

# CSE 373 Lecture 10 In-Class Worksheet — Fall 2018

Name: \_\_\_\_\_ Date: \_\_\_\_\_

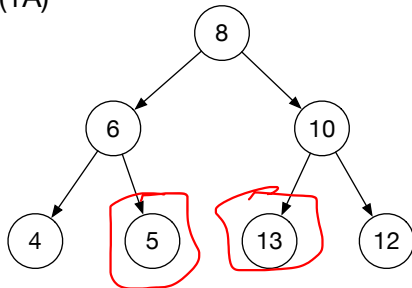
UW Student #: \_\_\_\_\_ UW Email address: \_\_\_\_\_

Partner name(s) for this activity: \_\_\_\_\_

Will you want to pick up your worksheet later? Circle one:    Yes    /    No

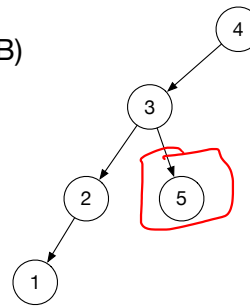
**(Q1)** Which of these following trees are binary search trees (BSTs)? If a tree is not a BST, mark the node(s) that violate the BST property.

(1A)



Is this a BST (Yes/No): **NO**

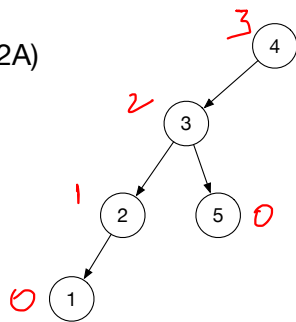
(1B)



Is this a BST (Yes/No): **No**

**(Q2)** Give the height of the following tree and any specified node(s).

(2A)



Height of tree: **3**

Height of node 2: **1**

(2B)



Height of tree:

**0**

(2C)

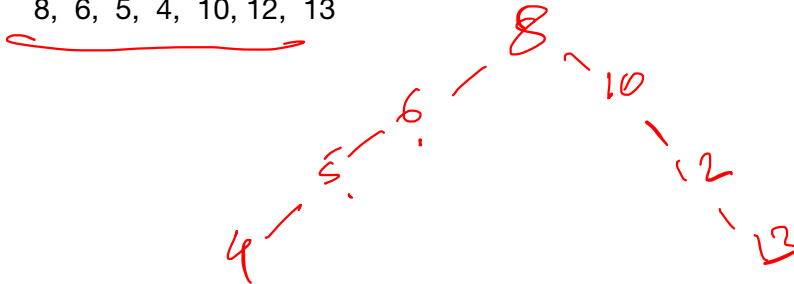
(null or empty tree)

Height of tree:

**-1**

**(Q3)** If you were to insert the following nodes in an empty binary search tree (BST) in the given order, what will the resulting BST look like?

8, 6, 5, 4, 10, 12, 13



Questions on traversals:

**(Q4)** What is the pre-order traversal for the tree you just drew in (Q3)?

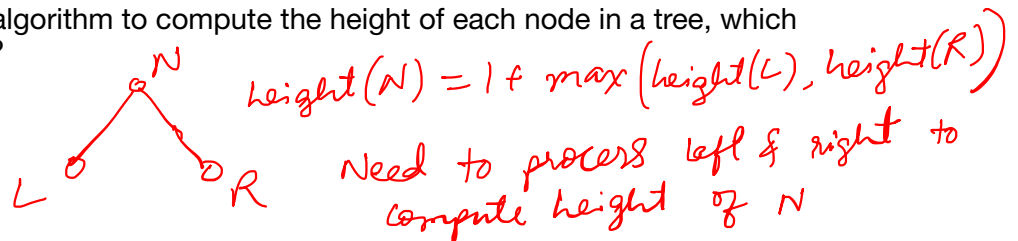
8, 6, 5, 4, 10, 12, 13

**(Q5)** In a BST with integer nodes, if you have to print numbers in sorted order, which traversal would you choose?

- A. Pre-order
- B. In-order
- C. Post-order

**(Q6)** If you have to write an algorithm to compute the height of each node in a tree, which traversal would you choose?

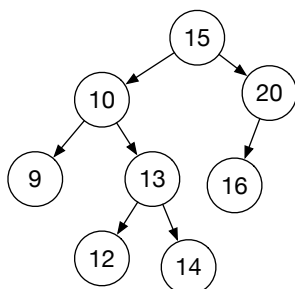
- A. Pre-order
- B. In-order
- C. Post-order



**(Q7)** If you have to copy a BST, which traversal would you choose?

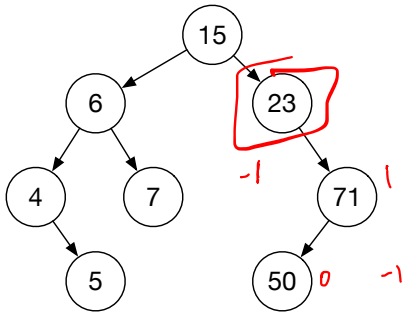
- A. Pre-order
- B. In-order
- C. Post-order

**(Q8)** Write the post-order traversal for this following tree?

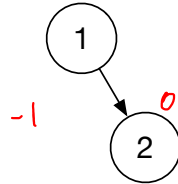


9, 12, 14, 13, 10, 16, 20, 15

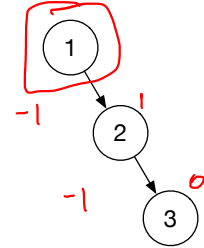
**(Q9)** All the following trees are BSTs. Which of these are AVL trees? If a BST is an invalid AVL tree, draw a box around the unbalanced node in the tree.



(9A) Is this a valid AVL tree: *No*

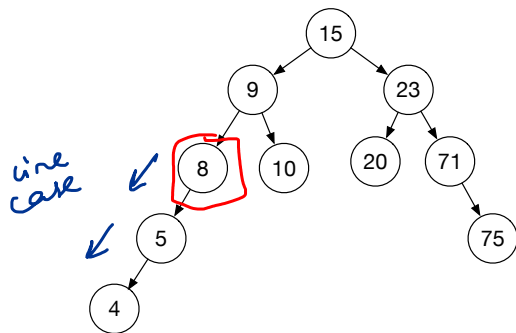


(9B) Is this a valid AVL tree: *Yes*

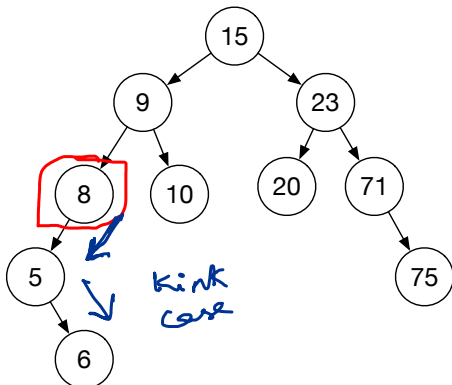


(9C) Is this a valid AVL tree: *No*

**(Q10)** To fix the unbalance in the following BSTs, would you need a single or a double rotation?



(10A) A *single* rotation would fix the unbalance in this tree



(10B) A *double* rotation would fix the unbalance in this tree