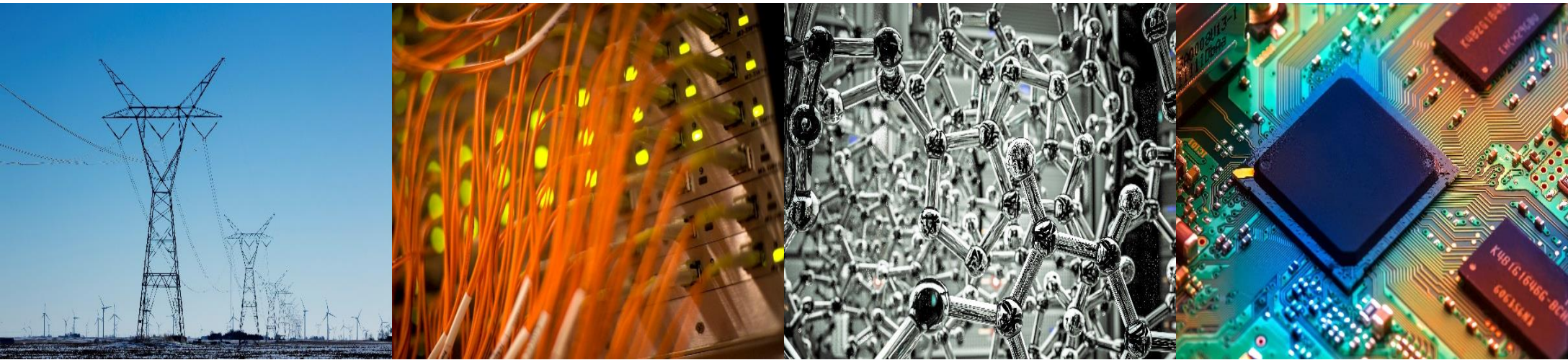


ECE 220 Computer Systems & Programming

Lecture 24 – C++ Examples

November 21, 2024



- No lecture next week – Fall Break
- Quiz6 is right after the break

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Tree Concept Check

What is a root?

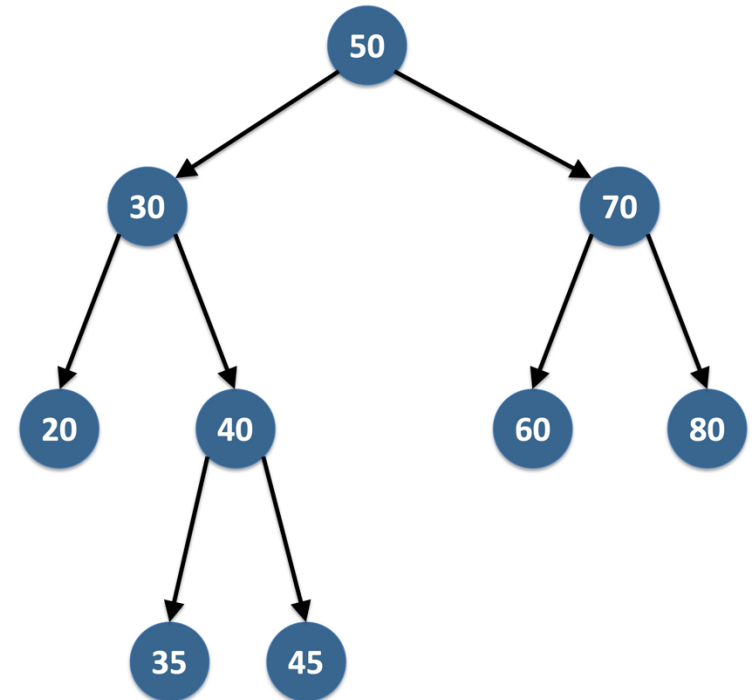
What is the difference between a binary tree and a binary search tree?

What is the height of the BST shown here?

Which nodes are internal nodes in this BST?

Which nodes are leaf nodes in this BST?

Where should a new node with data '36' be inserted into this BST?



C++ Tree Example

```
#include <iostream>
#include "bst.hpp"
using namespace std;

int main() {
    cout<<"build a binary search tree"<<endl;
    bst tree1;
    tree1.insert(30);
    tree1.insert(20);
    tree1.insert(10);
    tree1.insert(15);
    tree1.insert(40);
    cout<<"total number of nodes in this tree:"
         <<tree1.countnodes()<<endl;
    tree1.inorder();
    return 0;
}
```

bst.hpp

```
#include <vector>
using namespace std;
class bst{
    public:
        bst();
        ~bst();
        void insert(int data);
        node *search(int data);
        void inorder();
        int countnodes();

    private:
        void delete_tree(node *root);
        void insert(int data, node *root);
        node *search(int data, node *root);
        void inorder(node *root, vector<int> &v);
        int countnodes(node *root);
        node *root;
};
```

```
struct node{
    int data;
    node *left;
    node *right;
};
```