

④ In step ④ we have to define a new node having name 'z'.

⑤ step ⑤ and step ⑥ are used to remove the two lowest frequency character from the queue and assign it as left and right child of new node z.

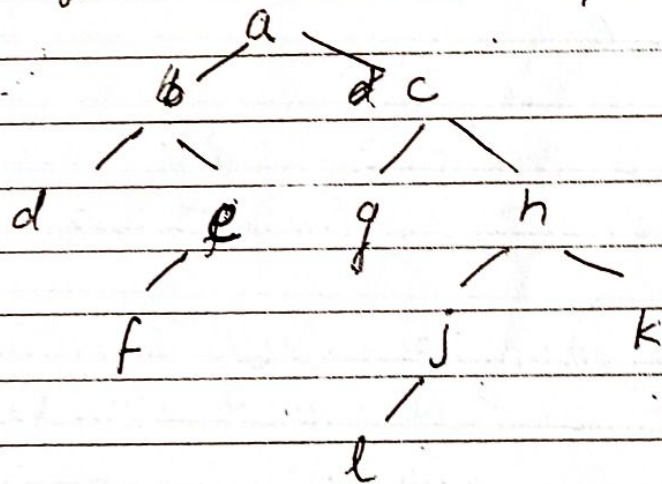
⑥ In step ⑥ the addition of frequency of x and y nodes is assigned to new node z.

⑦ In step ⑦ the new node will be inserted into the queue and step ⑧ will return the designed tree as output.

● Design a Tree from the given inorder and preorder Traversing :-

Ex →

Preorder :- a b d e f c g h j l k
In order :- d b f e a g c l j h k
 left subtree root right subtree



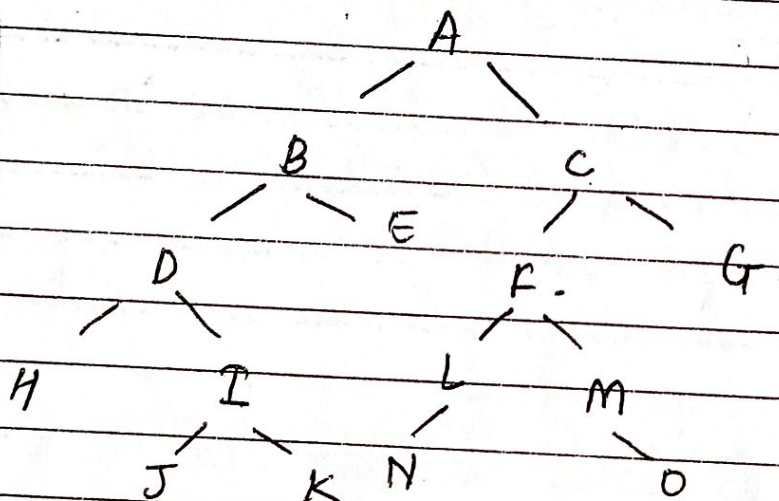
Another :- dbfeagcljnk

Preorder :- a b d e f c g h j l k

→ same sequence ←

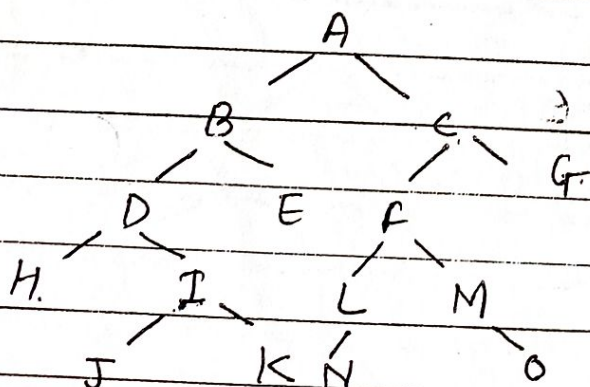
Ques) Preorder :- A B D H I J K E C F L N M O G

Inorder :- H D J I K B E A N L F M O C G



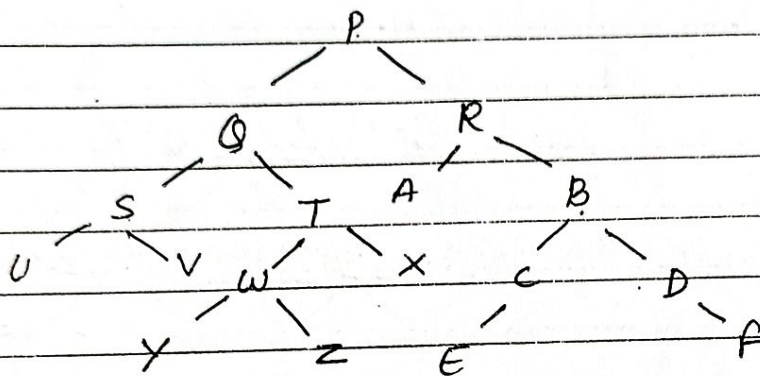
Ques) Preorder :- A B D H I J K E C F L N M O G

Inorder :- H D J I K B E A N L F M O C G



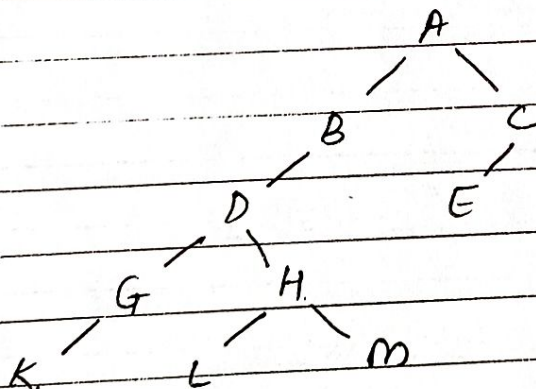
Ques) Preorder:- P Q S U V T W Y Z X R A B C E D F

Inorder:- U S V Q Y W Z T X P A R E C B D F



Ques) Preorder:- A B D G K H L M C E

Inorder:- K G D L H M B A E C

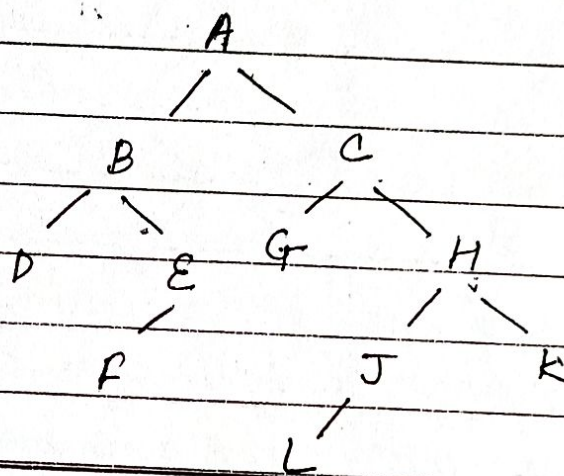


• Construct a binary tree from the given postorder and inorder series :-

Ques) Postorder :- D F E B G L J K H C A

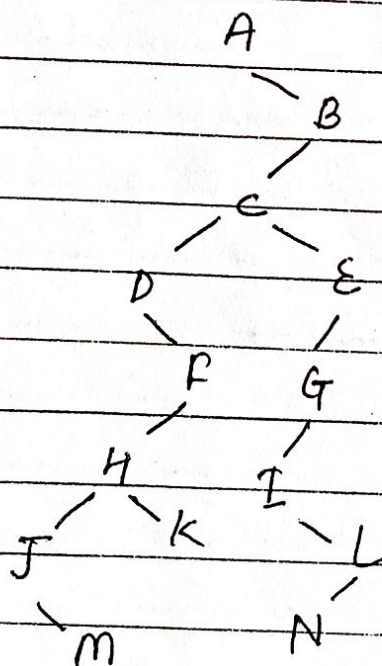
Inorder :- D B F E A G C L J H K

Tree :-



Ques) Preorder: A B C D F H J M K E G I L N

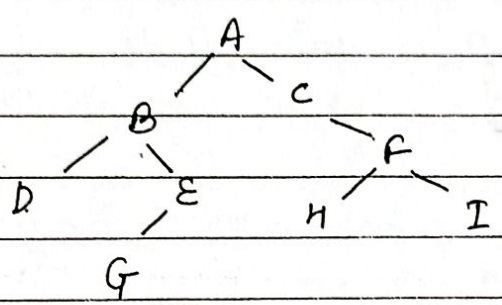
Inorder: A D J M H K F C I N L G E B





Ques) Postorder: DGEBHI FCA

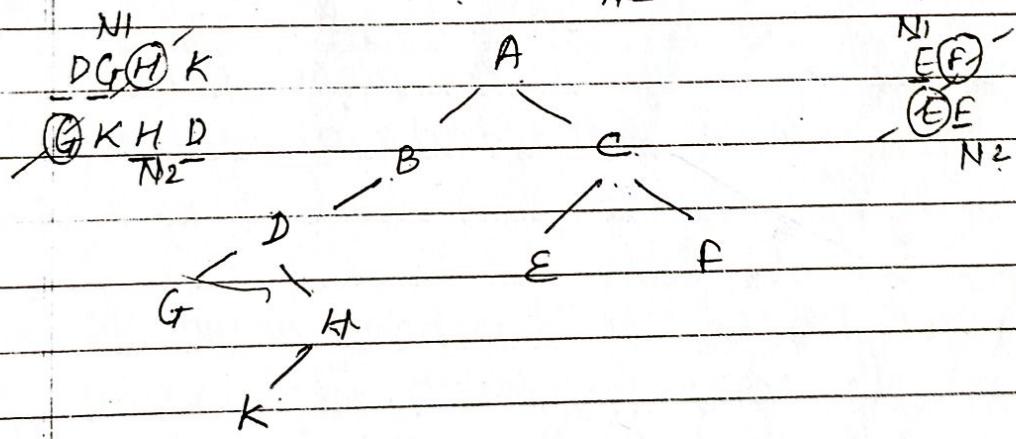
Inorder: DBGEA CHFI



- Preorder and Postorder:- Trees may be different

Ques) Preorder:- ^{N1}A B D G H K (E) F

Postorder:- G K H D (B) E F C A _{N2}



→ Rules to construct a binary tree from a given preorder and postorder sequence:-

- ① Rule 1:- The first node in the preorder traversal sequence and last node of the postorder sequence will be considered as root node.

(ii) Rule-2:- Find out the successor of root node in pre order sequence (N_1) and predecessor of root node in post order sequence (N_2).

a) If $N_1 = N_2$, then this node is considered either as left or as right child of the root node.

(For this reason sometimes a unique binary tree cannot be designed).

b) If $N_1 \neq N_2$, then N_1 is considered as left child and N_2 as right child of root node.

(iii) Rule 3:- Find the position of N_2 and N_1 in pre order and post order sequence respectively.

Now, consider the two sets of pre order and post order sequence of left and right subtree of the root.

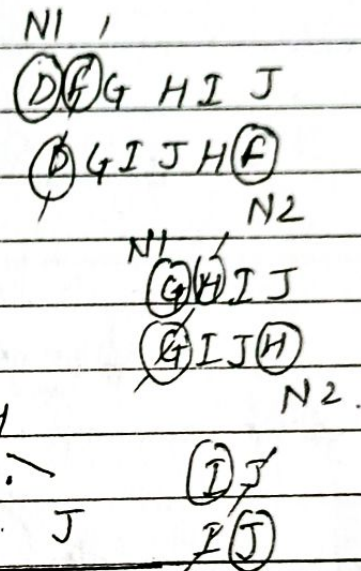
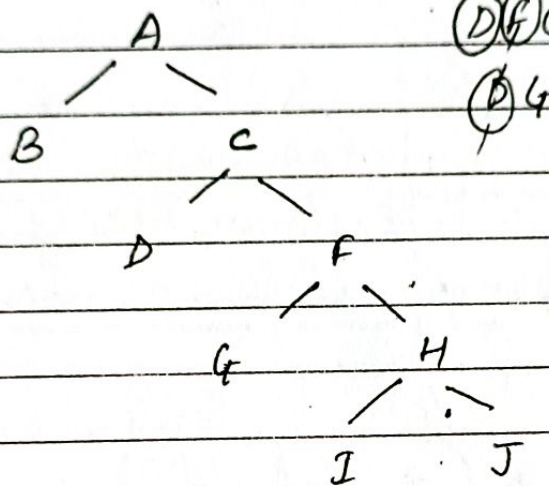
The first set is the nodes appear after N_1 and before N_2 in pre-order ^{sequence} traversal and the nodes precede to node N_1 in post order sequence.

The second set is the nodes appear after N_2 in pre order sequence and nodes in between N_1 and N_2 in post order sequence.

(10) Repeat the entire step until the tree is constructed.

Que) Preorder:- ^{N1 /} A B C D F G H I J

Post order:- A D G I J H F C A
N2



● Extended Binary Trees:- or 2-tree:-

- Extended binary tree is sometimes called as 2-tree.
- In extended binary tree an internal node is defined as a node that is having 2 children and it is represented by using a circle.
- An external node will be represented as a square.
- The expression tree is a perfect example of extended binary tree in which operands are denoted by the external nodes and operators are denoted by the internal nodes.