APPLICATIONS OF ROOTED TREES

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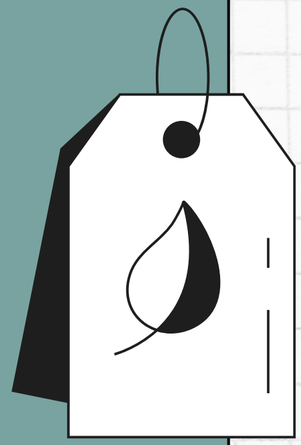
PROBLEM STATEMENT



Objective: Explore rooted trees in-depth, their connections with graph theory, and applications in algorithmic problem-solving.

Key Tasks:

- Explore fundamental properties of rooted trees.
- Establish connections between rooted trees and graph theory.
- Discuss applications of rooted trees in Binary Search Trees (BST) and Decision Trees.
- Implement theoretical insights through C/C++ coding for practical validation.

Significance:

- Rooted trees serve as hierarchical structures with broad applications in computer science and mathematics.
- The study aims to bridge theoretical understanding with practical implementations, contributing to the discourse on rooted trees.

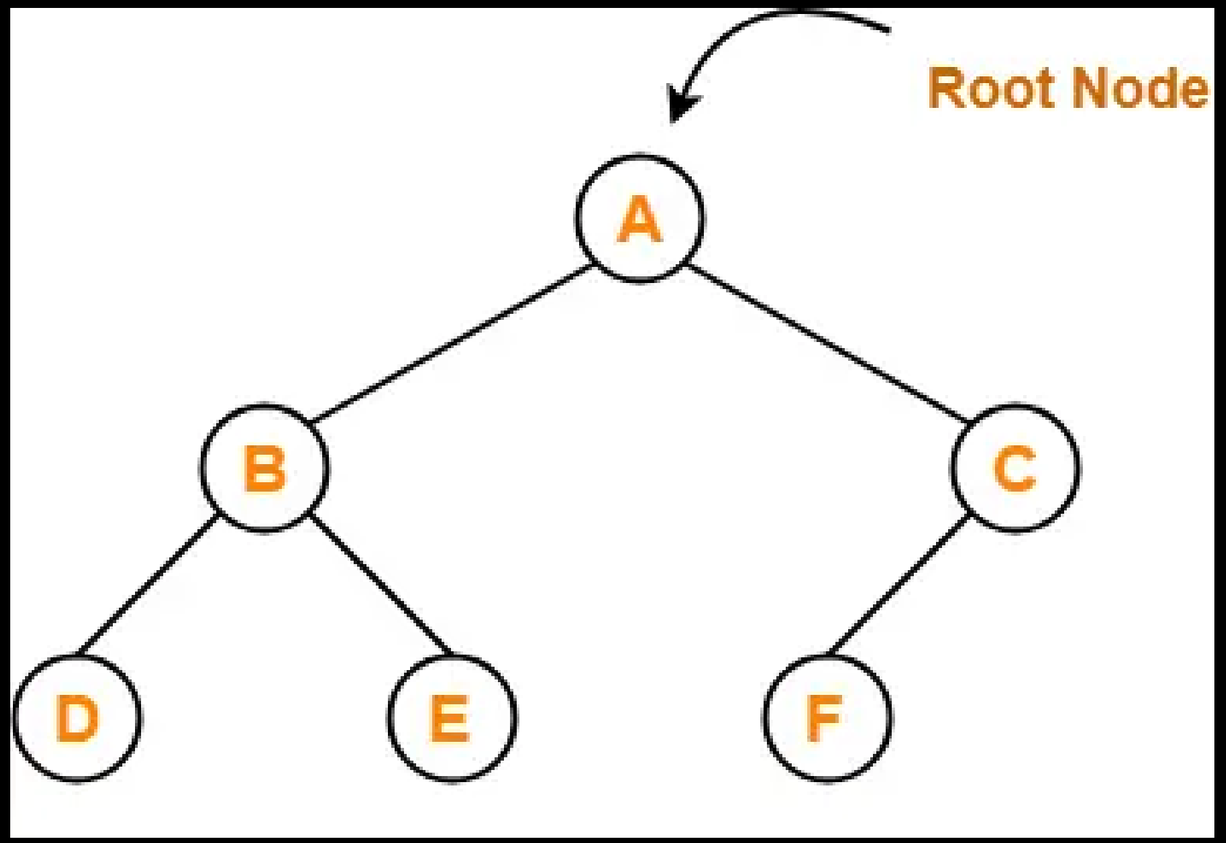
WHAT IS ROOTED TREES?

Components of Rooted Trees:

1. Node
2. Root
3. Parent Nodes
4. Child Nodes
5. Leaf Nodes
6. Sibling Nodes
7. Ancestor Nodes
8. Descendant Nodes

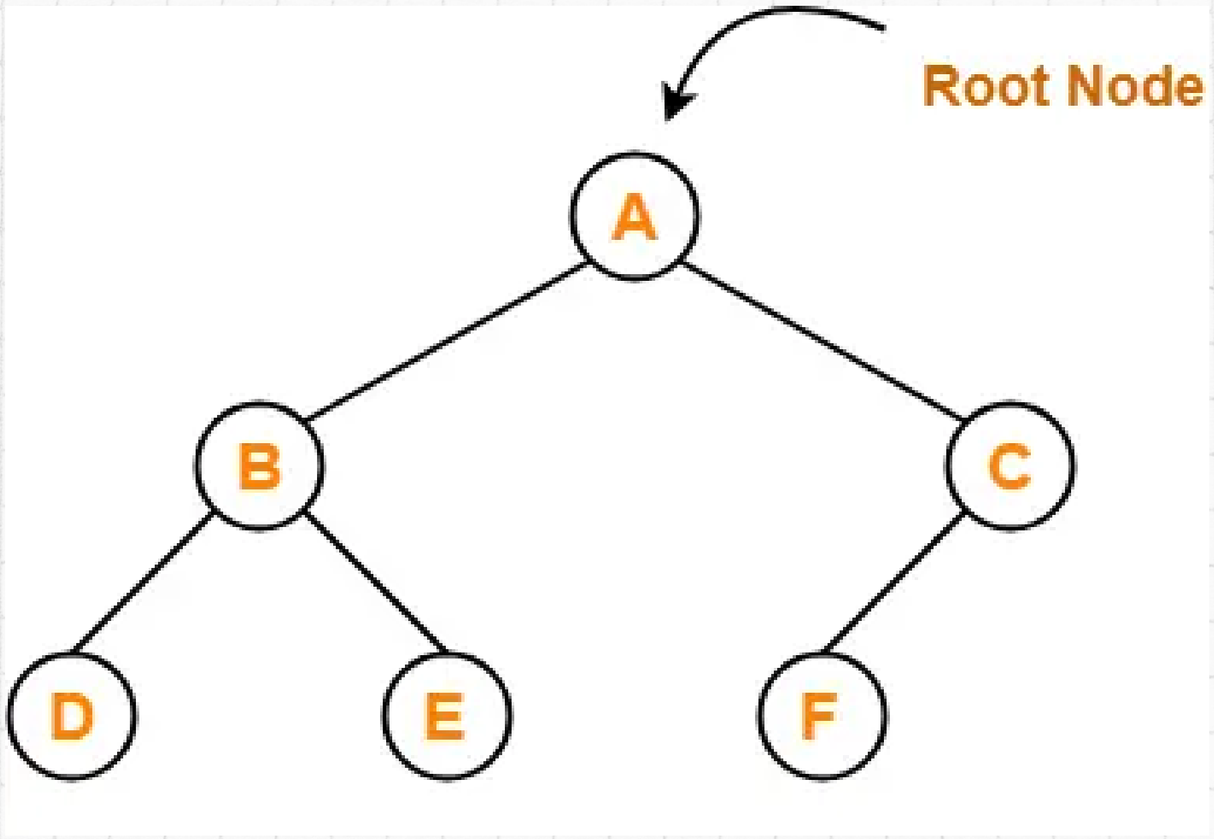
Properties of Rooted Trees:

1. Depth
2. Height
3. Level
4. Subtrees
5. Degree of a Node
6. Forest
7. Degree of a Tree
8. Balanced Trees



CONNECTION WITH GRAPH THEORY

1. Directed Acyclic Graphs (DAGs)
2. Hierarchy and Parent-Child Relationships
3. Paths and Connectivity
4. Tree as a Specialized Graph
5. Depth-first and Breadth-First Traversal
6. Subtrees and Connected Components
7. Isomorphism
8. Binary Trees and Graph Theory
9. Topological Ordering
10. Minimum Spanning Trees (MST)
11. Network Flow in Trees
12. Planar Graphs and Tree Embedding
13. Graph Coloring and Tree Labeling



APPLICATIONS OF ROOTED TREES

1. Binary Search Trees (BST)

1. Database Management Systems (DBMS)
2. Symbol Tables
3. File Systems
4. Network Routing Algorithms
5. Auto-Complete and Spell Checking
6. Compression Algorithms

2. Decision Trees

1. Machine Learning and Data Mining
2. Game Playing
3. Business Decision Making
4. Medical Diagnosis
5. Credit Scoring
6. Fault Diagnosis in Engineering

IMPLEMENTING APPLICATIONS OF ROOTED TREES

BINARY SEARCH TREES

DATABASE MANAGEMENT SYSTEMS

IMPLEMENTING INSERTION, DELETION, AND SEARCHING

PREORDER TRAVERSAL

BINARY TREE VISUALIZATION FOR PREORDER TRAVERSAL

DECISION TREES

GAME PLAYING

TIC-TAC-TOE

CREDIT SCORING

SORTING STUDENT'S MARK


THANK
YOU!