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Tree Revision

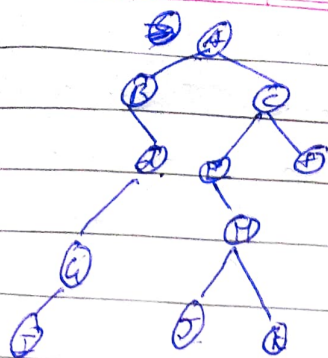
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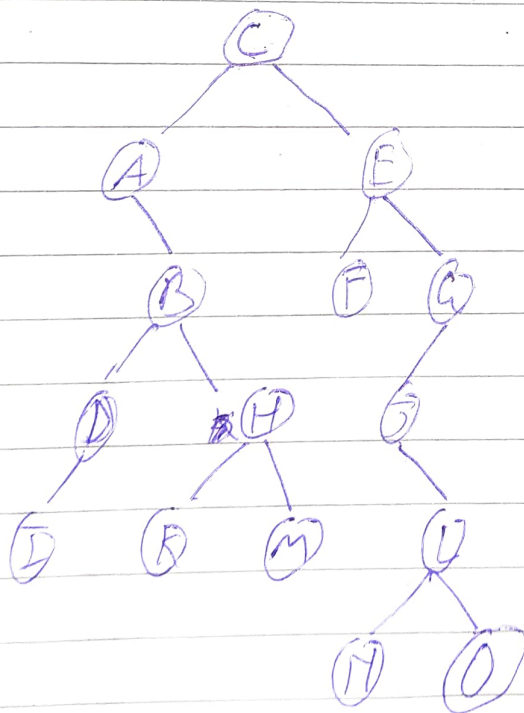
Q 1

- (1) node with outdegree 0 are called as leaves.
- (2) The children of ~~A~~ D is G.
- (3) Depth of node D is 1 as it is ~~the~~ child of root node
- (4) Height of node D is 1.
- (5) The degree of node G is ~~4~~ 4
- (6) ~~A~~ node A and node D are the ancestors of node G.
- (7) Descendants of node G are node J, K, L, M, O, P.
- (8) Nodes at level 3 are E, F, G.
- (9) The height of ~~a~~ the tree is ~~5~~ 4
- (10) Depth of binary tree is 4

Q2



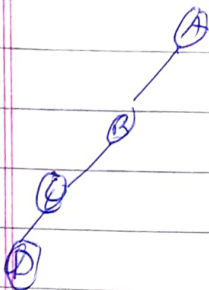
- (i) Pre order : $\&$ VLR.
- A B D G I C E H J K F
- (ii) Post order :- LRV :-
I G D B J K H E F C A
- (iii) In order :- LVR.
B I G D A E J K H C F
- (3) pre order :- C A B D I H K M E F G J L M O \rightarrow VLR
In order :- A I D B K H M C F E J H L O G \rightarrow LVR.
Left tree Right tree.
- \therefore Root node = C



Q 4

The height of a binary tree with nodes n is defined as the longest path between the root node and the leaf node.

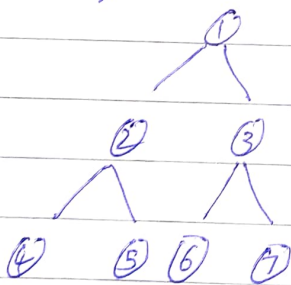
The maximum height is achieved when there are ~~are~~ only right node i.e. out degree of each node is 1



Here the Height of tree is $h = n - 1$.

7.

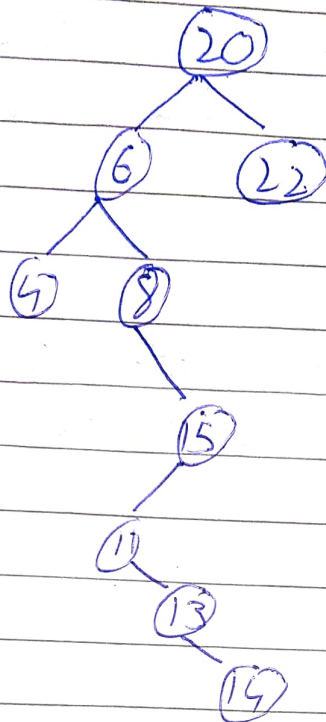
The minimum height is achieved when the tree is complete or almost complete binary tree



Here the Height of tree is

$$h = \text{floor}(\log_2 n)$$

(5) 20 6 4 8 15 22 11 13 14



Inorder traversal :- LVR.

4 6 8 15 13 14 15 20 22.

Reverse Inorder traversal :- RVL

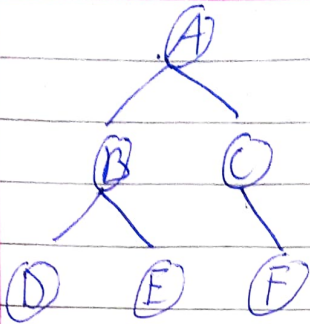
22 20 15 14 13 11 8 6 4.

From this we observe that inorder traversal gives the elements in ascending order.

And that reverse inorder traversal gives the elements in descending order.

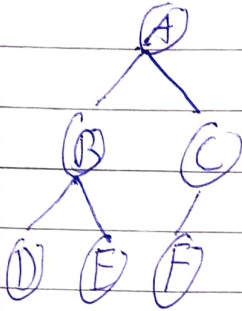
(6)

(1)



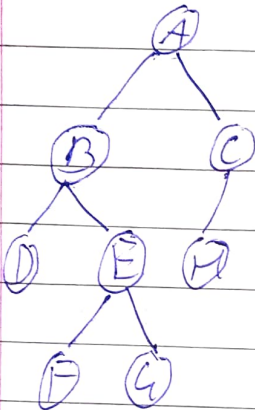
→ Not strictly Binary Tree
→ Not Almost Complete Binary Tree.

(2)



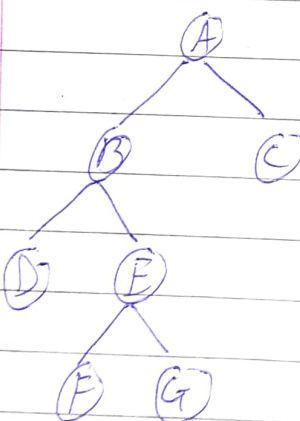
→ Not strictly Binary tree
→ Almost Complete Binary tree

(3)



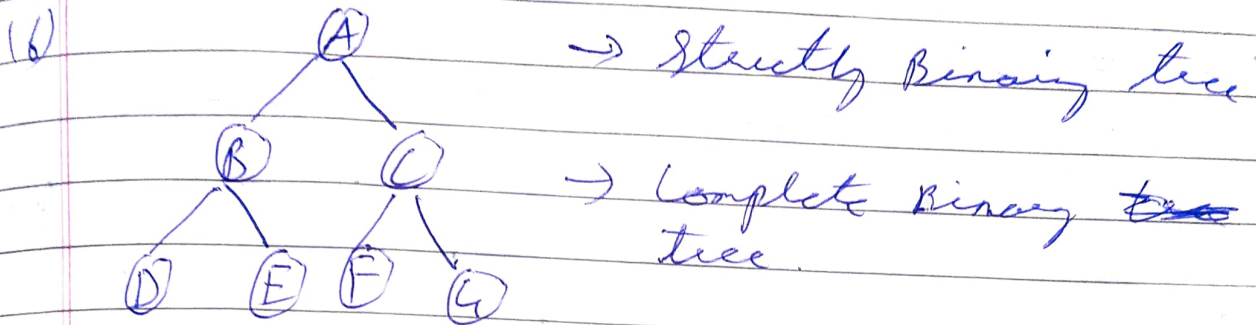
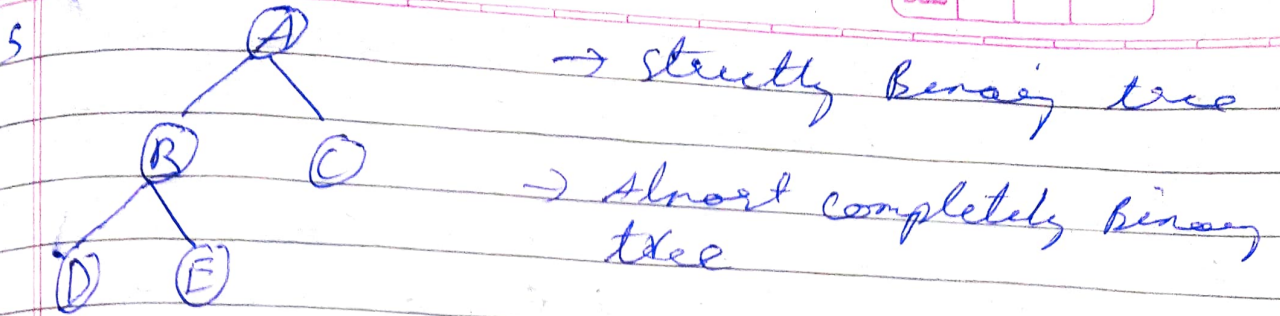
→ Not strictly Binary tree
→ Not Almost Completely Binary tree

(4)



→ Strictly Binary Tree.

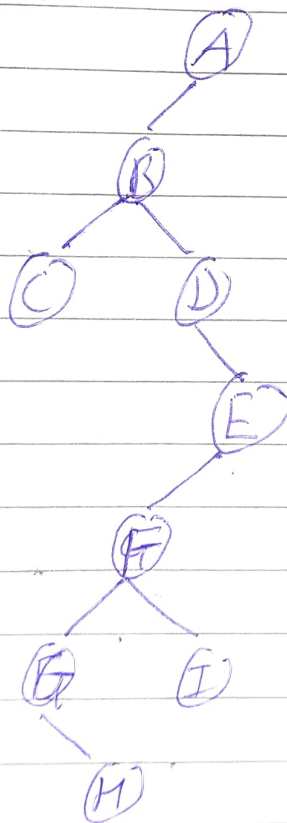
→ Not Almost Completely Binary Tree.



Q7 Construct Binary Tree.

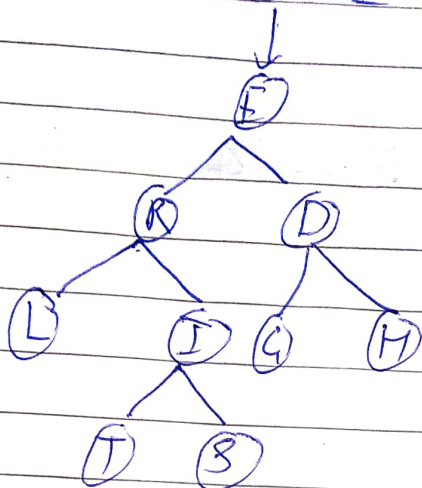
Pre order:- A B C D E F G H I

Post order:- C H F I G E D B A



Q8

Tree 1



Static Implementation using Array.

E	R	D	L	I	G	H	-	-	T	S
---	---	---	---	---	---	---	---	---	---	---

Q9 VLRft descendants of E:-
R L I T S

(i) Right descendants of E:-
D G H

(ii) Right descendants of R:-
I T S

(iv) Left Descendants of D:-
G