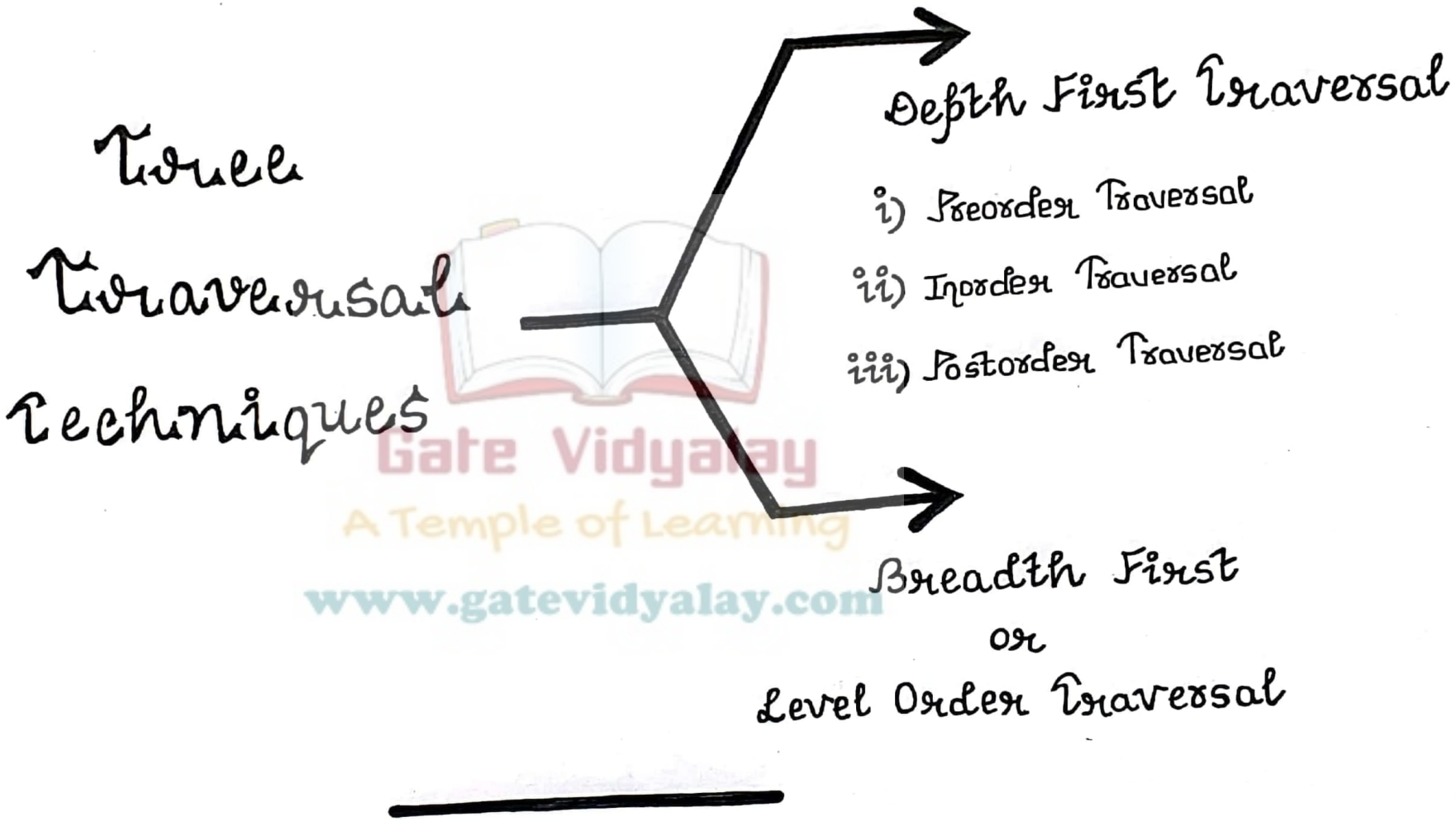
Binary Trees

Tree Traversal:

Tree traversal refers to the process of visiting each node in a tree data structure exactly once.



I) Preorder Traversal :

Algorithm:

i) Visit the root

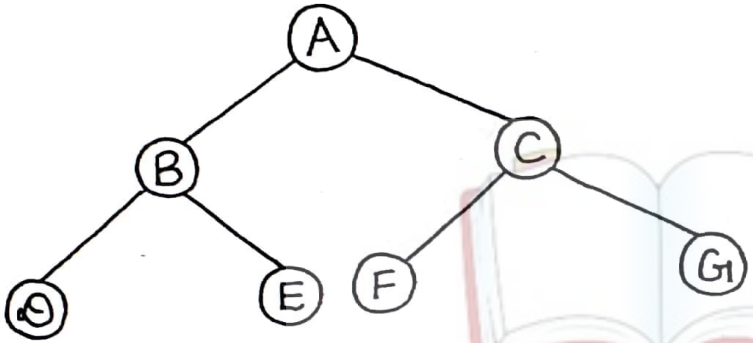
ii) Traverse the left subtree i.e. call Preorder (left subtree)

iii) Traverse the right subtree i.e. call Preorder (Right subtree)

Remember:

Root → Left → Right

Example:

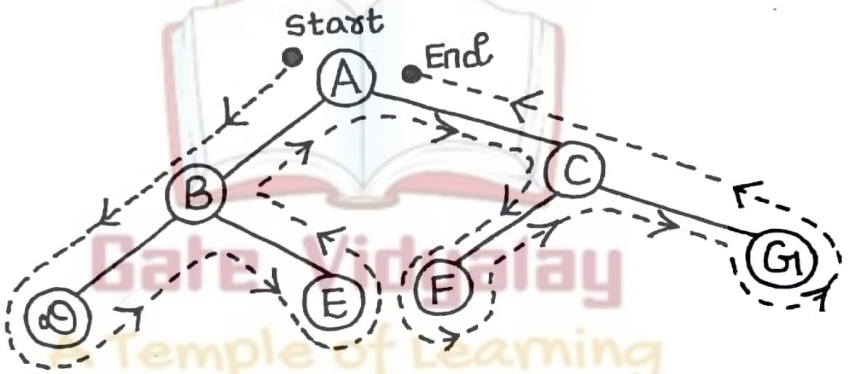


Binary Tree

Preorder Traversal: A B D E C F G1

Shortcut for Preorder Traversal :

Just traverse the entire tree starting from the root node keeping yourself to the left.



∴ Preorder Traversal = A B D E C F G1

II) In order Traversal:

Algorithm:

i) Traverse the left subtree i.e. call Inorder (left-subtree)

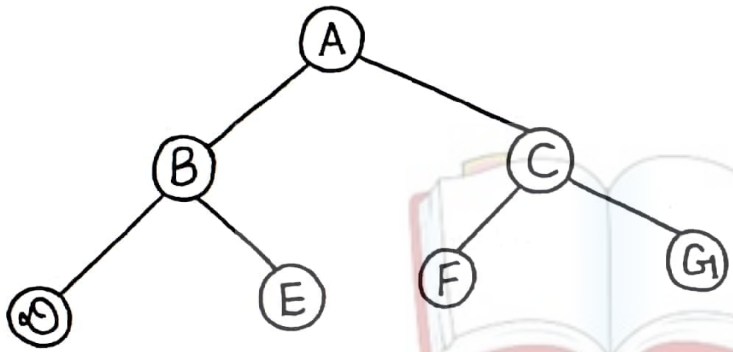
ii) visit the root

iii) Traverse the right subtree i.e. call Inorder (right-subtree)

Remember:

Left → Root → Right

Example :

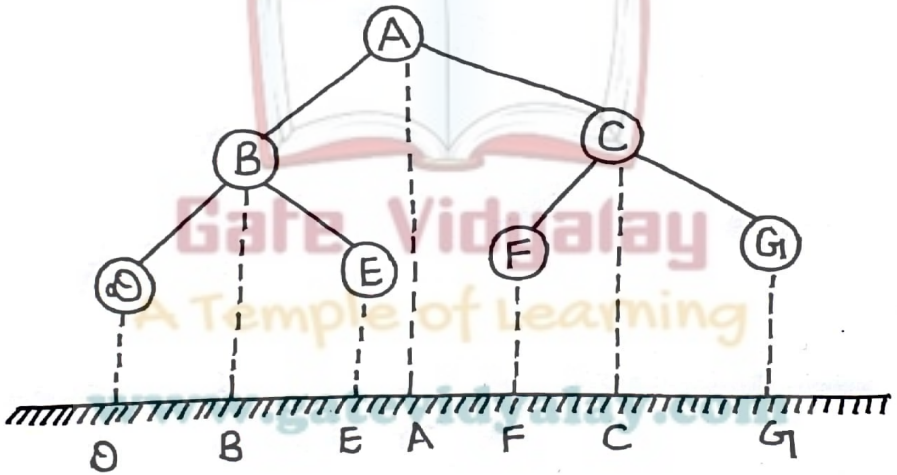


Binary Tree

Inorder Traversal : D B E A F C G

Shortcut for Inorder Traversal :

Just keep a plane mirror horizontally at the bottom of the tree and take the projection of all nodes.



∴ Inorder Traversal = D B E A F C G

iii) Postorder Traversal:

Algorithm:

i) Traverse the left subtree i.e. call Postorder (Left subtree)

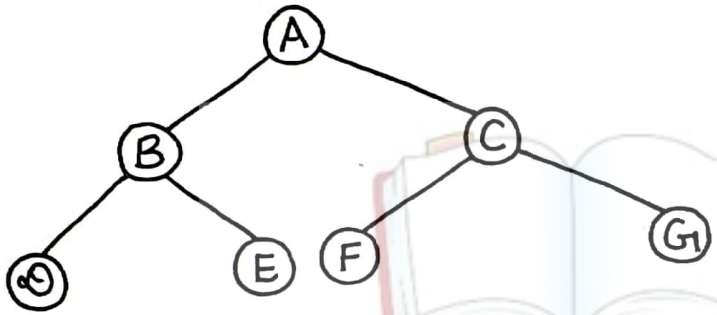
ii) Traverse the right subtree i.e. call Postorder (Right subtree)

iii) visit the root

Remember:

Left → Right → Root

Example :

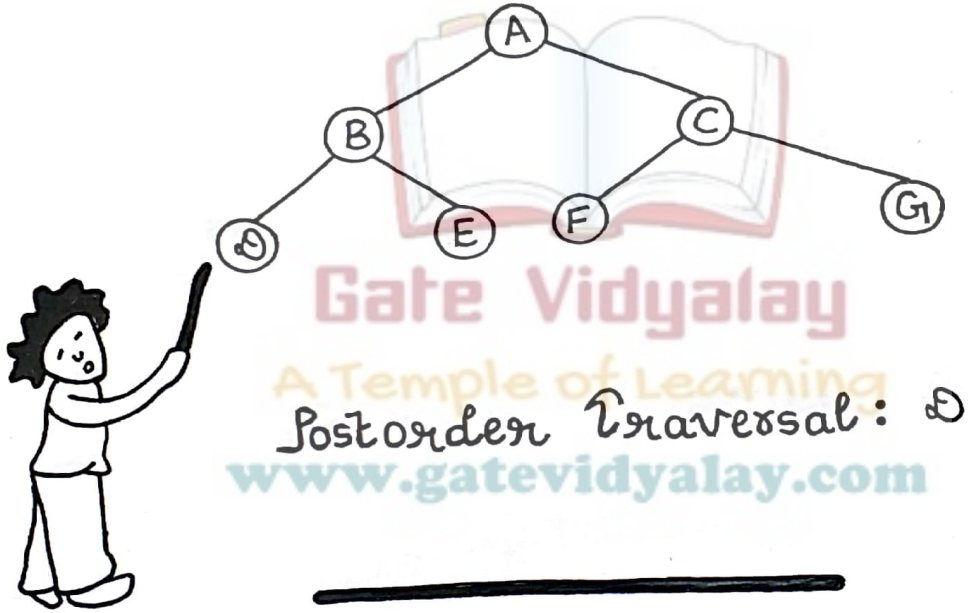


Binary Tree

Postorder Traversal : D E B F G C A

Shortcut for Postorder Traversal:

Just pluck the leftmost leaf nodes one by one.

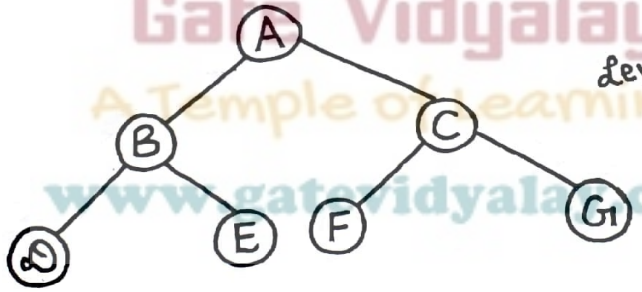


Postorder Traversal: D E B F G C A

iv) Level Order Traversal:

- Level Order Traversal of a tree is the breadth first traversal of a tree which prints all the nodes of a tree level by level.

- **Example:**



Level order Traversal :

A B C D E F G1

Important Points for exam:

- Preorder traversal is used to get prefix expression of an expression tree.
- Inorder traversal is used to get infix expression of an expression tree.
- Postorder traversal is used to get postfix expression of an expression tree.
- Preorder traversal is used to create a copy of the tree.
- Postorder traversal is used to delete the tree.
- Level order traversal prints the data in the same order as it is stored in the array representation of complete binary tree.