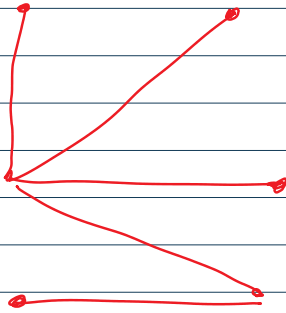


"TREES".

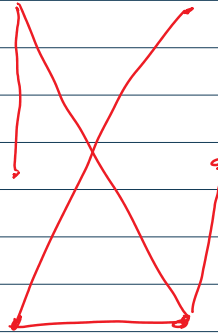
- 1- Connected
- 2- Undirected
- 3- No Simple Circuit.

Ex 1
1824



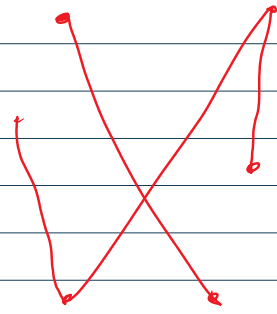
(a)

✓



(b)

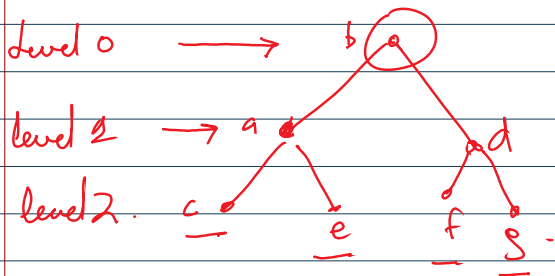
✓



(c)

X

Rooted Tree:-
 1) A Single Vertex designated as root.
 2) Every Edge is directed away from Root.



A Simple path exist btw every pair of Vertices which is Unique.

parent → Unique, one level less.

child → many, one level more.

Sibling → Same level, Same parent.

Ancestor →

Descendant →

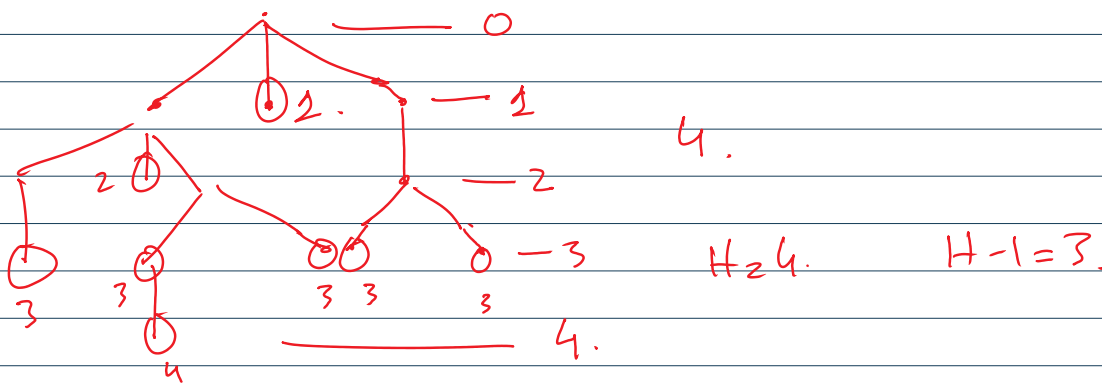
Right child \rightarrow

left child \rightarrow the at the left of the parent.
leaf. \Rightarrow No further child.

level.

height: Highest level of any vertex.

Balance. H , (H or $H-1$) all leaves.



Ex 3
627.

m-ary tree.

2-ary tree.

3-ary tree.



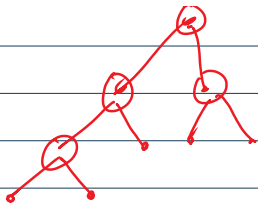
5-ary.

full m-ary tree.

full-2-ary tree.



124.



full-2-ary tree.
full-Binary tree

Theorem 2 :- A tree with n vertices has $n-1$ edges.
630

Theorem 3 :- A full m -ary tree with i internal vertices contains $n \geq mi + 1$ vertices.
 $\geq 2 \times 4 + 1 \geq 9$.

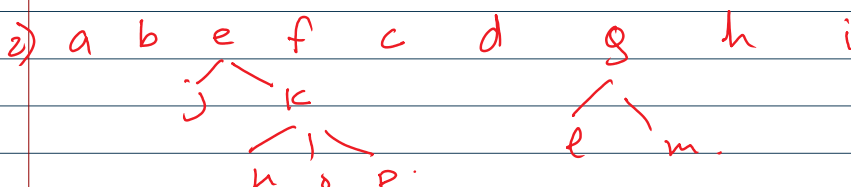
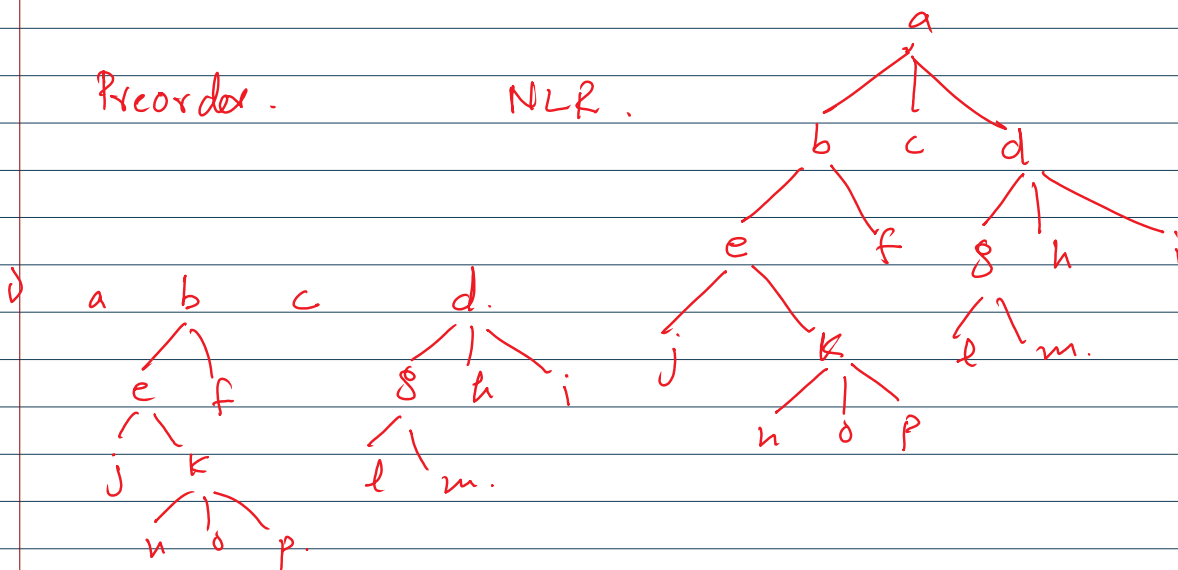
Ex 633
(1-40).

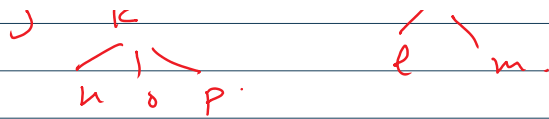
Applications. later on.


Tree traversal.

Preorder.

NLR.

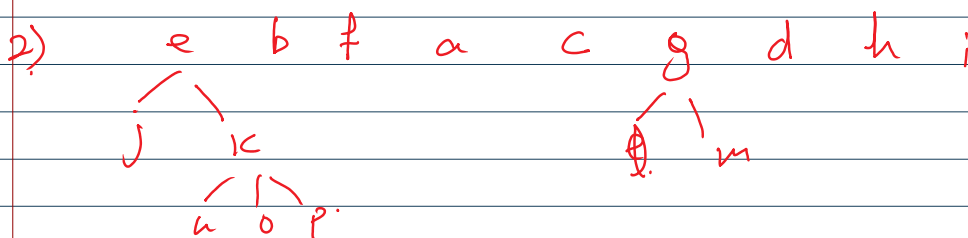
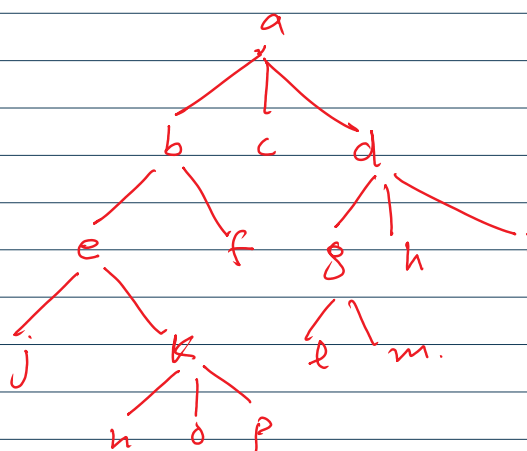
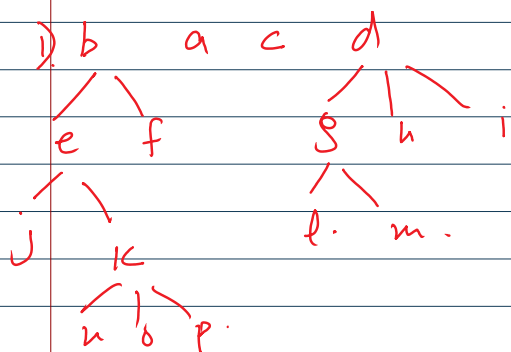


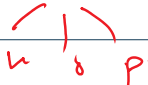


3) a b e j k f c d g l m h i


4) a b e j k n o p f c d g l m h i

Inorder. LNR.
 LN(L-P).



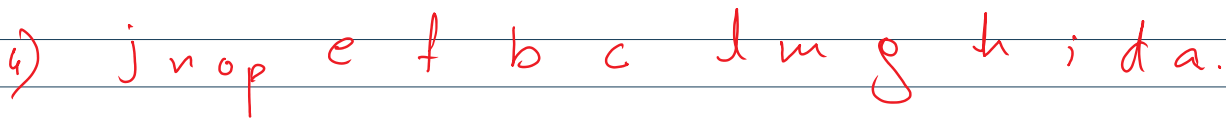
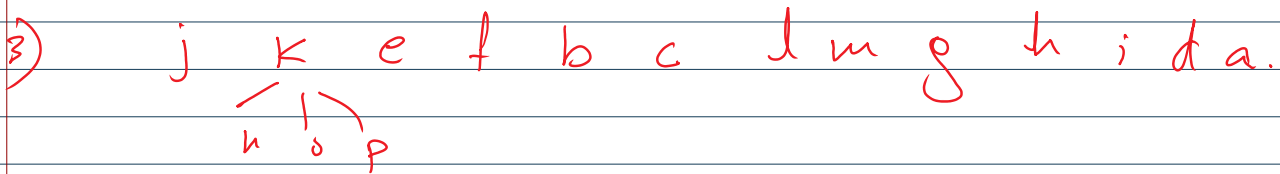
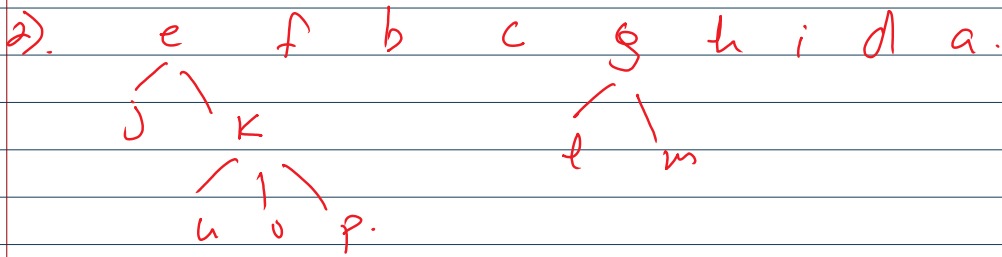
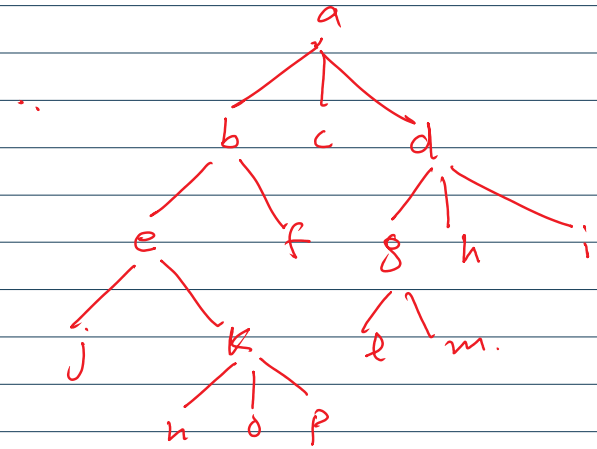
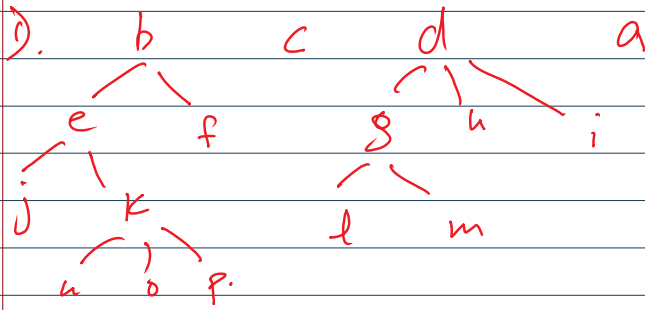
3) j e k b f a c l g m d h i


4) j e n k o p b f a c l g m d h i.

Pre order. NLR.
 Inorder LNR.
 Post order. LRN.

a

In order LNR.
 Post order. LRN.

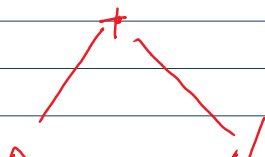


Tree traversal Application.

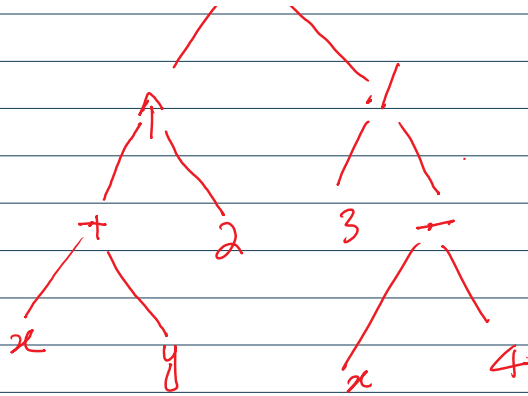
Evaluating Expressions.

- operators.
- operands.

Exs: $((x+y)^2) + ((x-4)/3)$



Preorder = Prefix form
 Inorder = Infix form
 Post order = Post form



In order = Infix
 Post order = Post from Reverse Polish

Ex7 :-
 P658

+ - * 2 3 5 % ↑ 2 3 4.

Prefix = Preorder
 = Polish.

+ - * 2 3 5 % 8 4

+ - * 2 3 5 2

+ - 6 5 2.

+ 1 2
 3.

Ex8
 659

7 2 3 * - 4 ↑ 9 3 1 +.

Postfix = Postorder.
 = Reverse Polish.

7 6 - 4 ↑ 9 3 1 +.

1 4 ↑ 9 3 1 +.

1 9 3 1 +.

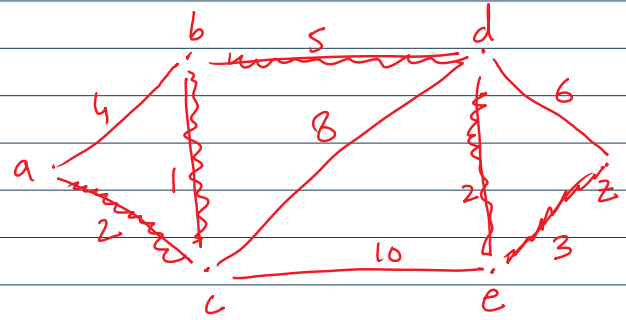
1 3 +
 4.

(P660-662) Ex:-
 1-40

Dijkstra algorithm.

a to z.

(13.)



	a	b	c	d	e	z	
	∞	∞	∞	∞	∞	∞	
a	0a	4a	2a	∞	∞	∞	acbde z
c	0a	3c	2a	10c	12c	∞	
b	0a	3c	2a	8b	12c	∞	
d	0a	3c	2a	8b	10d	14d	
e	0a	3c	2a	8b	10d	13e	

p 593 Ex.
(1 - 40)