CSCI Lecture Notes

4/19/19

Self-Balancing Trees

* AVL
* Red Black Trees

Red Black Trees

* still satisfies the BST properties
* every node now has a color
* we have additional operations associated with rebalancing
* Rules
  + a node is either red or black
    - color can change as a tree rebalances
  + root node is black
  + every leaf node is an empty null node and is black
  + If a node is red, both its children must be black
  + for every node in the tree, all paths to a descendant leaf node must pass through same number of black nodes
  + a new node always gets initialized to red
* Special set of special operations
  + recolor
  + rotate
    - rotate left
    - rotate right
  + sometimes recoloring will suffice to fix the rb tree
  + typically, need to recolor and rotate a number of times