CS3A Class Test I

09/05/2024

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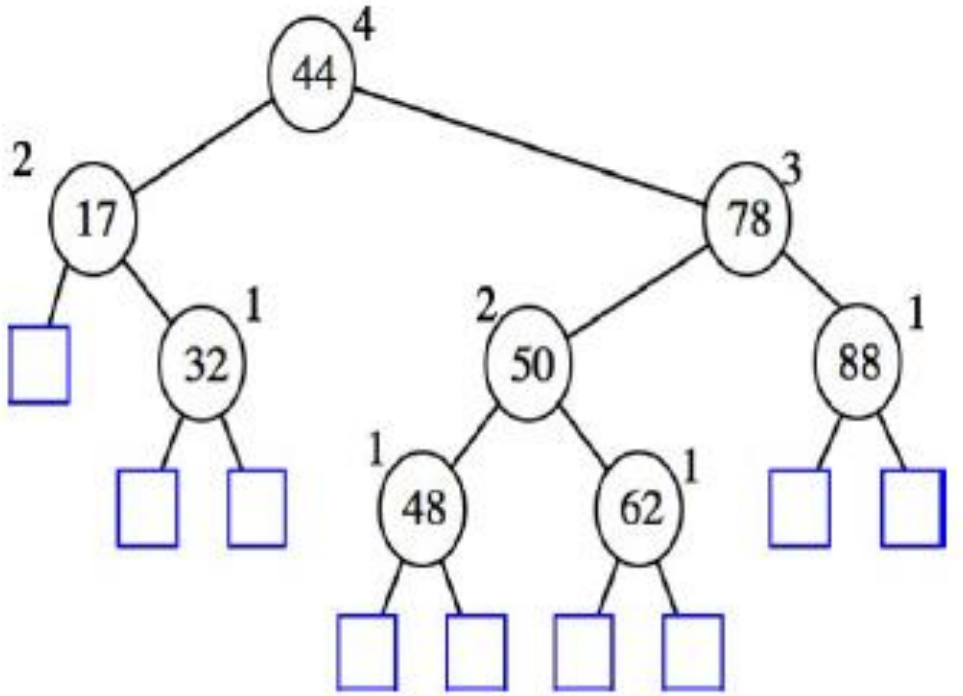
Computer Science 3A

Practical 9

08/05/2024

UNIVERSITY OF JOHANNESBURG

AVL Trees



AVL Trees

- AVL trees are balanced.
- An AVL Tree is: a binary search tree such that for every internal node v of T, the heights of the children of v can differ by at most 1.

AVL Nodes

- BT nodes with a height attribute

AVLTree

Operations to implement:

- treeSearch(node)
- insert(k, v)
- checkBalance(node)
- rebalance(node)

AVLTree

Operations to implement:

- **treeSearch(node):**
  search the AVL tree for a node

*to cast the BTPosition to an AVLNode use the:
checkPosition() method

AVLTree

Operations to implement:

- **Insert(k, v):**

  Insert an item into the AVL Tree

AVLTree

Operations to implement:

- **checkTreeBalance(node):**
  will check to see if the tree is balanced and perform a rebalance if necessary.

AVLTree

Operations to implement:

- **rebalance(node):**

  Changes the structure of the tree to ensure that the height-balance property is maintained.

AVLTree - Restructuring

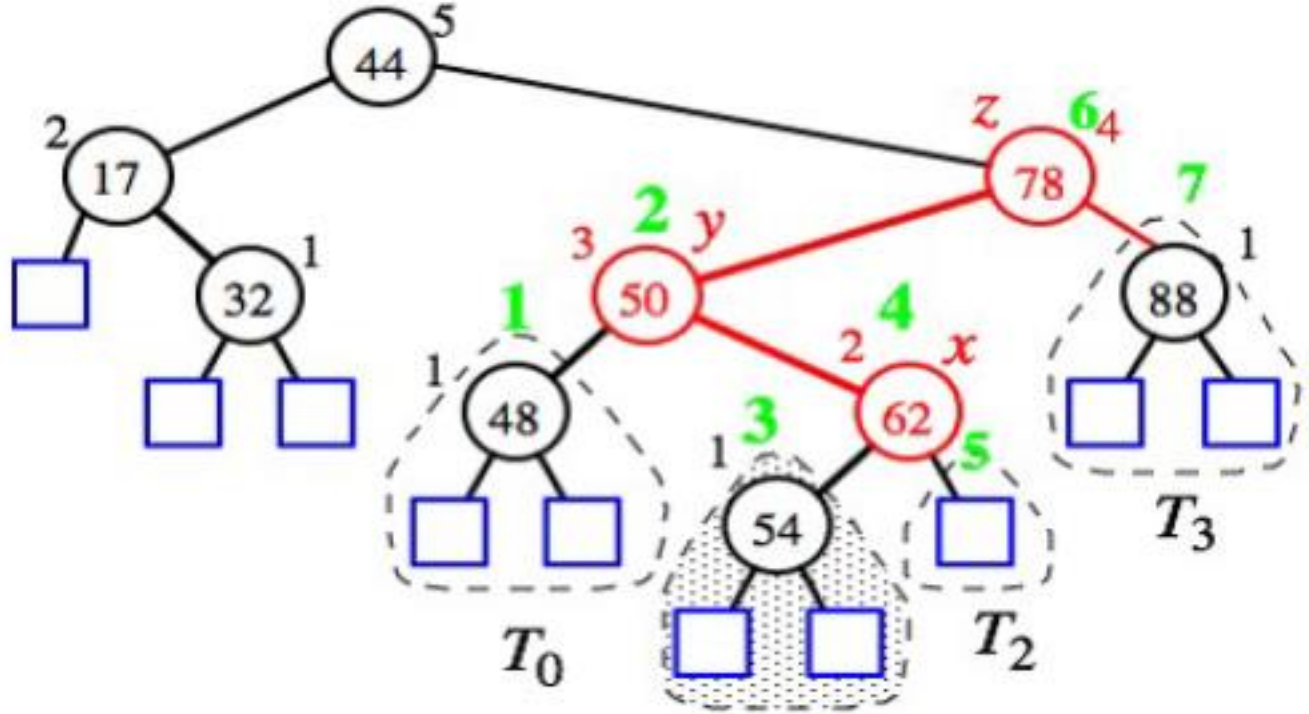


Figure: Unbalanced

AVLTree - Restructuring

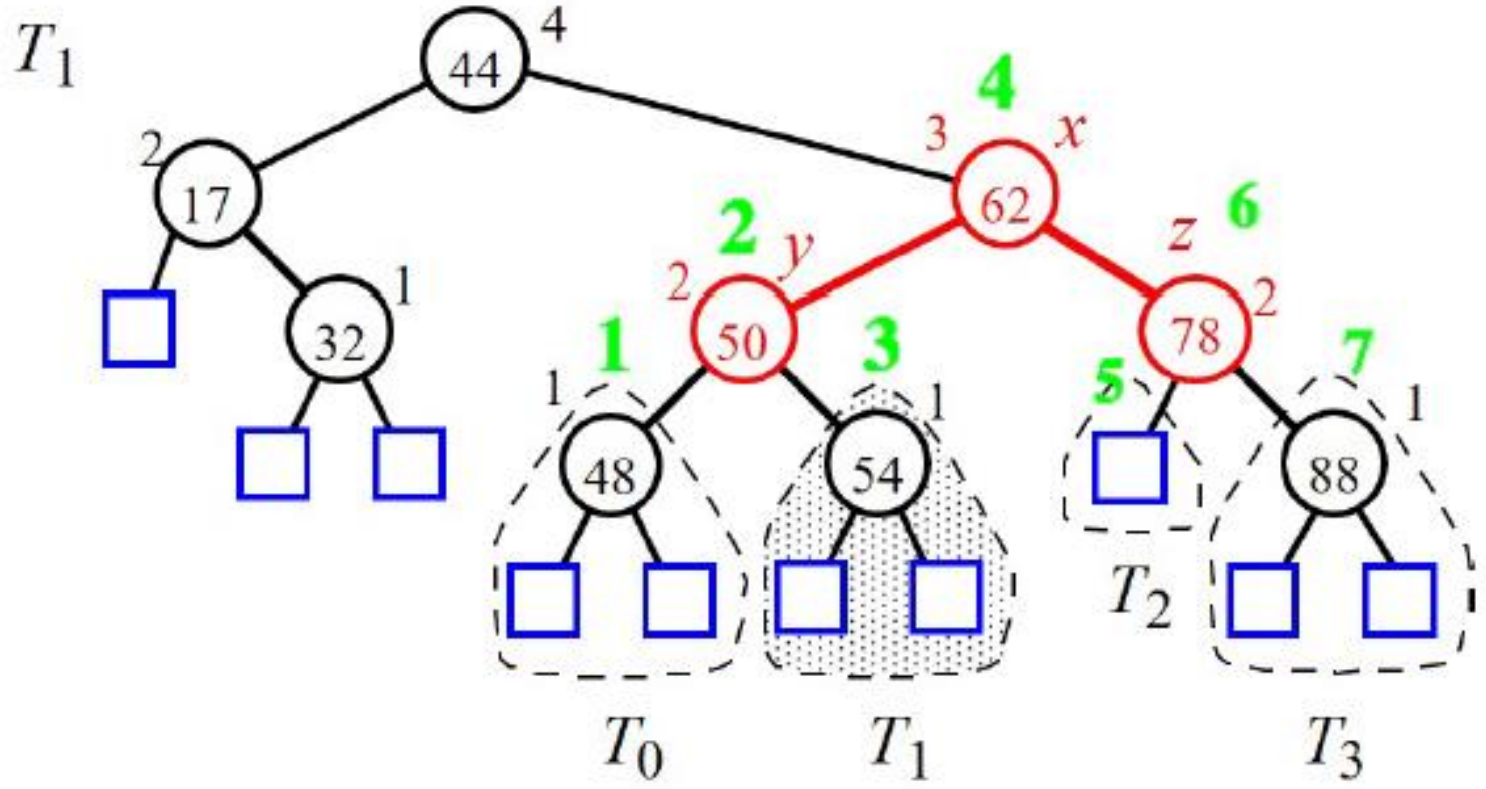
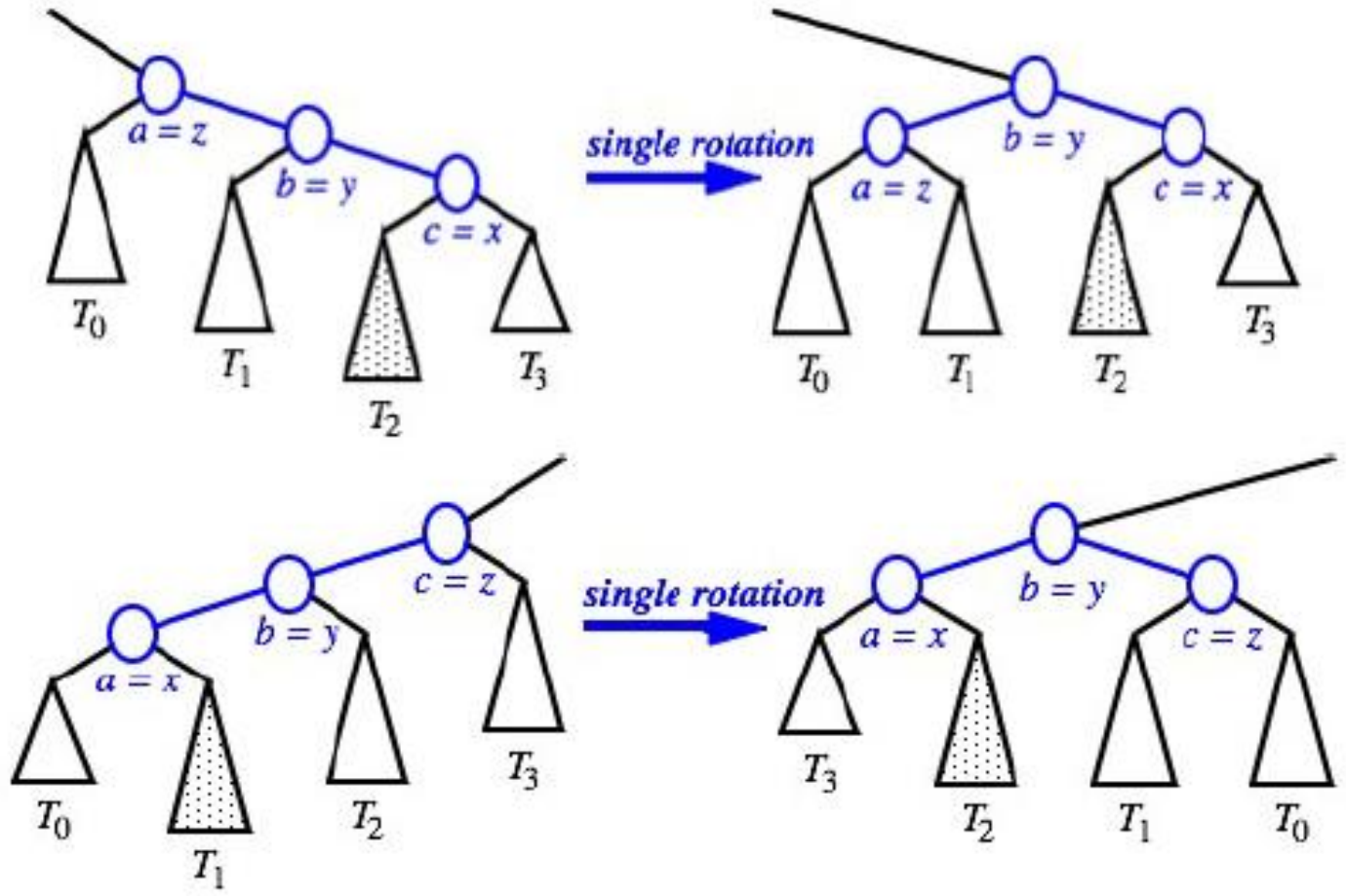


Figure: Balanced

AVLTree – Single Rotations



AVLTree – Double Rotations