CSE 12 – Basic Data Structures and Object-Oriented Design
Lecture 18

Greg Miranda, Fall 2020

This lecture is being recorded

Announcements

- Quiz 18 due Wednesday @ 9am
- Survey 7 due Friday @ 11:59pm
- PA6 due Wednesday @ 11:59pm
- Exam 2
  - Released Tuesday 11/24 @ 6pm
  - Due Wednesday 11/25 @ 11:59pm
  - Topics:
    - Cumulative
    - Big topics
      - Big O, Big Theta run-time analysis
      - Sorting algorithms,
      - Hash tables/maps

→ 1 hour

Topics

- Binary Search Trees
- Questions on Lecture 18?

```
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;
  }
}
```

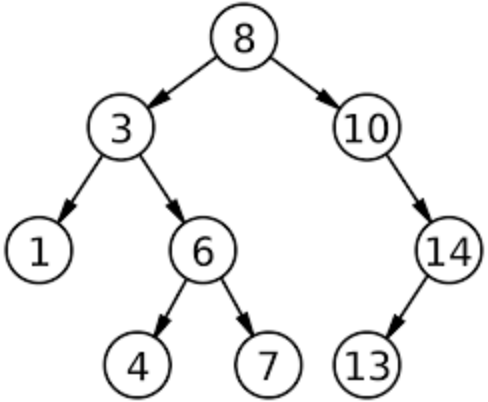
```
class BST<K, V> {
  Node<K, V> root;
  BST() (this.root = null);
  BST(Node<K, V> root) { this.root = root; }

  V get(Node<K, V> node, K key) {
    if (node == null) { //throw error }
    if (node.key.equals(key)) {
      return node.value;
    }
    if (node.key > key) {
      return get(node.left, key);
    }
    else {
      return get(node.right, key);
    }
  }

  V get(Key key) {
    return this.get(root, key);
  }
}
```

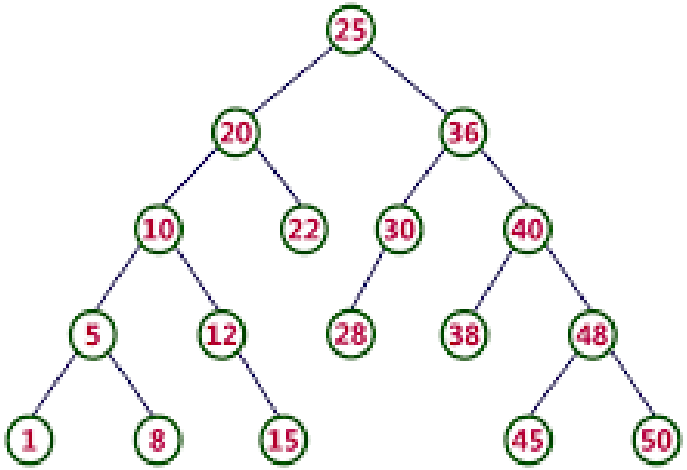
Binary Search Tree

- Assume the key and value are identical for this example
- Trace the path for get(4)
  - How many nodes does it touch?
- Trace the path for get(2)
  - How many nodes does it touch?
  - What happens when the nodes isn't found?



Binary Search Tree

- Assume the key and value are identical for this example
- Trace the path for get(40)
  - How many nodes does it touch?
- Trace the path for get(4)
  - How many nodes does it touch?



Questions on Lecture 18?