Data Structures

Homework 2

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Teaching, Training and Coaching since more than a decade!

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Problem #1: Binary Tree Destructor

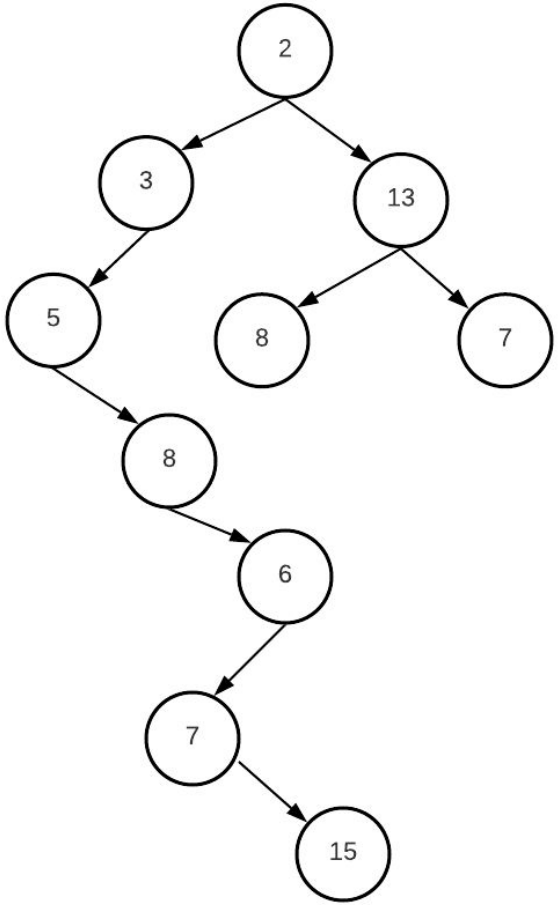
- Develop void clear() that clear the whole tree
- Develop ~BinaryTree() that clear the whole tree

Problem #2: Inorder iterative

- void print_inorder_iterative()
- Develop this function that prints the tree inorder
- This time you won’t use the recursion
- Replace recursion with a stack

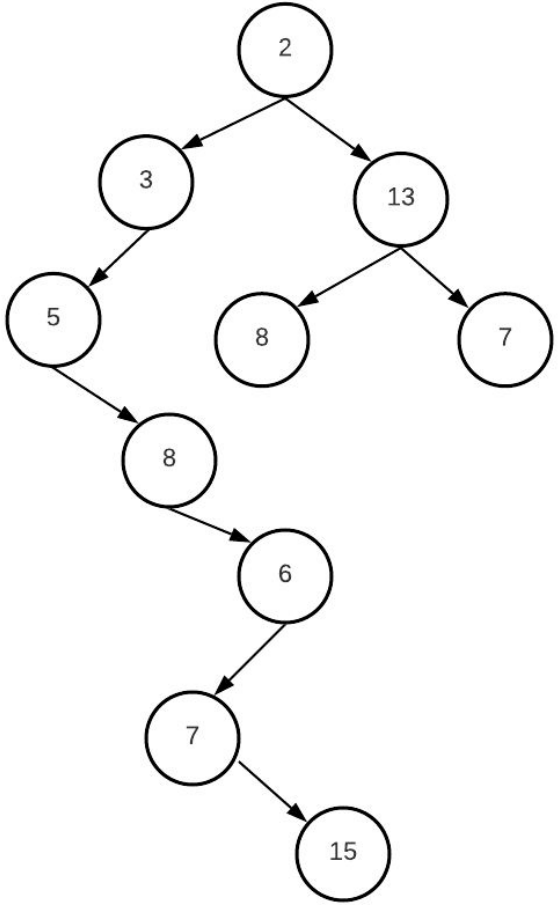
Problem #3: Tree boundary

- void traverse_left_boundry()
  - Prints theses on the boundary
- Nodes of tree left boundary are nodes from the nodes to the **left-most** node in a tree
- Node 15 here is **most-left** node
  - Most-left doesn't mean you just keep going left tell no more left
  - Do u see why we call it boundary?
- **Output is: 2 3 5 8 6 7 15**



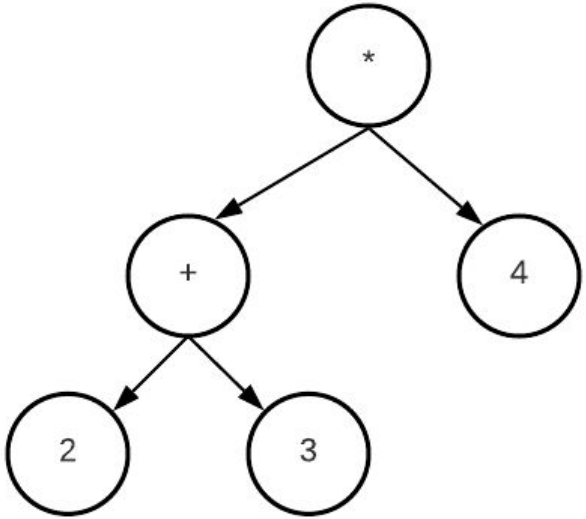
Problem #4: Binary Tree Diameter

- The diameter of a binary tree is the length of the **longest path** between any two nodes in a tree.
  - The longest path here is from node 8 to node 15
    - 8 13 2 3 5 8 6 7 15
- Tips
  - The code follows similar recurrence to tree height function
  - This path may or may not pass through the root.
    - Develop logic for each of these 2 cases



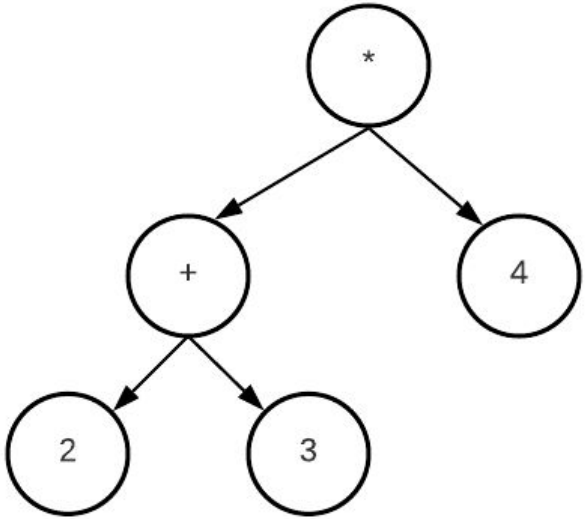
Problem #5: Expression Tree

- Add a **new constructor**: BinaryTree(string postfix)
- It builds an expression tree based on the given postfix expression
- E.g. BinaryTree root("23+4*");
- When you call the print_postorder, the **output must be same** to the input
- Tip: Similar logic to postfix evaluation code



Problem #6: Expression Tree Inorder

- When we try to print the tree inorder for this expression tree, the output is: 2+3*4
- But this is wrong as it should be (2+3)*4
- Implement **print_inorder_expression**()
- This function add proper parentheses to have valid infix output
  - 51+2/ ⇒ (5+1)/2
  - 534*2^+ ⇒ 5+((3*4)^2)



"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."