

* Tree Traversal :-

- Traversal means visiting, accessing all the nodes present in the tree exactly once.
- Tree has various ways to traverse or visit each node.
- The following are the three different ways of traversal :-
 - In order
 - Pre order
 - Post order

1. Pre-order traversal :-

In this traversal method, the root node is processed first, then the left sub tree and then the right sub-tree.

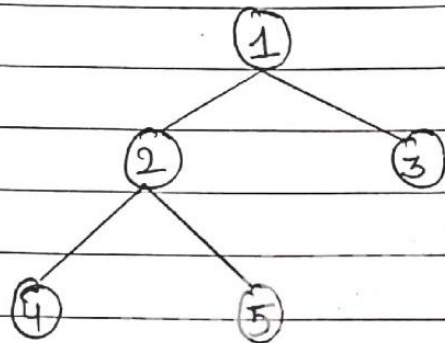
i.e. \rightarrow Root Left Right

- Visit the Root node.
- Traverse the left sub tree
- Traverse the Right sub tree.

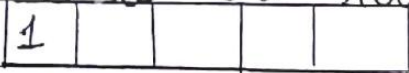
Algorithm Pre order (tree):-

1. Visit the root.
2. Traverse the left sub tree i.e.
call Preorder (left-sub tree)
3. Traverse the right sub tree i.e.
call preorder (right-sub tree)

Example:-



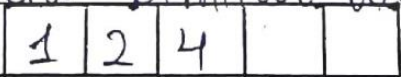
→ node ① is the root node, so it gets printed.



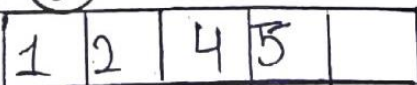
→ Once the root node is traversed, we move to the left sub tree.



→ In the similar way ④



→ Visit ⑤



→ Then move to right part of root node.



Preorder:- 1 2 4 5 3

② Inorder Traversal :-

In this method of traversal, left sub tree of root is processed first and then the root is processed, after that right sub tree is processed.

(i) Process the left sub tree in in-order.

(ii) Visit the root node.

(iii) Process the right sub tree in in-order.

i.e. Left Root Right

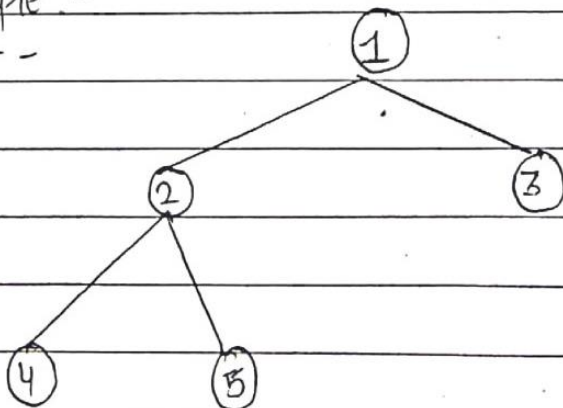
Algorithm

1. Traverse the left sub-tree i.e. Inorder (left-subtree)

2. Visit the root.

3. Traverse the right sub-tree i.e. Inorder (right-subtree)

Example :-



→

4				
---	--	--	--	--

 left sub-tree

→

4	2			
---	---	--	--	--

→

4	2	5		
---	---	---	--	--

→

4	2	5	1	
---	---	---	---	--

 (1 is root node)

→

4	2	5	1	3
---	---	---	---	---

 (3 is Right sub-tree)
Inorder = 4 2 5 1 3

③ Post-Order Traversal :-

- In this, method of traversal, left subtree of root node is processed first and then right subtree is processed and after that root node is processed.

ie.

Left	Right	Root
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(i) Process the left subtree in post order.

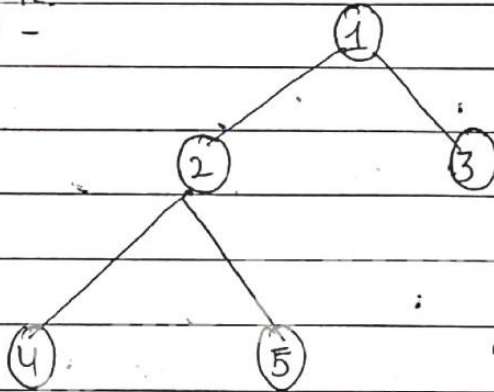
(ii) Process the right subtree.

(iii) Visit the root node.

Algorithm :-

1. Traverse the left sub tree i.e. (left subtree)
2. Traverse the right sub tree i.e. (right subtree)
3. Visit the root.

Example :-



4				
---	--	--	--	--

4	5			
---	---	--	--	--

4	5	2		
---	---	---	--	--

4	5	2	3	
---	---	---	---	--

4	5	2	3	1
---	---	---	---	---

Post order :- 4, 5, 2, 3, 1