

Function:

Preorder (Pseudocode) (N-L-R)

Print
Void Preorder (TreeNode *r)

1) If $r == \text{null}$ \rightarrow Return (stop)

2) Print $r \rightarrow \text{value}$

3) Print Preorder($r \rightarrow \text{left}$)

4) Print Preorder($r \rightarrow \text{right}$)

• Access value + Print

• Recursive (access val + Print)

• Recursive (access val + Print)

Function:

In-order (Pseudocode) (L-N-R)

Print
Void Inorder (TreeNode *r)

1) If $r == \text{null}$ \rightarrow return (stop)

2) In-order($r \rightarrow \text{left}$)

3) Print $r \rightarrow \text{value}$

4) In-order($r \rightarrow \text{right}$)

• Recursive (until null, then

• Access value + Print

• Recursive

Function:

Post-order (Pseudocode) (L-R-N)

Void Postorder (TreeNode *r)

1) If $r == \text{null}$ \rightarrow return (stop)

2) Postorder($r \rightarrow \text{left}$)

3) Postorder($r \rightarrow \text{right}$)

4) print $r \rightarrow \text{value}$

recursive (Till left = null)

recursive (Till right = null)

Delete Pseudocode

- 1) IF $r \neq \text{null}$
 - ↳ return r
 - 2) Else if $v < r \rightarrow \text{value}$ // if val smaller go left
 - ↳ $r \rightarrow \text{left} = \text{delete Node}(r \rightarrow \text{left}, v)$
 - 3) Else if $v > r \rightarrow \text{value}$ // if val larger go right
 - ↳ $r \rightarrow \text{right} = \text{delete Node}(r \rightarrow \text{right}, v)$
 - 4) Else // if value matches
 - ↳ if $r \rightarrow \text{left} \neq \text{null}$ // node w/ child right child
 - ↳ $\text{temp} = r \rightarrow \text{right}$
 - ↳ delete r
 - ↳ return temp
 - ↳ Else if $r \rightarrow \text{right} \neq \text{null}$ // node w/ only left child
 - ↳ $\text{temp} = r \rightarrow \text{left}$
 - ↳ delete r
 - ↳ return temp
 - ↳ Else
 - ↳ $\text{temp} = \text{min right val node}(r \rightarrow \text{right})$
 - ↳ $r \rightarrow \text{value} = \text{temp} \rightarrow \text{value}$
 - ↳ $r \rightarrow \text{right} = \text{delete Node}(r \rightarrow \text{right}, \text{temp} \rightarrow \text{value})$
- return r

Tests

Insert_Node :

- ① Insert duplicate values; Should prompt user to reenter
- ② Insert Node \rightarrow value $>$ root \rightarrow value; Should create a left and right subtree.

Search_Node :

- ① Search for node \rightarrow value that doesn't exist; Should prompt that val does not exist

Delete_Node :

- ① Delete root node \rightarrow value; root \rightarrow value should be replaced by min val on right subtree.

Pre-order_Print :

\hookrightarrow 77, 56, 45, 57, 90, 89, 98

In-order_Prints

\hookrightarrow 45, 56, 57, 77, 89, 90, 98

Post-order_Print :

45, 57, 56, 89, 90, 98

