**Tutorial 8 Answers**

**1.**

* Pre-order traversal
* In-order traversal
* Post-order traversal

**2.**

* Pre-order traversal: In pre-order traversal, the root node is visited first, followed by a recursive traversal of the left subtree, and then a recursive traversal of the right subtree. The order of operations for each node is "Root-Left-Right."
* b. In-order traversal: In in-order traversal, the left subtree is recursively traversed first, then the root node is visited, and finally, the right subtree is recursively traversed. The order of operations for each node is "Left-Root-Right." In a binary search tree, an in-order traversal results in nodes being visited in ascending order.
* Post-order traversal: In post-order traversal, the left subtree is recursively traversed first, then the right subtree is traversed, and finally, the root node is visited. The order of operations for each node is "Left-Right-Root."

**3.**

a. Root: The topmost node of a tree from which all other nodes are derived.

b. Node: A fundamental building block of a tree that holds data and references to its child nodes (if any).

c. Parent: A node in a tree that has one or more child nodes.

d. Child: A node that is directly connected to its parent node.

e. Sibling: Nodes that share the same parent are considered siblings.

f. Leaf: A node with no children in a tree is called a leaf node.

g. Subtree: A portion of a tree that can be treated as an independent tree itself.

**4.**

a) 6

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3 19

/ \ \

2 4 30

/ \

12 15

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7

(b) Outputs of post-order, pre-order, and in-order traversals:

Post-order traversal: 2, 7, 4, 3, 15, 12, 30, 19, 6

Pre-order traversal: 6, 3, 2, 4, 19, 30, 12, 15, 7

In-order traversal: 2, 3, 4, 6, 7, 12, 15, 19, 30

**5.**

* Pre-order traversal: Used to create a copy of the tree or to serialize the tree into a specific format for storage or transmission.
* In-order traversal: Commonly used in binary search trees to retrieve elements in sorted order. It can also be used to evaluate arithmetic expressions stored in trees.
* Post-order traversal: Often used to delete the entire tree in a memory-efficient way since it starts from the leaf nodes. It is also useful in expression evaluation, where we first visit the operands and then apply the operations.