot LB

UB

S-1 : 20, 25, 10, 5, 32, 11, 45, 60, 65, 89

↑ ↓

Pivot LB

UB

S-2 : 11, 10, 5, 20, 25, 32, 45, 60, 65, 89

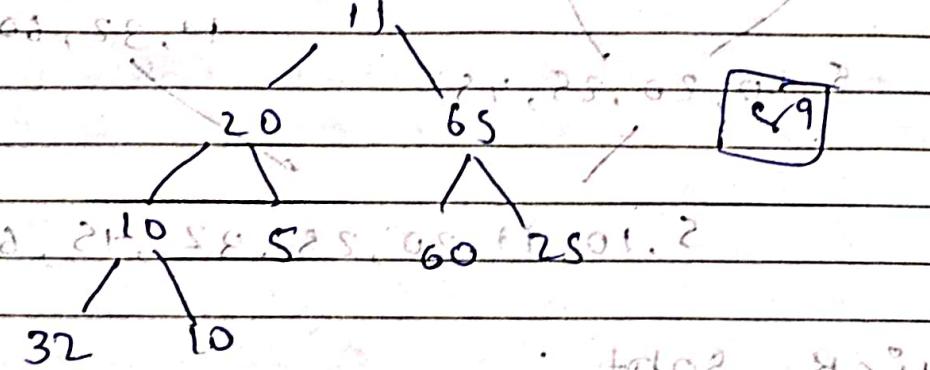
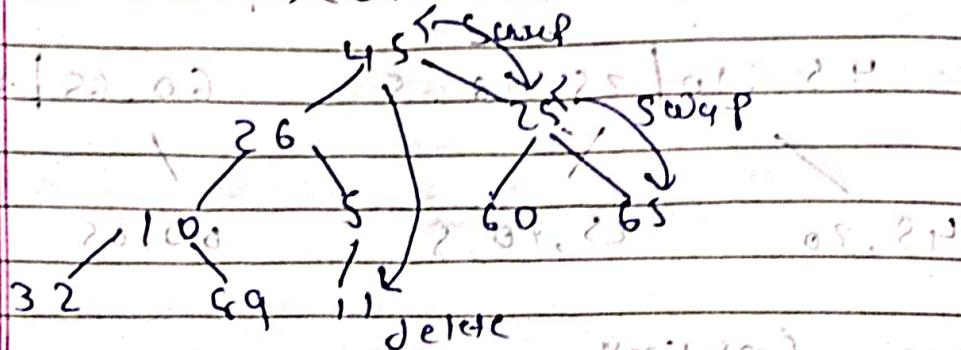
↓ ↓ ↓

Pivot LB UB

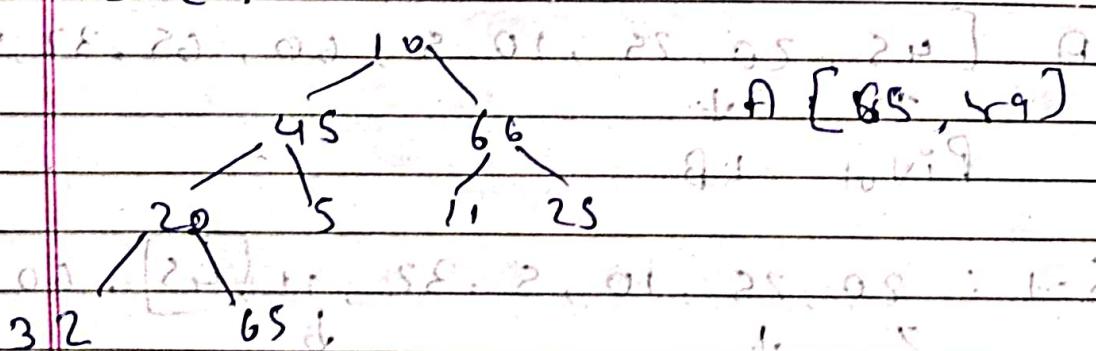
S-3 : 5, 10, 11, 20, 25, 32, 45, 60, 65, 89

- Heap sort:

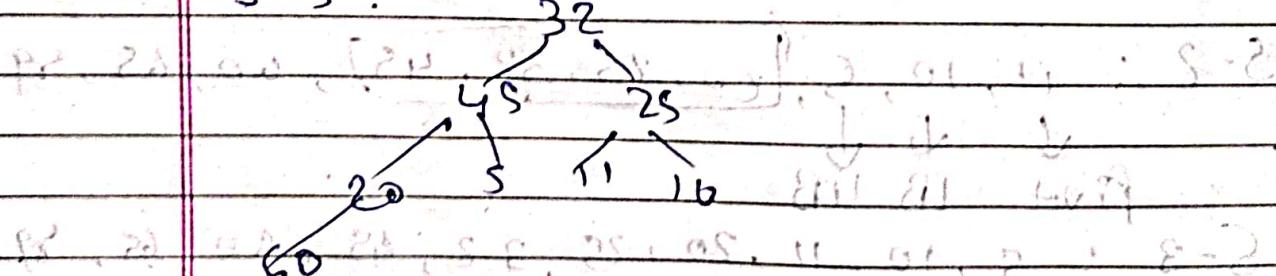
A [45, 20, 25, 10, 5, 60, 65, 32, 49, 11]



S-2:



S-3:



S-4 : 10  
37  
20 5 11 45

S-5 : 11  
20  
16 5 32

S-6 : 5  
20 11  
10 25

S-7 : 5  
10 11  
20

S-8 : 5  
10 11

S-9 : 5  
10

S-10 :

A [5, 10, 11, 20, 25, 32, 45, 60,  
63, 89]