Tutorial 08

(1) What are the three types of Depth First Traversal (DFT)?

V → Visiting a node
L → Traversing the left sub tree if any
R → Traversing the right sub tree if any

VLR (preorder)
LVR (inorder)
LRV (postorder)

(2) Briefly explain the identified traversal methods.

preorder :- Start from the root visit the node first, then move to the left as possible and then to the right child up until the first crossroad and repeat the VLR process.

postorder :- Start from the root move to the left as far as possible and then to the right and finally point the value ones the L and R traversing is over.

inorder :- Start from the root traverse the left sub tree as far as possible then visit the node traverse the right child up until the first crossroad and repeat the LVR process again.

(3) Explain the terms used in trees.

node :- Fundamental building block storing data and forming the structure of the tree

root :- topmost node serving as the starting point of the tree.

parent :- node with connected child nodes below it.

child :- nodes directly connected below a parent node

siblings :- nodes sharing the same parent

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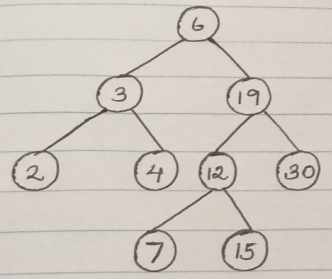
leaf (terminal node) :- node with no children
internal node (non-terminal node) :- node with at least one child
sub tree :- Smaller tree within the main tree, formed by a node and its descendants.
depth :- number of edges from the root to a specific node.
height :- number of edges on the longest path from a node to a leaf node
binary tree :- tree where each node has at most two children
binary search tree :- binary tree with left child <= node <= right child property

(a) You have been given the following integer array,
Array: 6, 19, 3, 4, 2, 30, 12, 15, 7

(c) Draw a binary search tree based on the given array.



(b) Get the outputs of post-order, pre-order and in-order using the tree that you identified.

LRV (post-order) → {2, 4, 3, 7, 15, 12, 30, 19, 6}
VLR (pre-order) → {6, 3, 2, 4, 19, 12, 7, 15, 30}
LVR (in-order) → {2, 3, 4, 6, 7, 12, 15, 19, 30}

(5) Identify the practical use of the types of DFT types.

signal processing
communication system
spectral analysis
image processing and computer vision
audio and music processing
control systems
medical imaging
seismic data analysis