

# Assignment # 6: BST and AVL trees

---

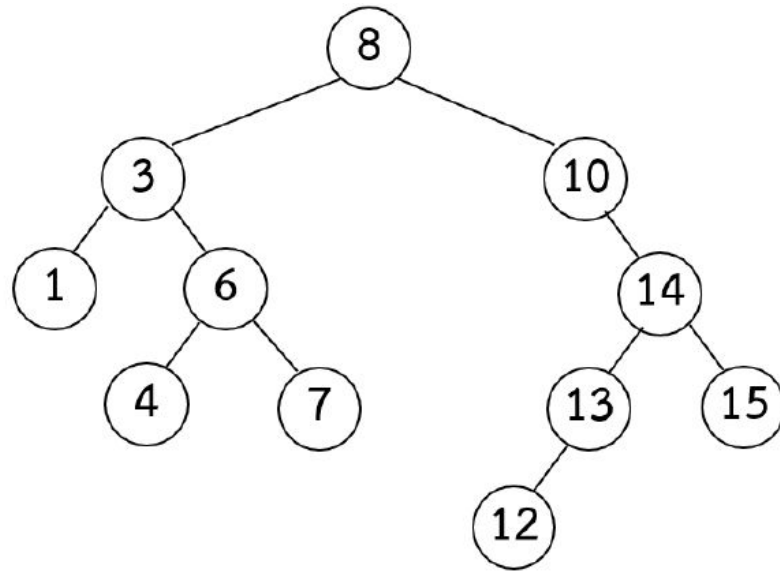
1. In your own words, describe the definition of a binary search tree, including its properties.

2. Explain the reason a binary search tree should be balanced.

3. Explain the reason why deleting a specified node in a binary search tree requires more considerations than inserting a new node.

4. What is the role of a balance factor in an AVL tree?

5. Given the binary search tree below, write the search path for the following nodes.

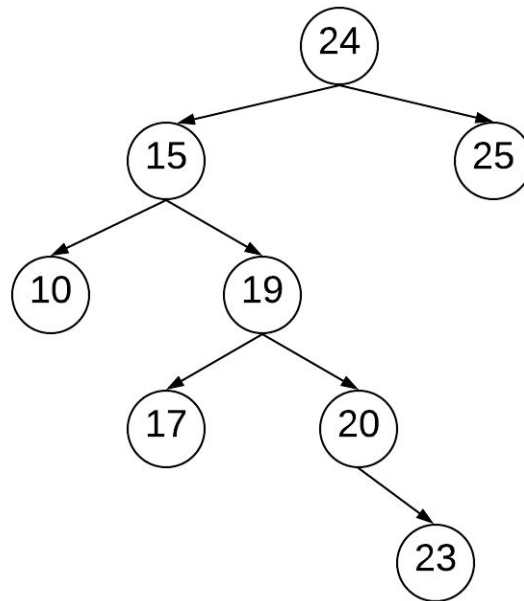


5.1 Node 7.

5.2 Node 13.

5.3 Node 20.

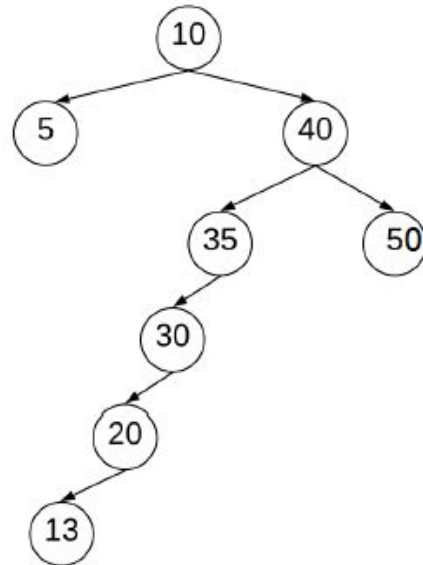
6. Given the binary search tree below, provide your answer on the following questions.



- 6.1 Draw the updated binary search tree after removing node 20.

6.2 Following the result from 6.1, draw the updated binary search tree after removing node 19.

7. Given the binary search tree below, provide your answer on the following questions.



- 7.1 Calculate and provide the balance factor for each node.

7.2 Draw the rebalanced binary search tree.

**Hint:** Use your own judgement, no need to use AVL tree method.

8. Given a set of integers {10, 78, 70, 35, 40, 90, 27, 25, 66, 21}, provide an answer on the following questions.

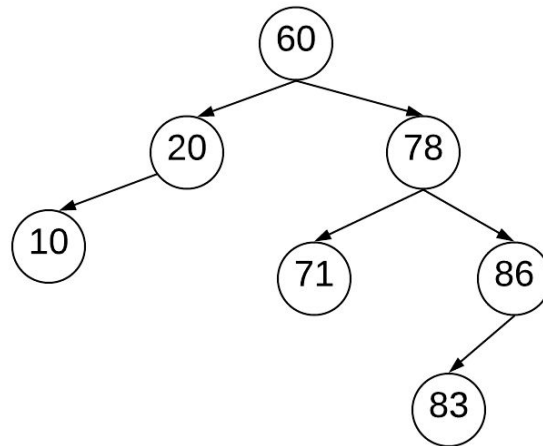
8.1 Construct an AVL tree following this sequence.

**Note:** You are not required to draw an updated tree for each step.



9. Draw the rebalanced AVL tree after the following operations.

**Note:** Each question is independent and not related. For instance, question 9.2 is not a continuation of question 9.1.



9.1 Delete Node 10.

9.2 Delete Node 20.

9.3 Insert Node 81.

9.3 Insert Node 90.