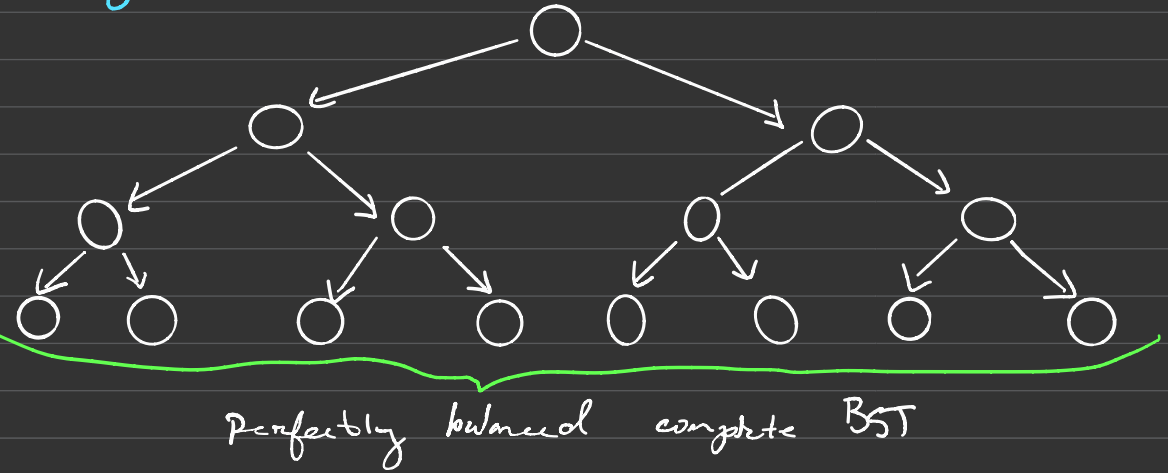C343 / Summer 2020

Lecture Task - 23

July 30, 2020 , 14:29

Clare Tidmarsh, cmtidmar

BST

BST support these operations in $O(h)$ time (h is the height of the tree: insertion, delete, find min/max, find successor and predecessor of a node

ideally, in a perfectly balanced tree, h could be exactly $= \log(n)$.
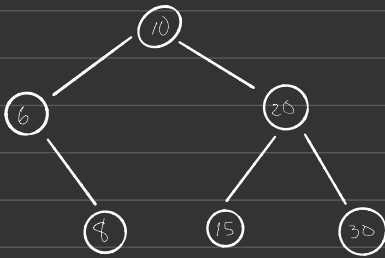

Perfectly balanced complete BST

Completely unbalanced BST: a path
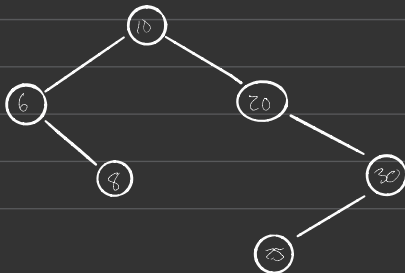
Binary Tree Traversals

· Any process for visiting all of the nodes in some order is called traversal.
· Any traversal that lists every node in the tree exactly once is called an enumeration of the tree's node.
· 3 common tree traversals:
    · Inorder
    · Preorder
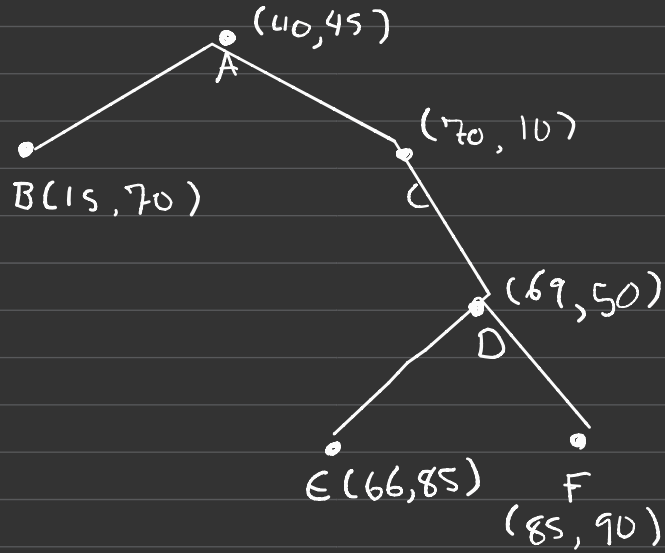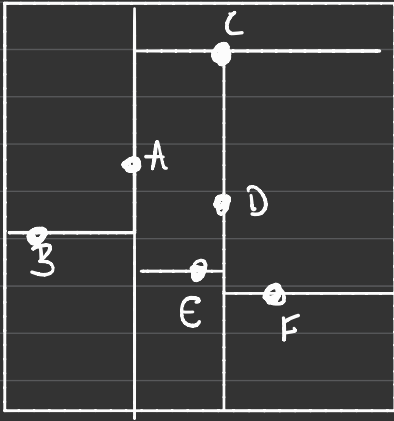   · Post order
· Time complexity : $\Theta(n)$

Example of BST & AVL :

Example of BST, but not AVL:
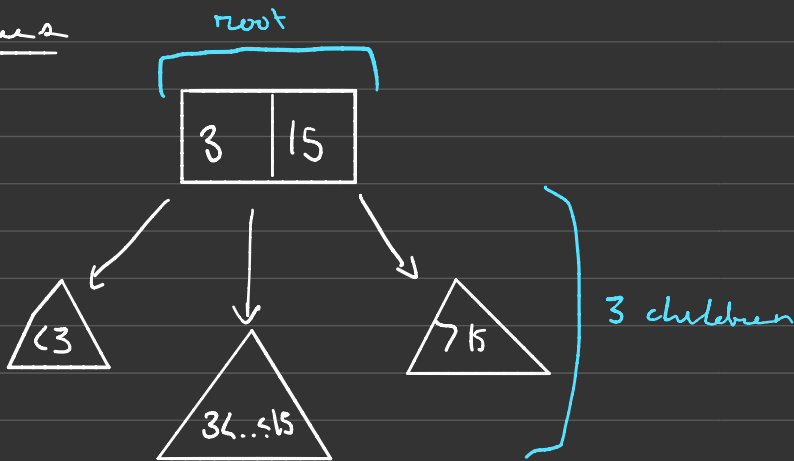
Two Spatial Data Structure: K-D Tree and P-R

The left diagram shows a spatial partition with points A, B, C, D, E, F. The right diagram shows a K-D tree with nodes:
- A (40, 45)
- B (15, 70)
- C (70, 10)
- D (69, 50)
- E (66, 85)
- F (85, 90)

Range Search

what does k-d stand for? K-dimensional tree

see Lecture 23 notes for a figure representation

B-Trees

root

3 | 15

< 3

3 ≤ .. ≤ 15

> 15

3 children

The **root** is either a leaf or has at least 2 children.