LEC 14

CSE 123

Binary Tree Modification

Questions during Class?

Raise hand or send here

sli.do #cse123

BEFORE WE START

Talk to your neighbors:

What are you looking forward to as it gets warmer?

Instructors: Brett Wortzman
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TAs:

Arohan	Neha	Rushil	Johnathan	Nicholas
Sean	Hayden	Srihari	Benoit	Isayiah
Audrey	Chris	Andras	Jessica	Kavya
Cynthia	Shreya	Kieran	Rohan	Eeshani
Amy	Packard	Cora	Dixon	Nichole
Trien	Lawrence	Liza	Helena	

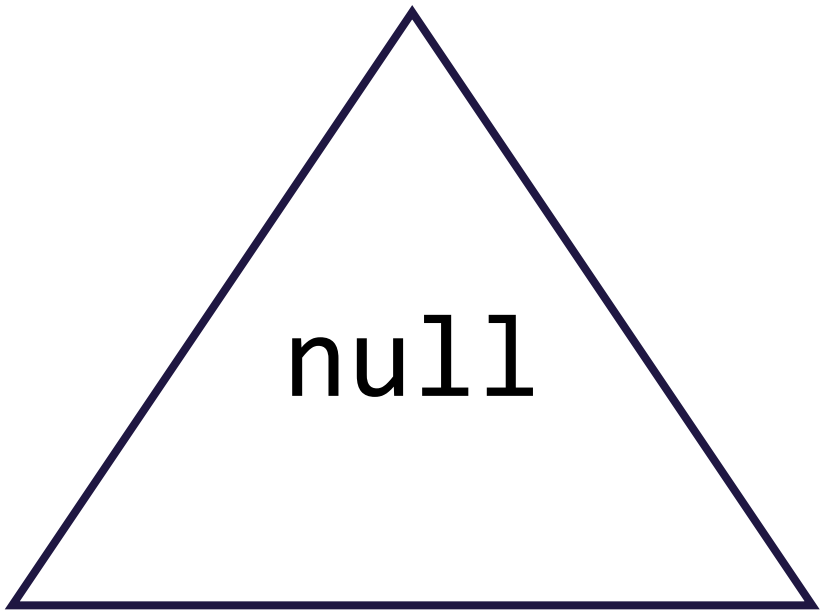
Music: CSE 123 25wi Lecture Tunes

Announcements

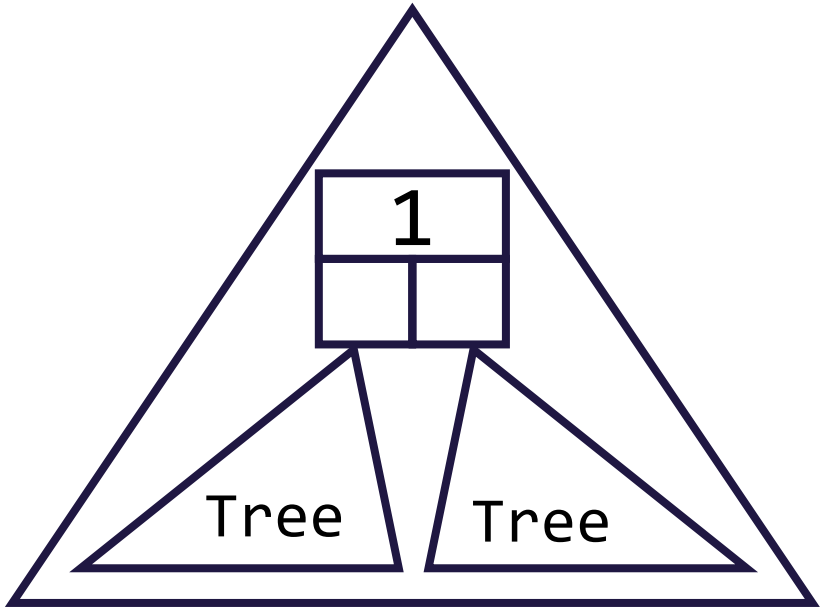
- Programming Assignment 2 due tonight at 11:59pm
- *Programming Assignment* 3 out tomorrow, due next Wednesday (3/5)
- Quiz 2 next Tuesday (3/4)
  - Practice quiz released later this week
- Quiz 1 grades out late this week

Review: Binary Trees

- A Binary Tree is either:



Empty tree



Node w/ two subtrees

This is a recursive definition!
A tree is either empty or a node with two more trees!

Review: Binary Tree Programming

- Programs look very similar to Recursive LinkedList!

- Guaranteed base case: empty tree
  - Simplest possible input, should immediately know the return
- Guaranteed public / private pair
  - Need to know which subtree you're currently processing
- If modifying, we use `x = change(x)`
  - Don't stop early, return updated subtree (`IntTreeNode`)

Review: Binary Tree Traversals

- 3 different primary traversals
  - All concerned with when you process your current root

- Pre-order traversal:
  - Process **root**, left subtree, right subtree
- In-order traversal:
  - Process left subtree, **root**, right subtree
- Post-order traversal:
  - Process left subtree, right subtree, **root**

Sometimes different traversals yield different results

Modifying Binary Trees

- Like linked lists, cannot modify nodes
  - Because data field is `final` (there are good reasons for this)
- Will need to create and insert new nodes
- Use `x = change(x)`, usually ***3 times***
  - overall root (in public method)
  - left subtree
  - right subtree

- Order might matter!
  - Does operation on root depend on children?