

# Data Structures and Algorithms

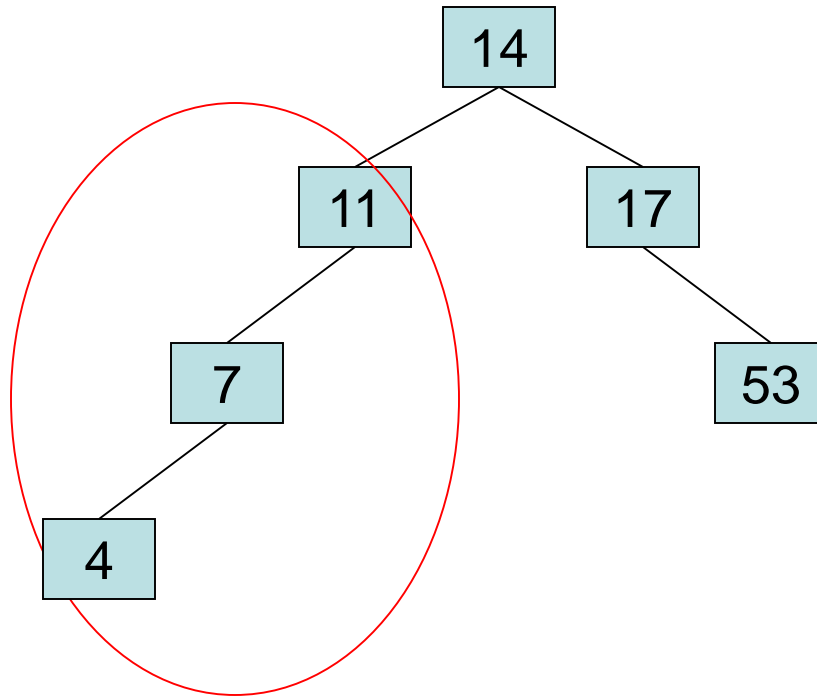
## AVL Tree

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(Computer and Communication  
Engineering)

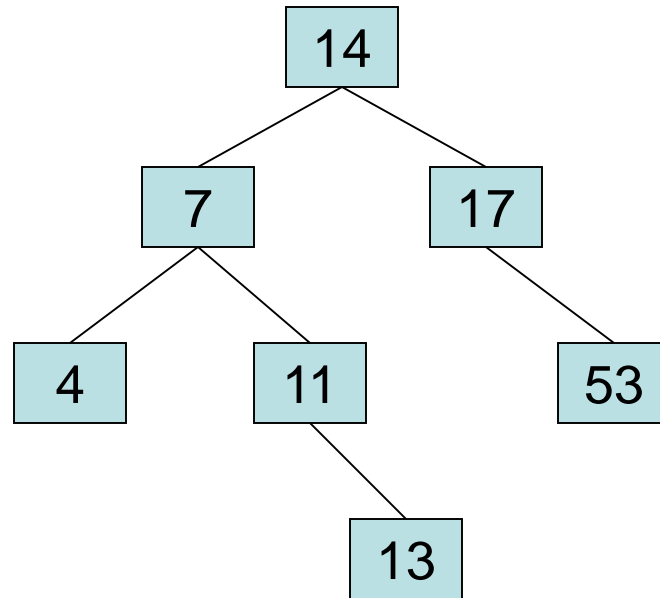
## AVL Tree Example:

- Insert 14, 17, 11, 7, 53, 4, 13 into an empty AVL tree



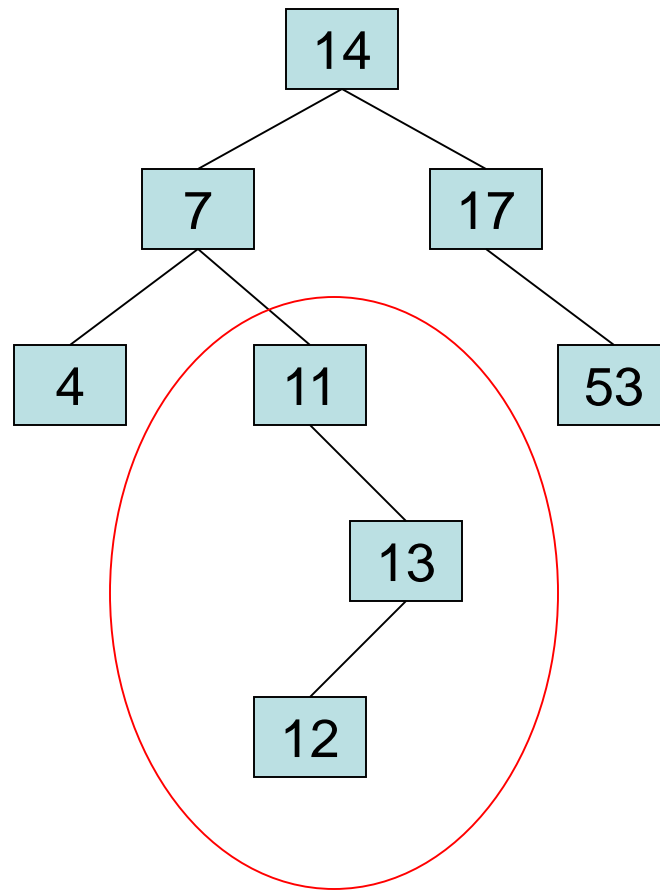
## AVL Tree Example:

- Insert 14, 17, 11, 7, 53, 4, 13 into an empty AVL tree



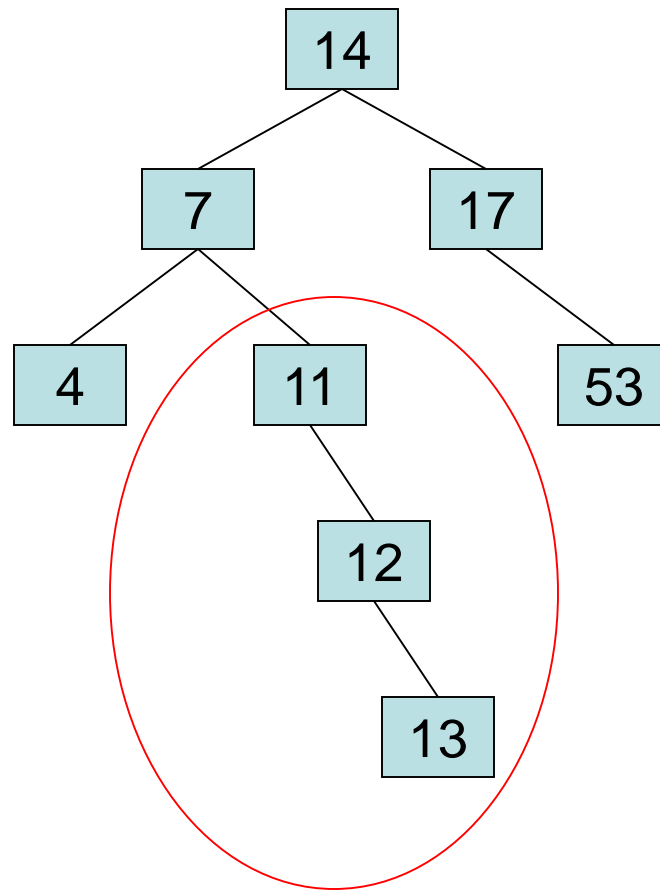
## AVL Tree Example:

- Now insert 12



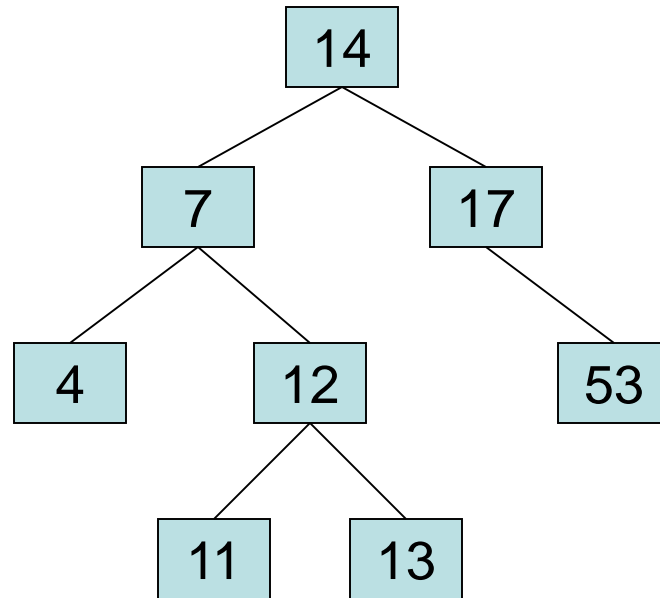
## AVL Tree Example:

- Now insert 12



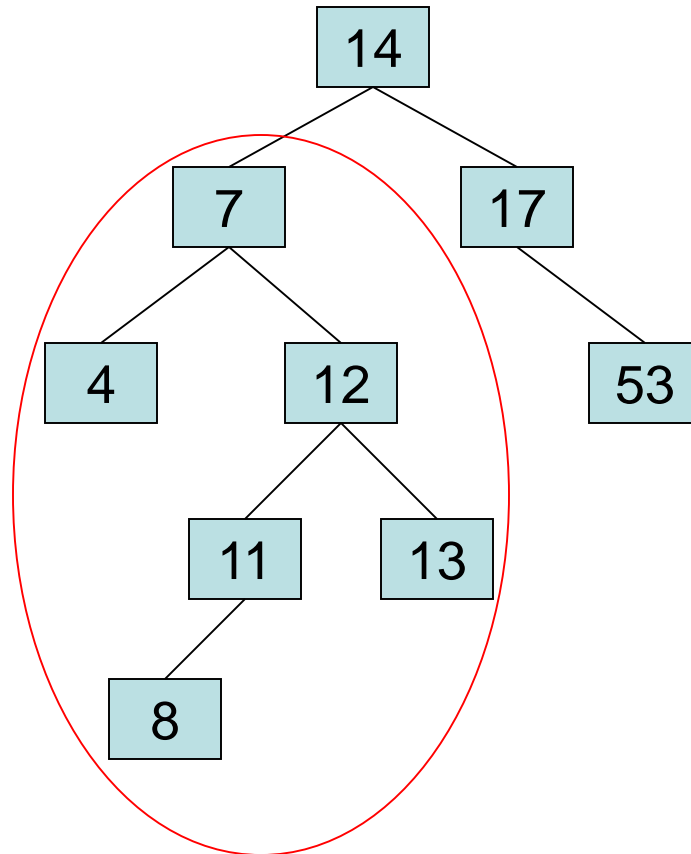
## AVL Tree Example:

- Now the AVL tree is balanced.



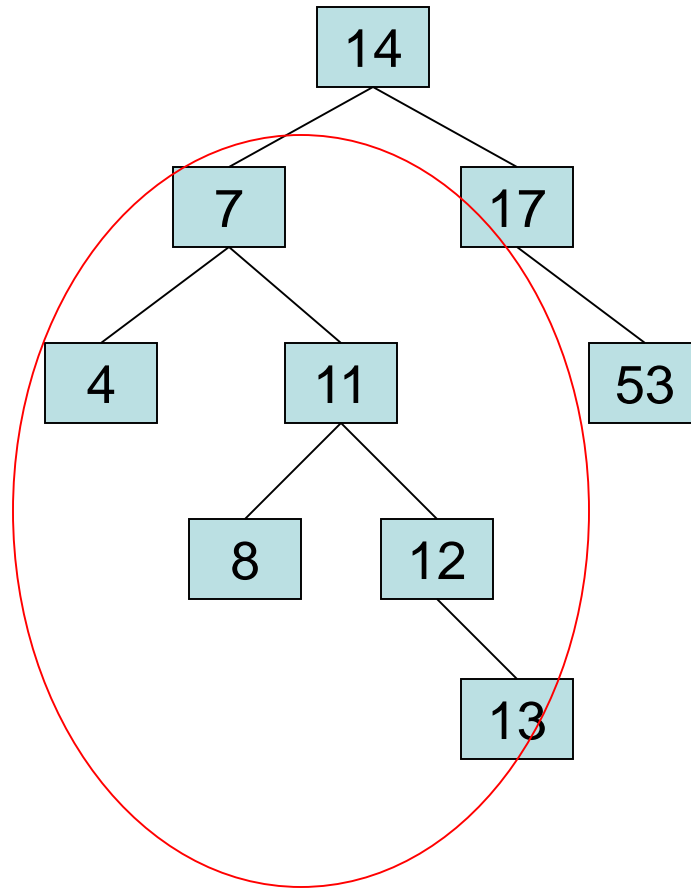
## AVL Tree Example:

- Now insert 8



## AVL Tree Example:

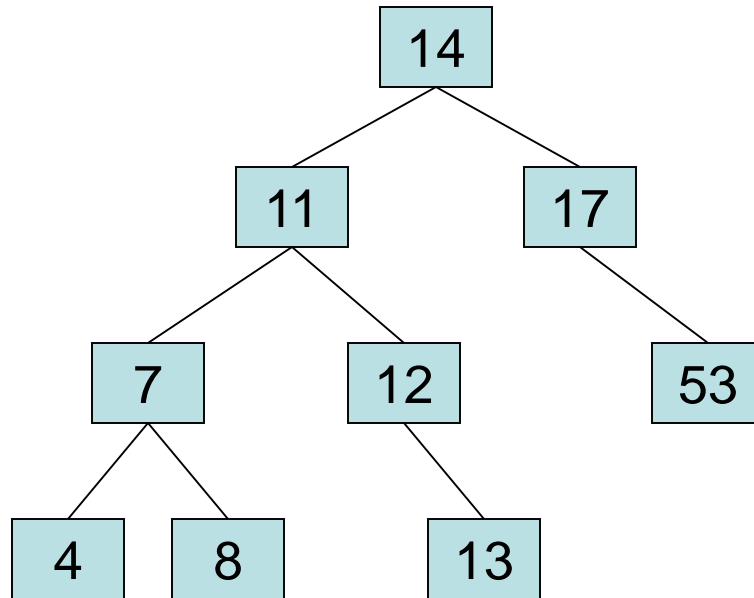
- Now insert 8





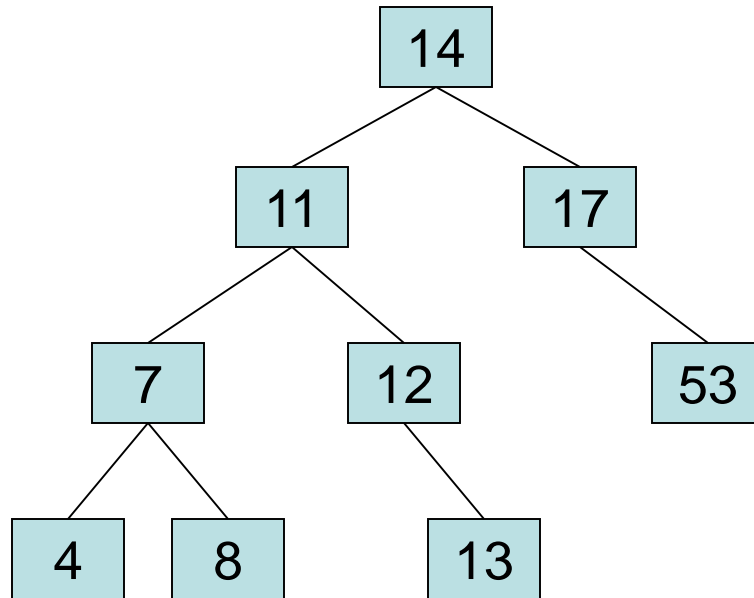
## AVL Tree Example:

- Now the AVL tree is balanced.



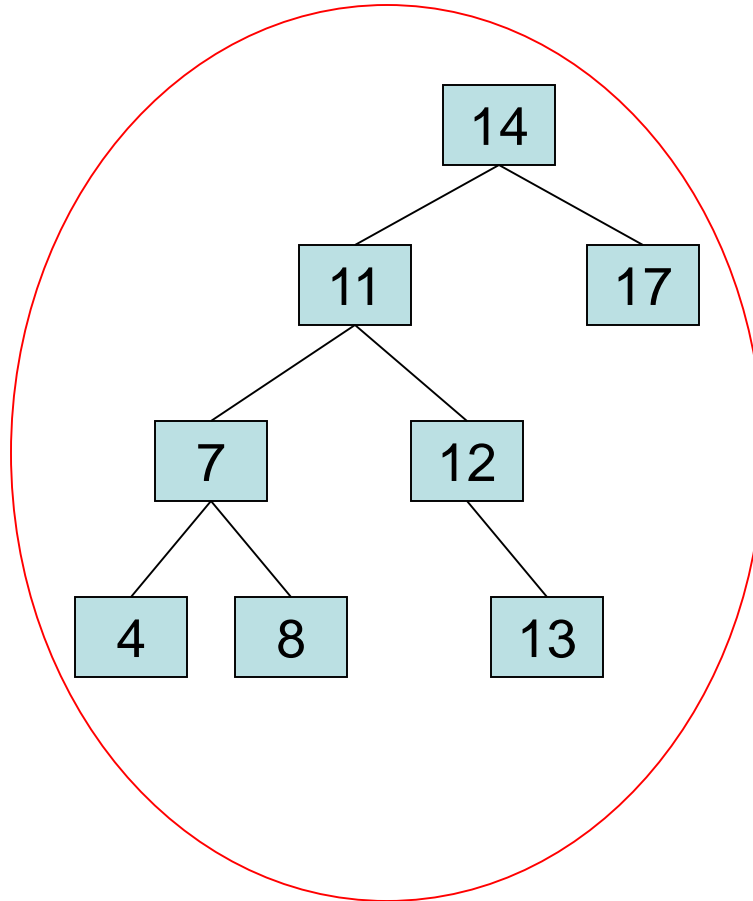
## AVL Tree Example:

- Now remove 53



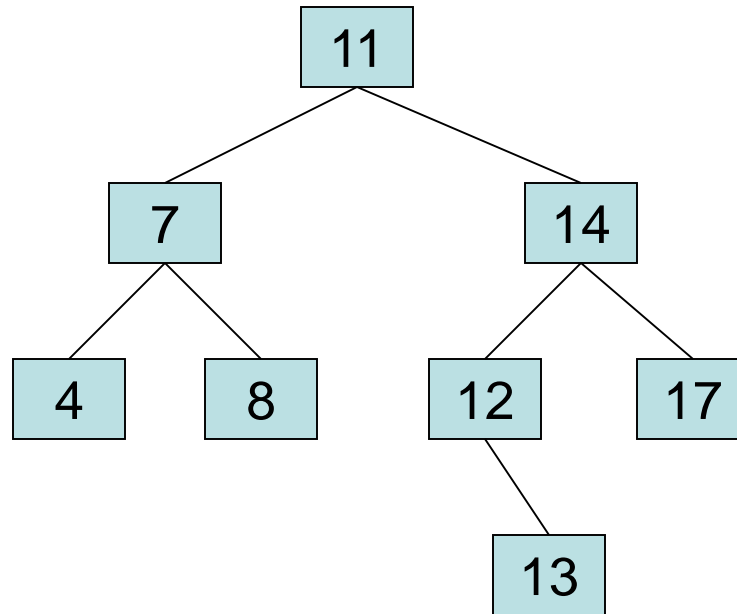
## AVL Tree Example:

- Now remove 53, unbalanced



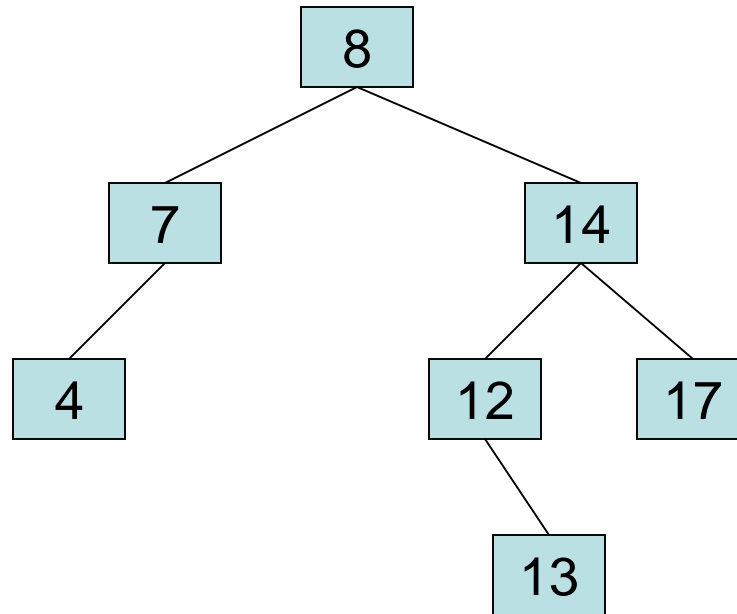
## AVL Tree Example:

- **Balanced! Remove 11**



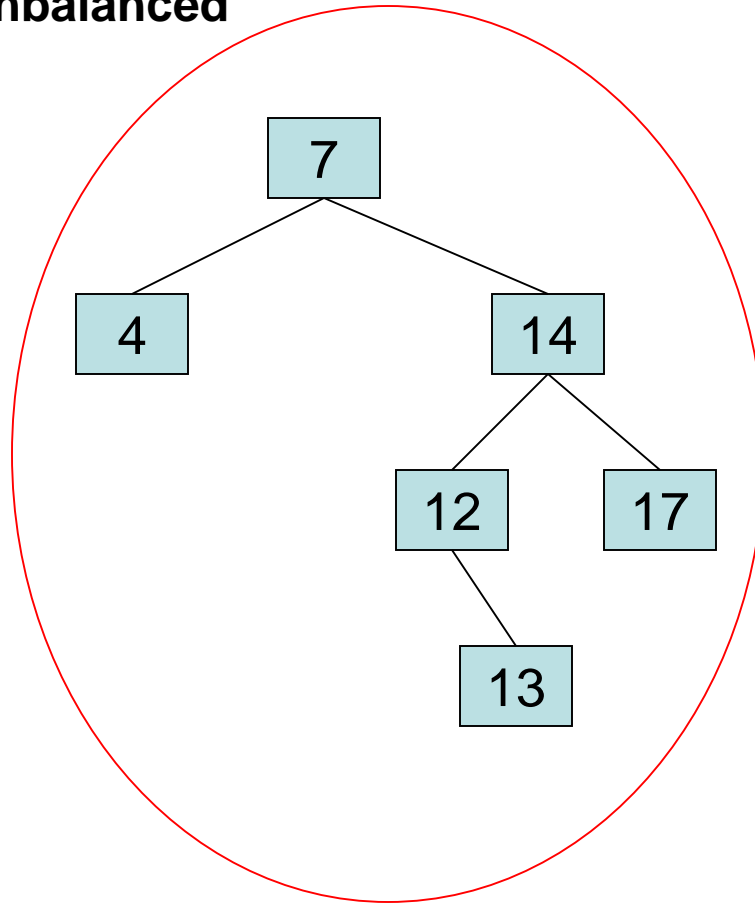
## AVL Tree Example:

- Remove 11, replace it with the largest in its left branch



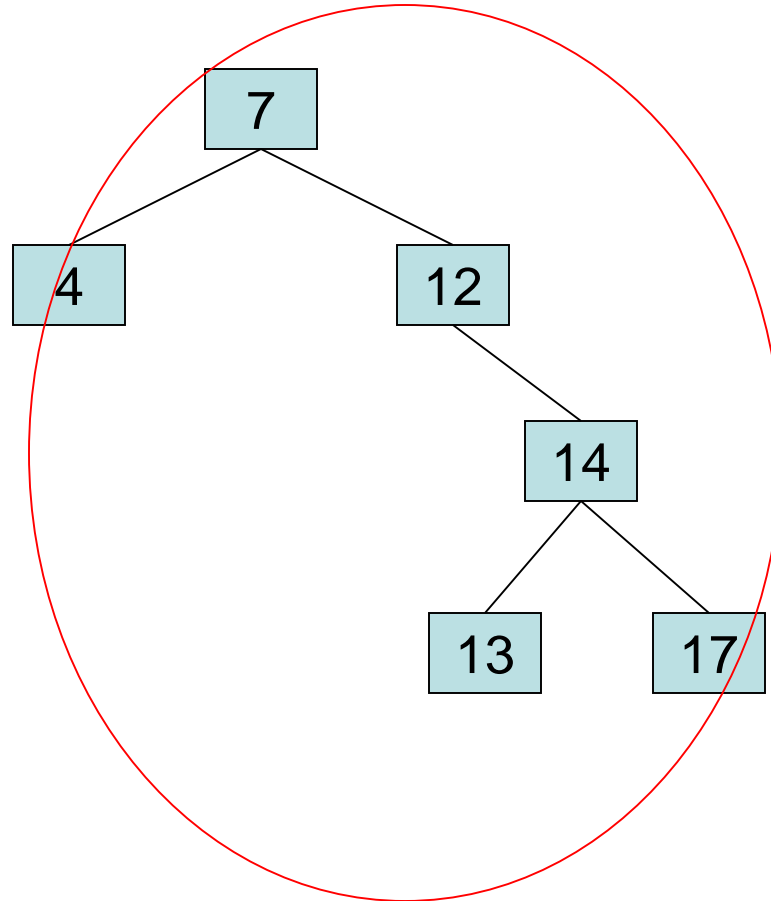
## AVL Tree Example:

- Remove 8, unbalanced



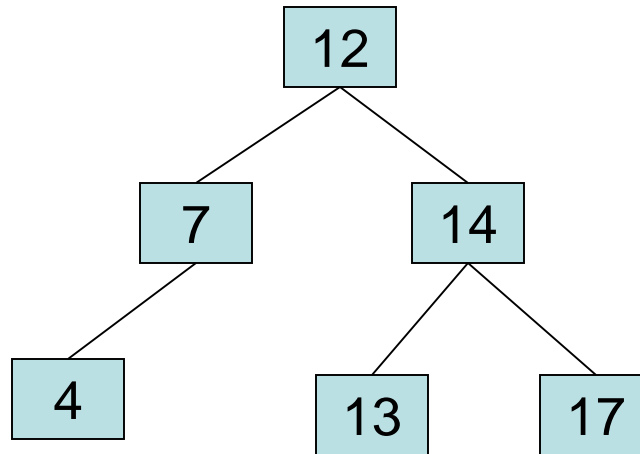
## AVL Tree Example:

- Remove 8, unbalanced



## AVL Tree Example:

- **Balanced!!**

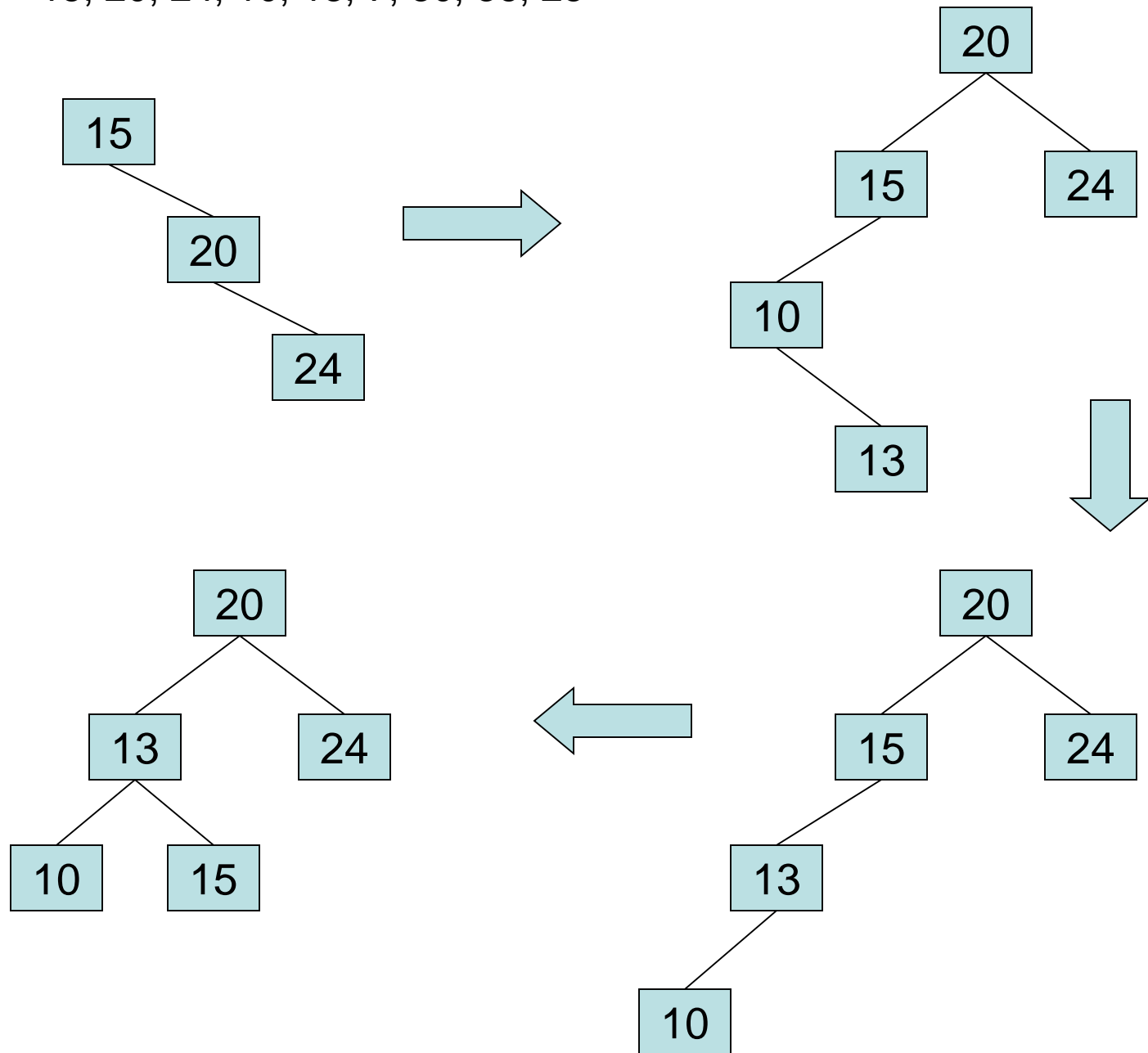




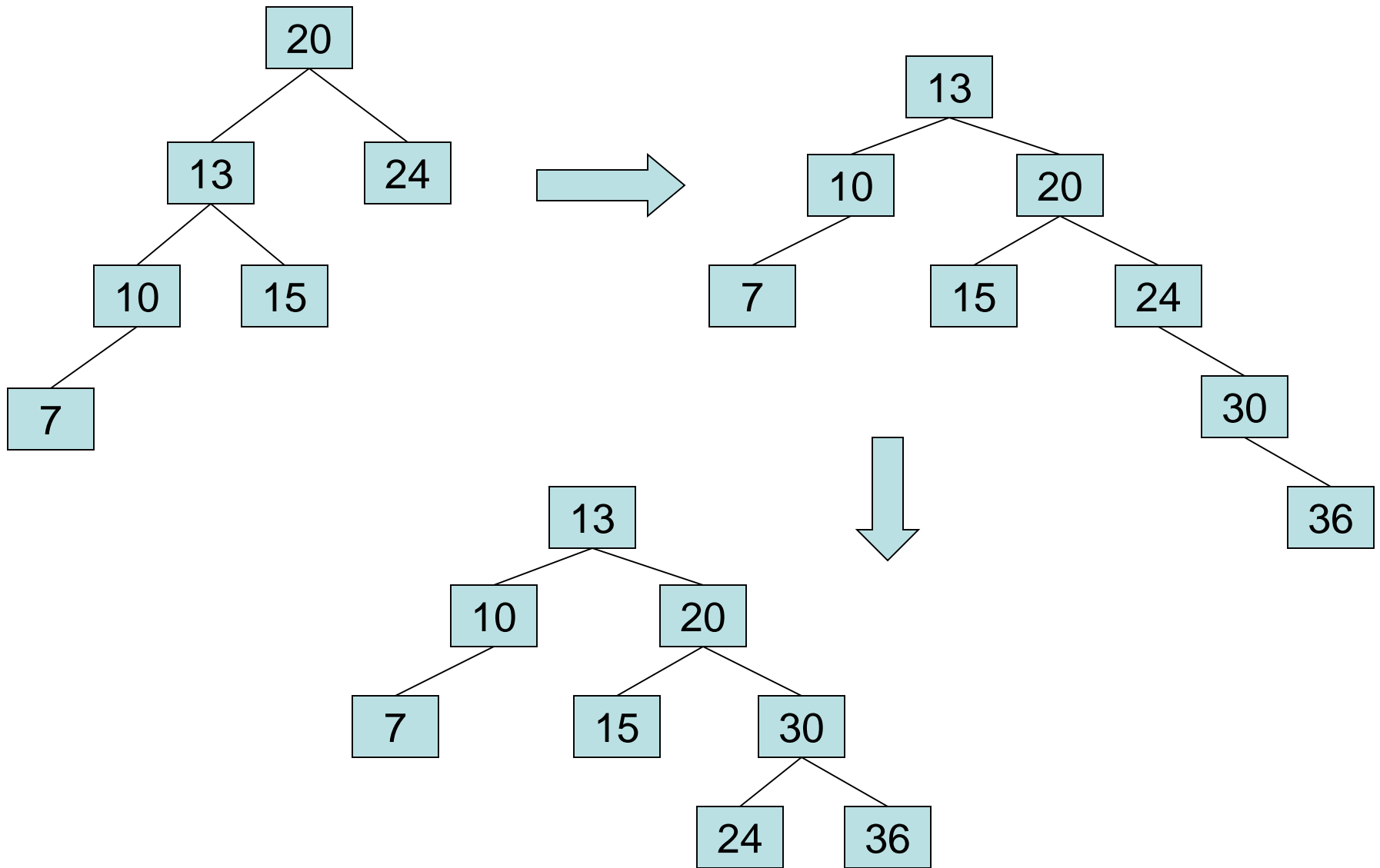
# In Class Exercises

- Build an AVL tree with the following values:  
15, 20, 24, 10, 13, 7, 30, 36, 25

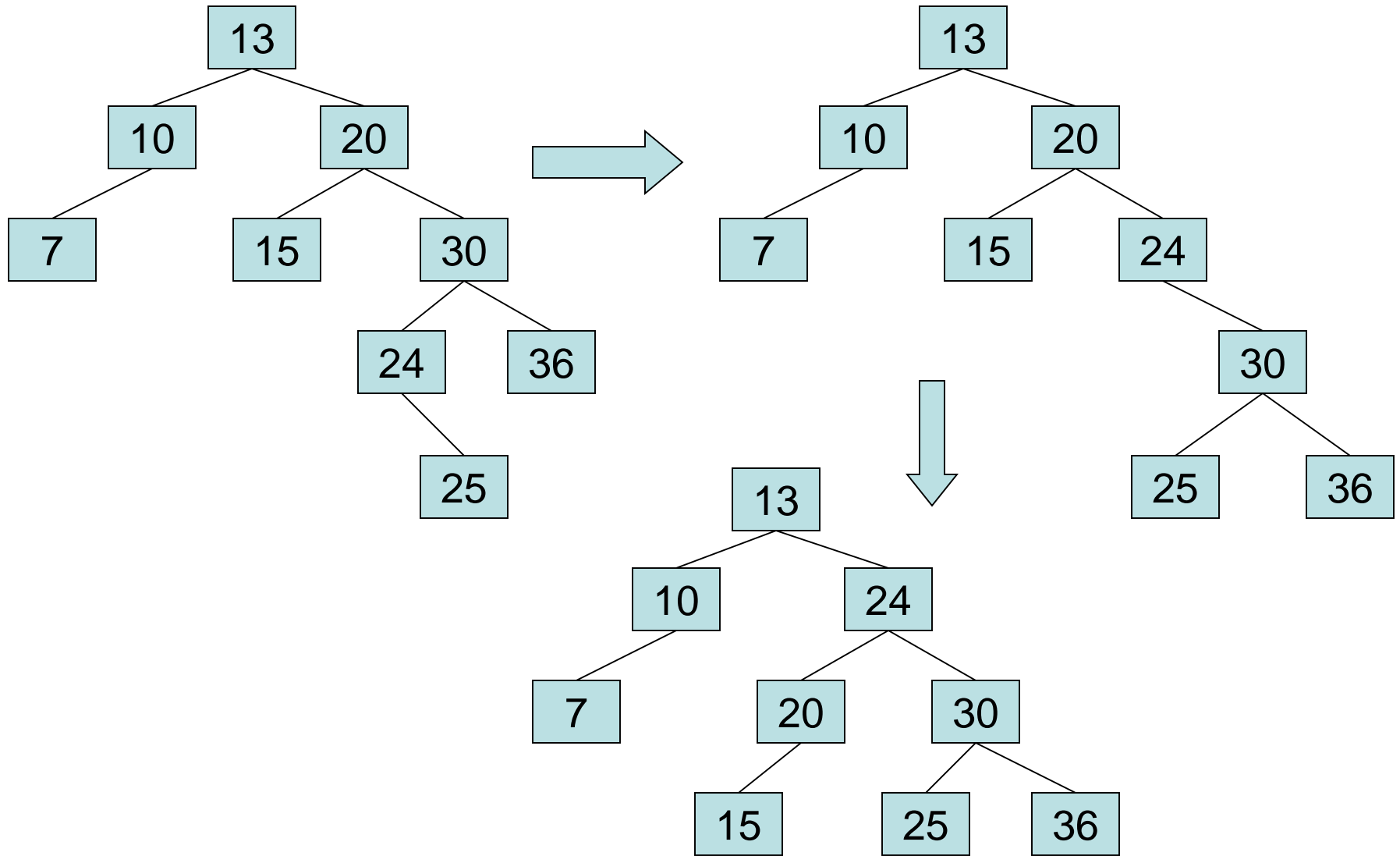
15, 20, 24, 10, 13, 7, 30, 36, 25



15, 20, 24, 10, 13, 7, 30, 36, 25



15, 20, 24, 10, 13, 7, 30, 36, 25



Remove 24 and 20 from the AVL tree.

