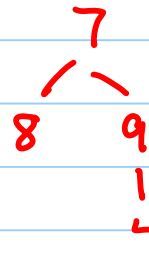
Trees

Note Title 10/29/2007

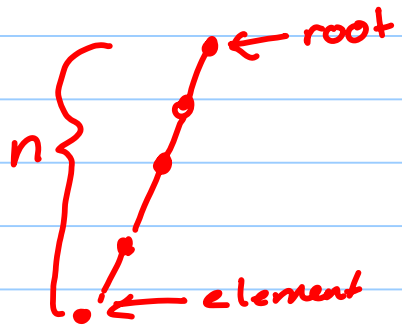
Binary Tree : Find(val)

How would you search for an element in a generic binary tree?

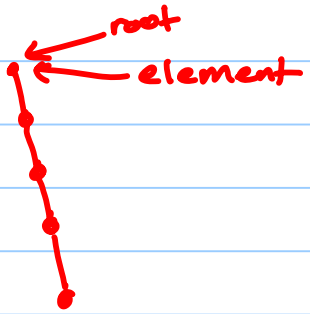
- Walk the tree
  - inorder
  - preorder
  - postorder



- What's the worst case?



- What's the best case?



- Average? ⟶ Also n (go through n/2 on average)

Binary Tree: Find Min

How would you search for the smallest element in a generic binary tree?

Tree structure doesn't matter!

Same time as using a flat list.

- Best: O(n)
- Avg: O(n)
- Worst: O(n)

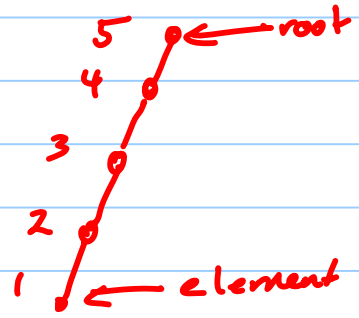
Binary Search Tree: Find Min

How would you search for the smallest element in a binary search tree?

Not necessarily balanced!

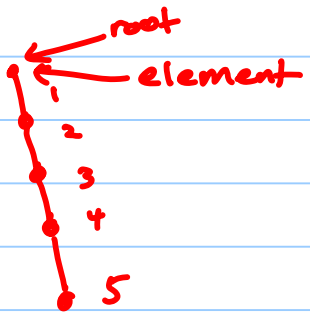
- What's the worst case?

n



- What's the best case?

1



- Average?

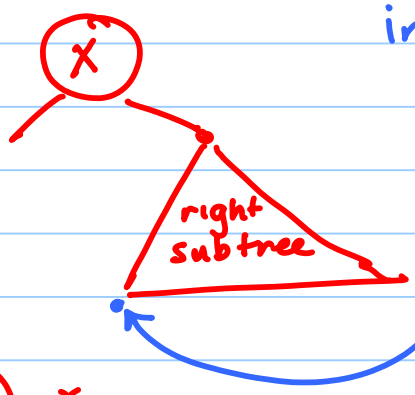
We could show (but won't) that the expected height of a binary search tree built with equally likely data orderings is $O(\log n)$.

Binary Search Tree: Find Next Largest.

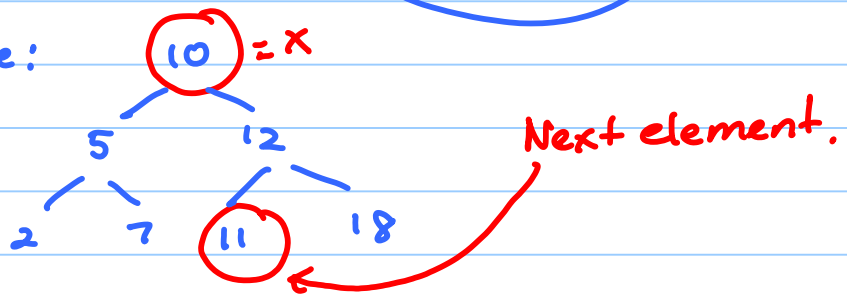
How would you find the next largest element in a binary search tree based on the element at which you are currently positioned?

Again, not necessarily balanced.

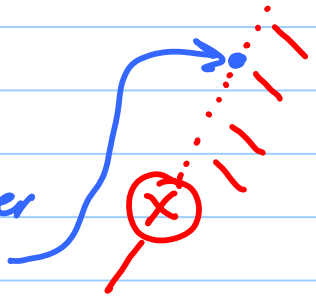
Case 1:
If there is a right subtree, it is in there - find smallest element in left most leaf node within this subtree.



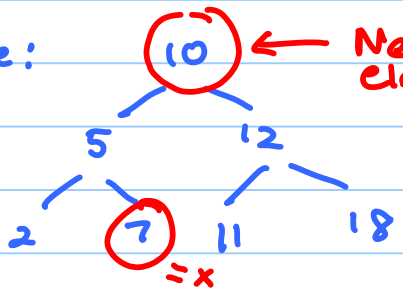
Example:



Case 2:
Otherwise, follow path upward until an ancestor is found that is greater than the current element. (Might be the root node.)



Example:



O(height)

Next time: Work on height.