

CSE 12 – Basic Data Structures and Object-Oriented Design

Lecture 19

Greg Miranda & Paul Cao, Winter 2021

Announcements

- Quiz 19 due Wednesday @ 8am
- Survey 8 due Friday @ 11:59pm
- PA7 due next Tuesday (3/2) @ 11:59pm
- Exam 2- see Piazza post

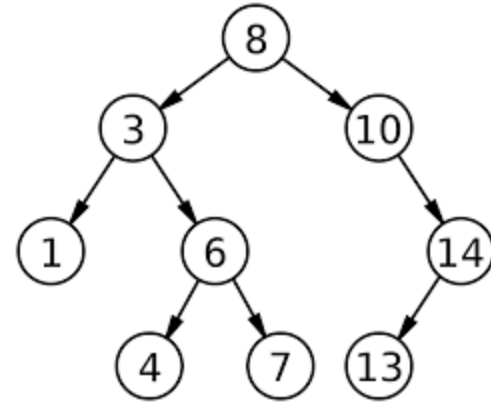
Topics

- Binary Search Trees
- Questions on Lecture 19?

Binary Search Tree

What order does PAE() traverse the tree?

```
void printAllElements(Node<K, N> n) {  
    if (n == null ) return;  
    System.out.println(n.key);  
    printAllElements(n.left);  
    printAllElements(n.right);  
}  
  
void printAllElement() {  
    printAllElements(this.root);  
}
```



What's the post, pre, in-order traversal of this tree?

```

class Node<K,V> {
    K key;
    V value;
    Node<K,V> left;
    Node<K,V> right;
    public Node(K key, V value,
                Node<K,V> left,
                Node<K,V> right) {
        this.key = key;
        this.value = value;
        this.left = left;
        this.right = right;
    }
}

```

```

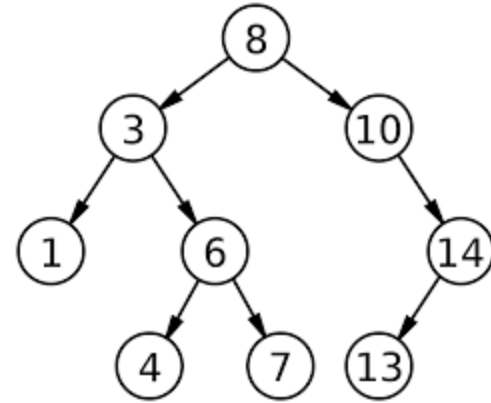
class BSTMap<K,V> implements OrderedDefaultMap<K,V>{
    Node<K, V> root;
    int size;
    Comparator<K> comparator;
    ...
    Node<K, V> set(Node<K, V> node, K key, V value) {
        if (node == null) {
            this.size += 1;
            return new Node<K, V>(key, value, null, null);
        }
        int comp = this.comparator.compare(node.key, key);
        if (comp < 0) {
            node.right = this.set(node.right, key, value);
            return node;
        } else if (comp > 0) {
            node.left = this.set(node.left, key, value);
            return node;
        } else {
            node.value = value;
            return node;
        }
    }
}

@Override
public void set(K key, V value) {
    if (key == null) {
        throw new IllegalArgumentException();
    }
    this.root = this.set(this.root, key, value);
}
}

```

Binary Search Tree

- Assume the key and value are identical for this example
- `set("5", 5);`
- `set("11", 11);`
- `set("15", 15);`
- `set("12", 12);`
- What's the picture after calling the above `set()` methods?



Questions on Lecture 19?