EE 200 Lecture 20: Binary search trees

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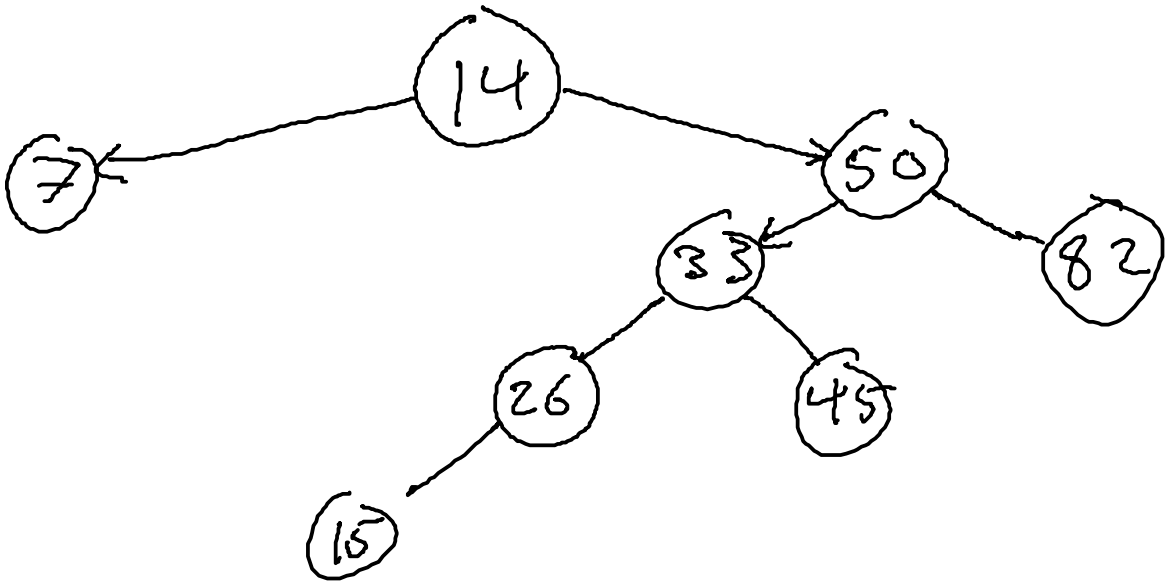
Animal game

Many copies passed around in the old DOS days,
now available online: animalgame.com

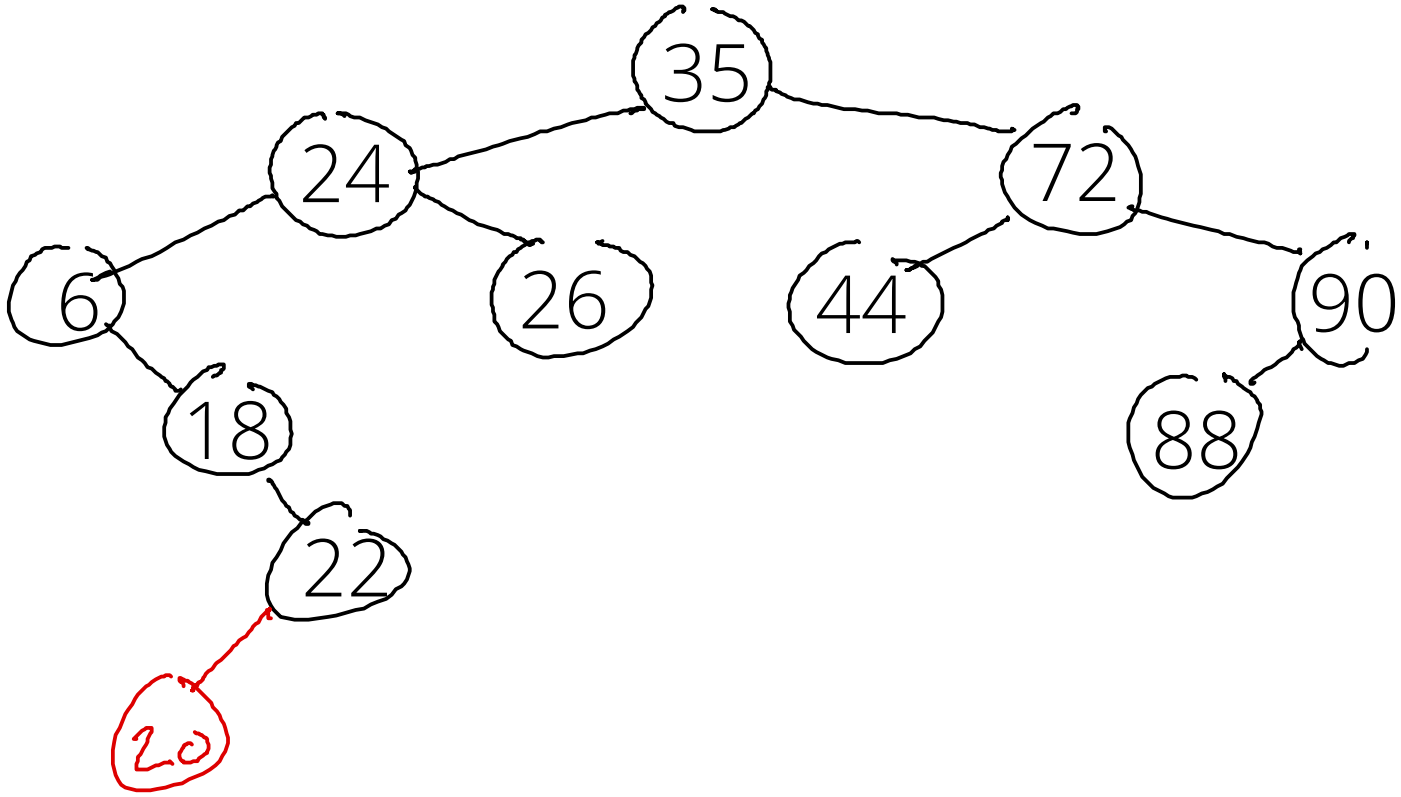
This isn't strictly a BST, but it illustrates search nicely.

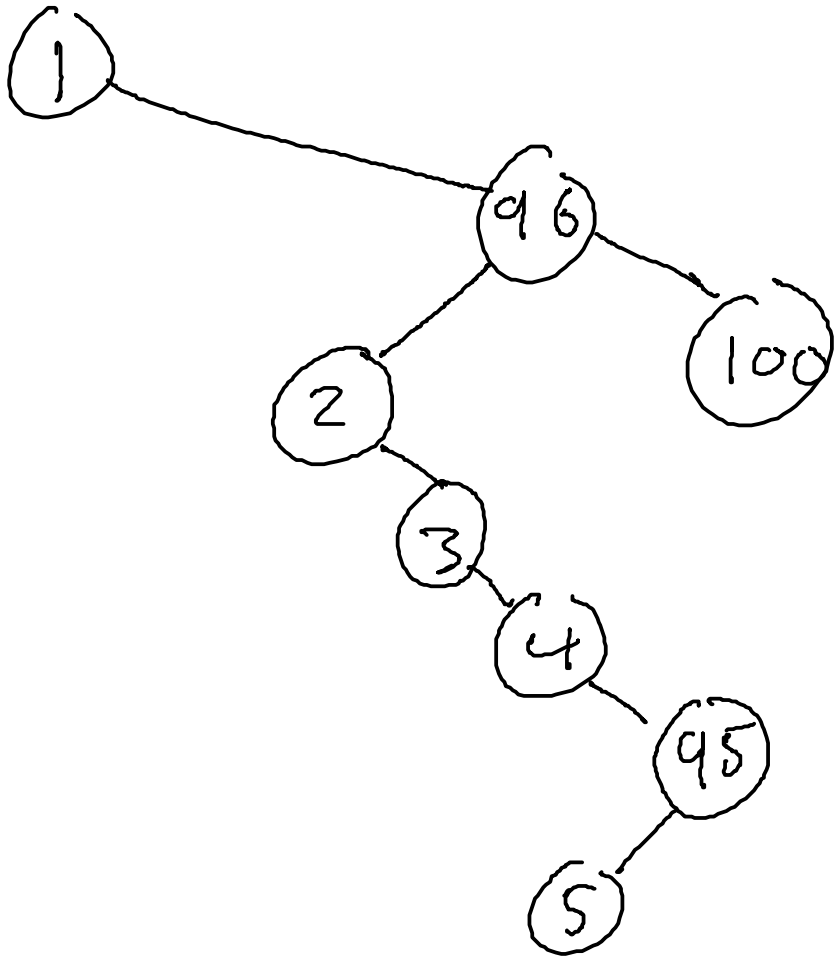
Let's play the animal game with numbers



Adding numbers to a BST

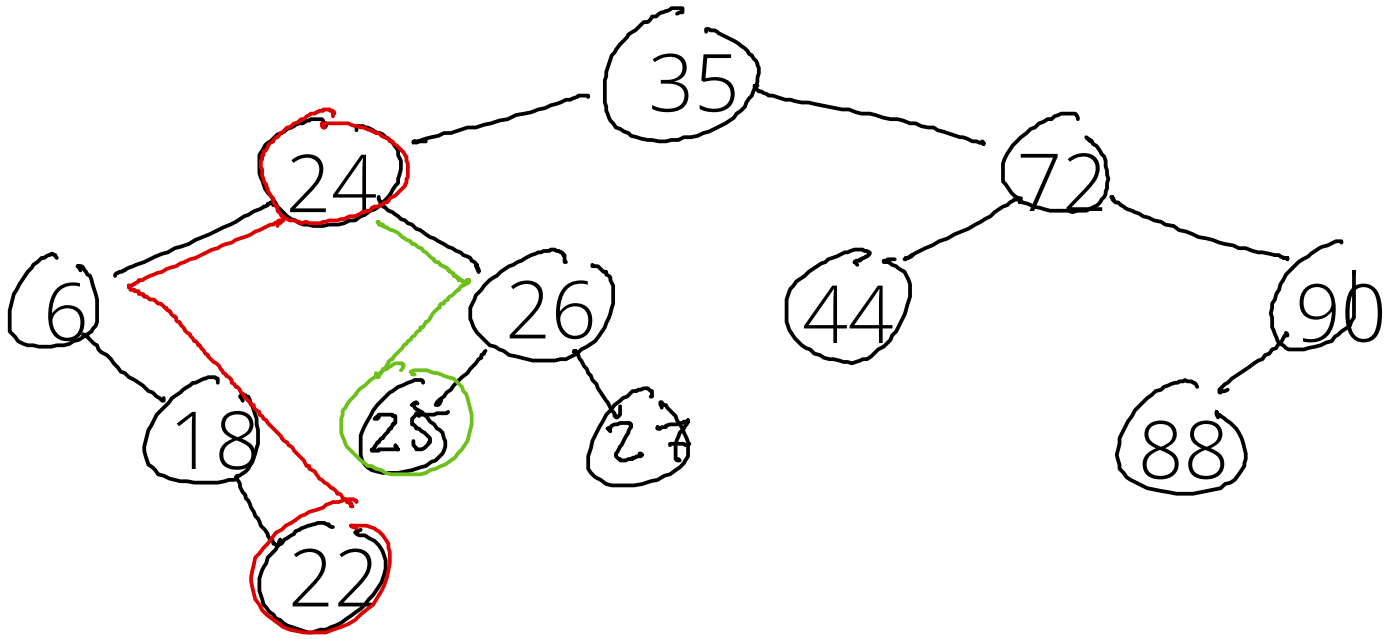
Add 20



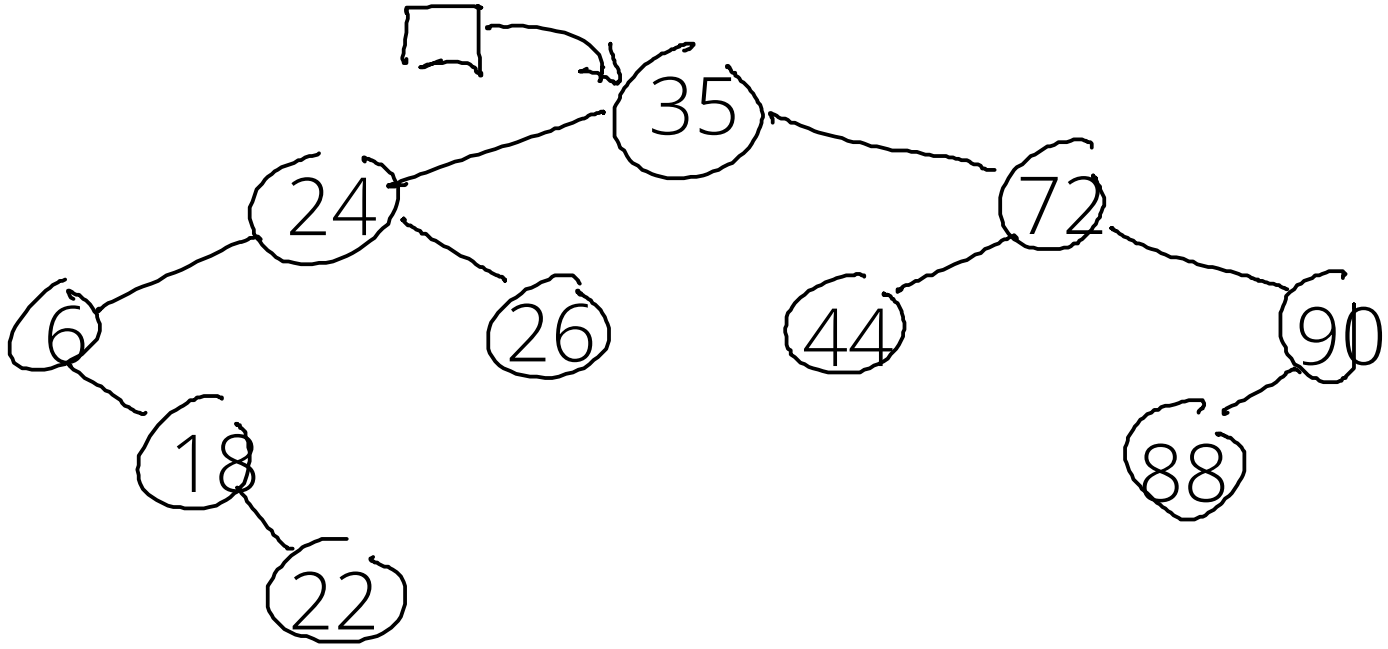

1
96
100
2
3
4
95
5

Removing numbers from a BST

Remove 24



Removing numbers from a BST



Left - Right - Self

22 18 6 26 24 44 88 90 72 35 post order

Left - Self - Right

6 18 22 24 26 35 44 72 88 90 in order

Self - left - right pre order

35 24 6 18 22 26 ...

BSTs versus other sorted structures

	Sorted Array	Linked list	BST
Find	O(log(N))	O(N)	O(log(N))
Insert	O(N)	O(N) (Find) / O(1) (Insert)	O(log(N))
Look up by index	O(1)	O(N)	?

O(log(N))

O(log(N))

N/A

Graph terminology

This is a…

Classwork 15 will be pushed to a Github repo

This will be the opposite of past assignments:

- I will provide you with 10 implementations of a binary search tree
- Your job is to figure out which one of them is correct.

Code should be uploaded on Gradescope by midnight (11:59pm) next Tuesday (12/6).