

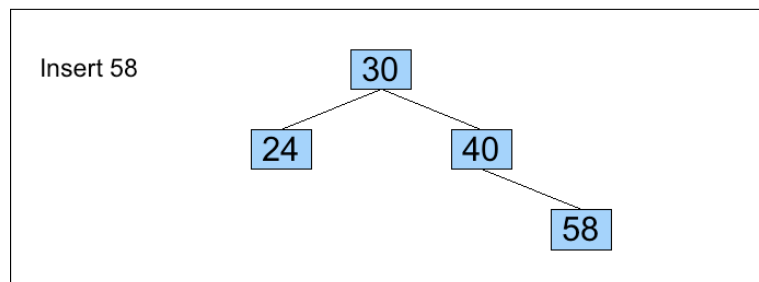
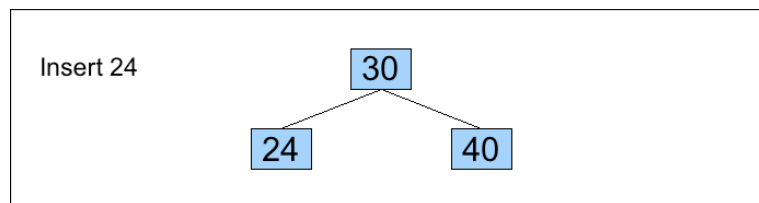
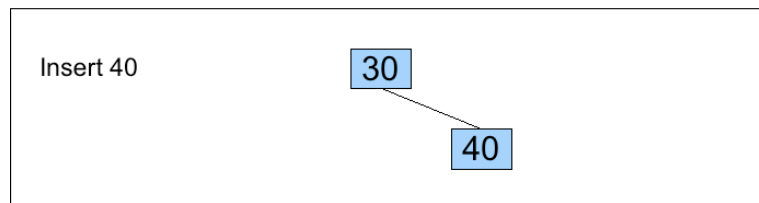
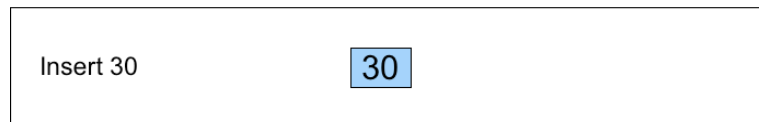
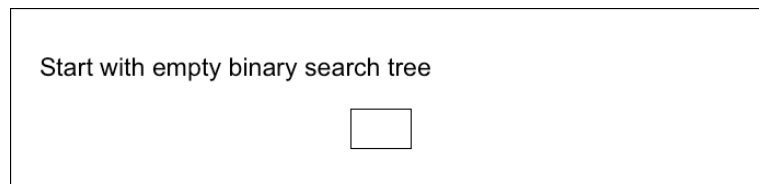
# COMP3506/COMP7505—Algorithms and Data Structures

School of Information Technology and Electrical Engineering

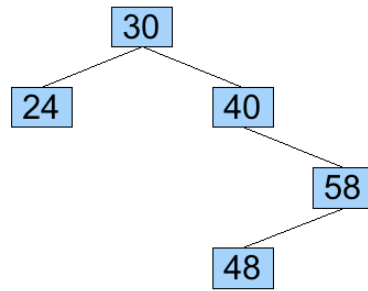
## Week 8 Tutorial Sample Solutions

### Question 1

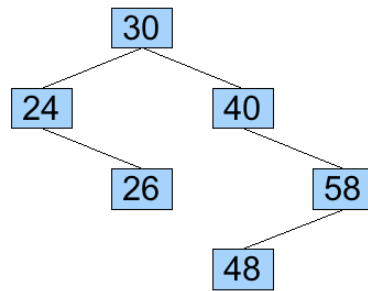
- a) Insert into an empty binary search tree, entries with keys 30, 40, 24, 58, 48, 26, 11, and 13 (in this order). Draw the tree after each insertion.



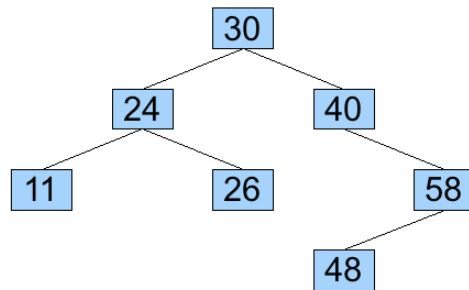
Insert 48



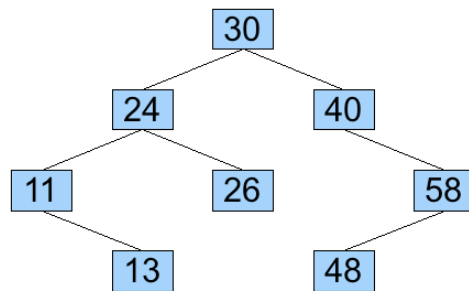
Insert 26



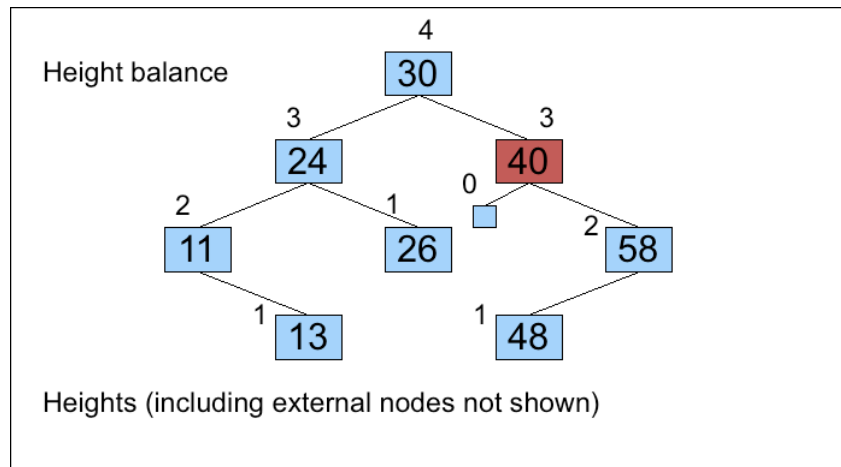
Insert 11



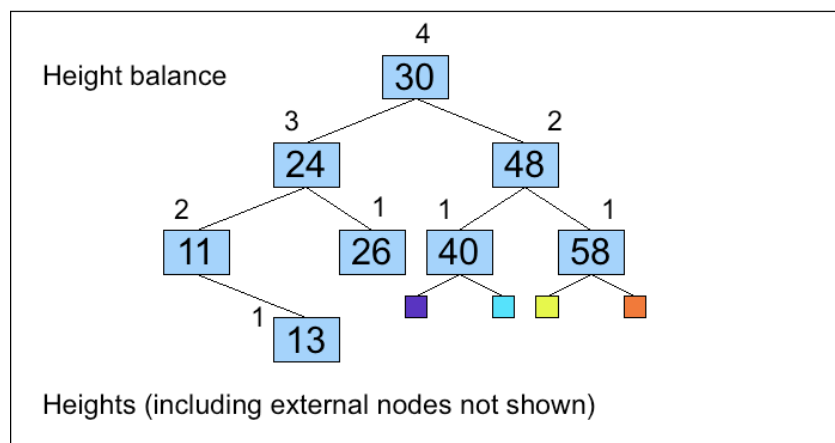
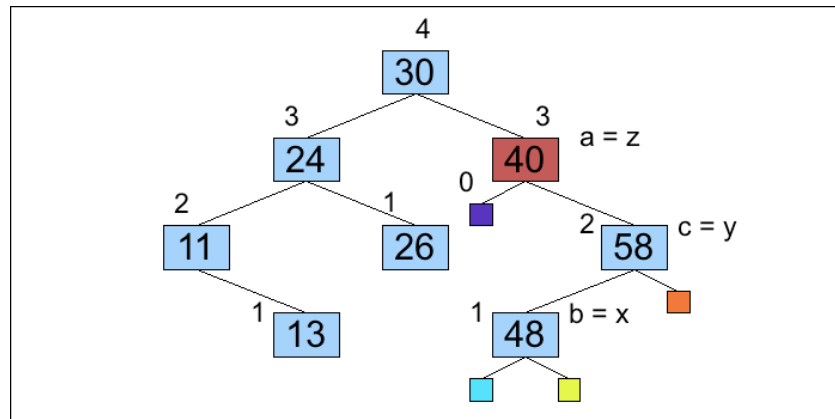
Insert 13



- b) Does the final tree meet the height-balance property? Show the tree with each node annotated with its height.



- c) Perform a single tri-node restructuring to balance the tree of question 2b.



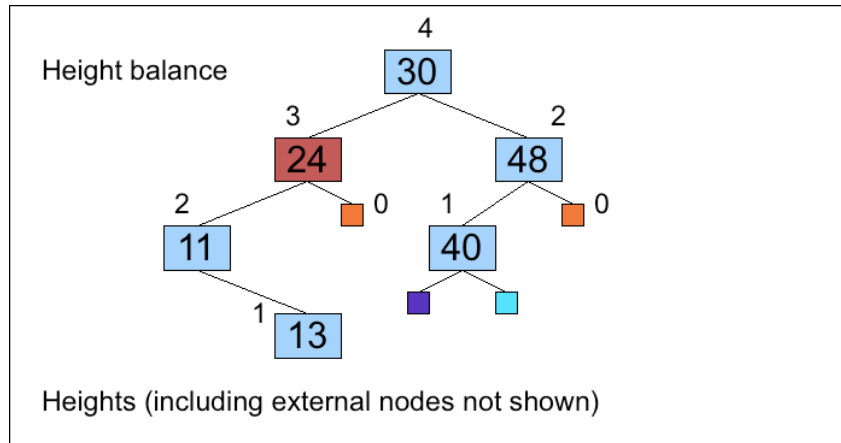
- d) Show by annotating the nodes that the tree is now meets the height-balance property.

See answer (c)

e) Remove the following nodes from the result of question 3. Remove 26 and 58.

See answer (f).

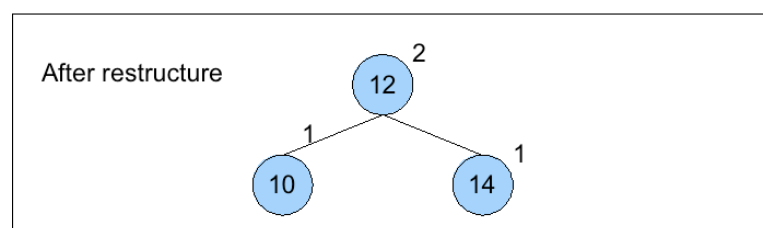
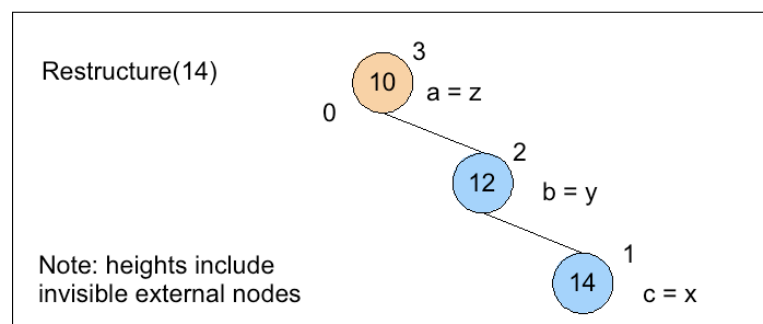
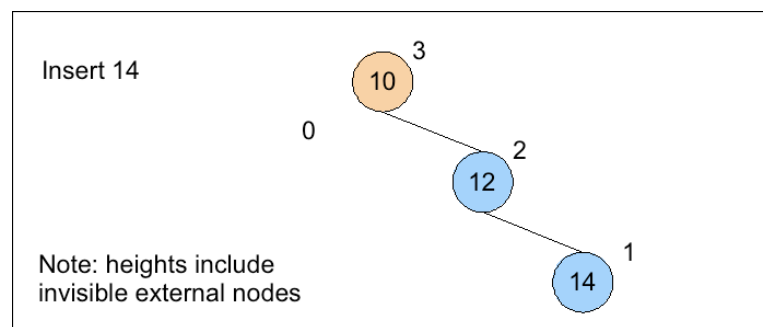
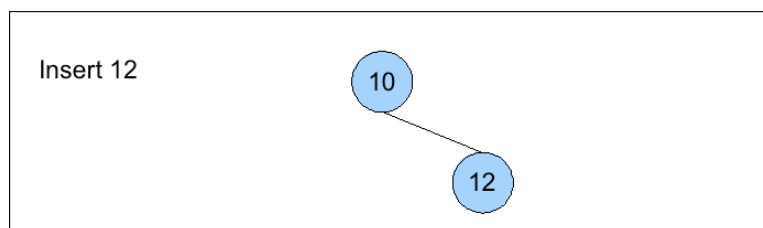
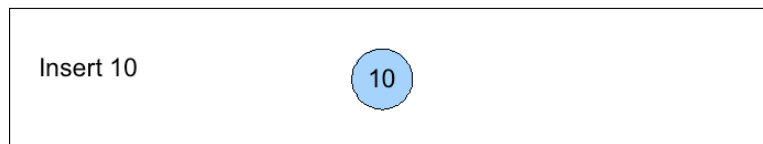
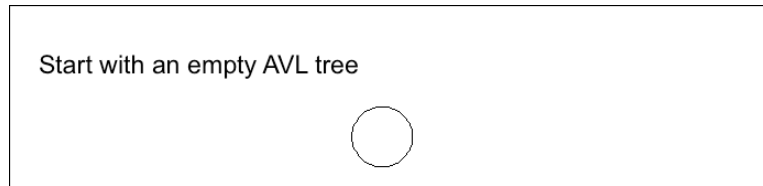
f) Does the final tree meet the height-balance property? Show the tree with each node annotated with its height.



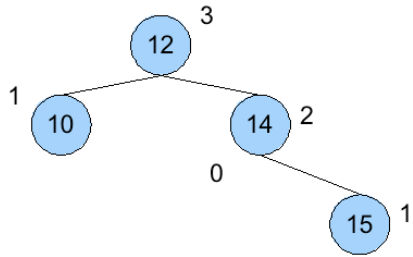
## Question 2

Show the insertion of the following numbers into an AVL tree: 10, 12, 14, 15, 23, 32, 35.

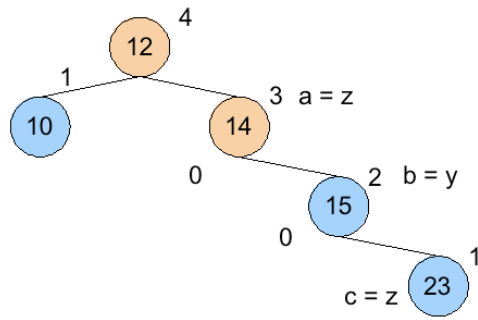
Show the structure of the tree after each insertion.



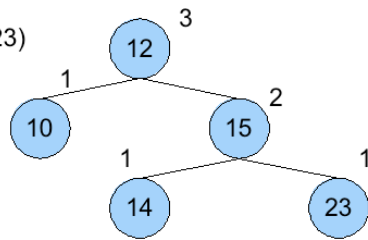
Insert 15



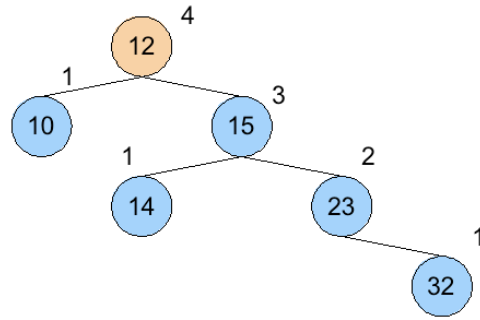
Insert 23



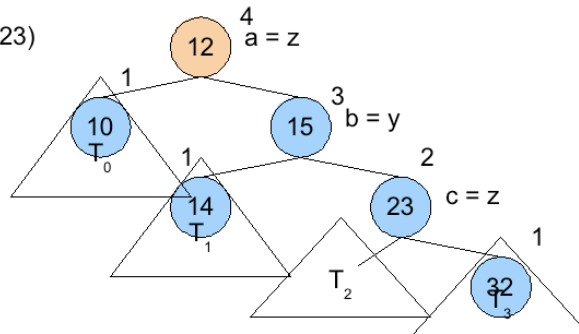
After restructure(23)



Insert 32



Restructure(23)



Restructure(23)

