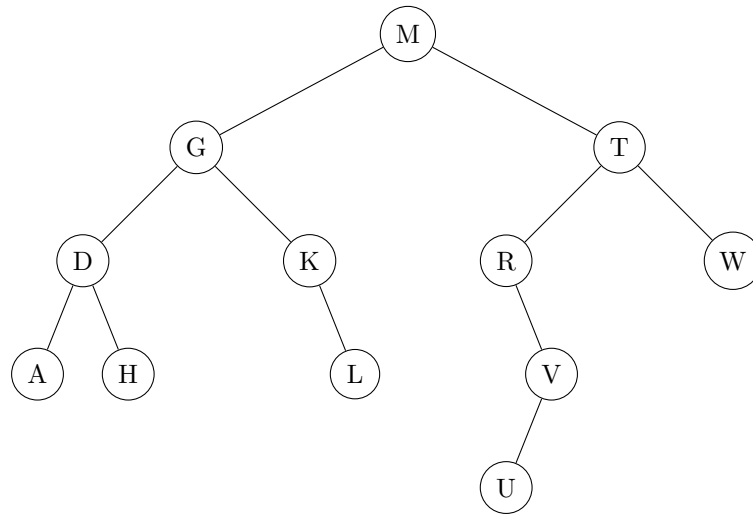


Homework: Binary Search Trees

Name: _____

1. Use the following binary search tree to answer the questions below.

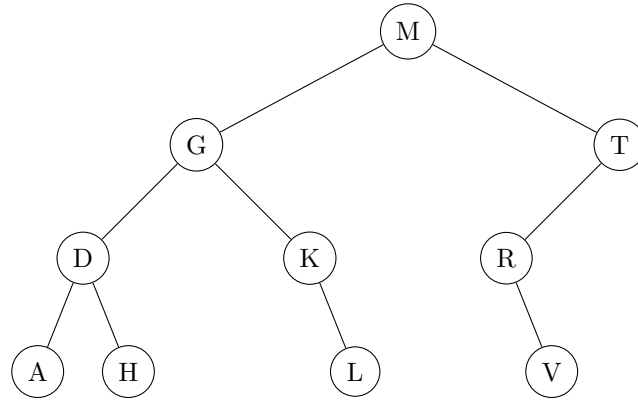


- (a) (5 points) What is the pre-order traversal of this tree?
- (b) (5 points) What is the in-order traversal of this tree?
- (c) (5 points) What is the post-order traversal of this tree?
2. (5 points) What is the **maximum** height of a binary search tree that contains n items? Why?
3. (5 points) What is the **minimum** height of a binary search tree that contains n items? Why?
4. (5 points) Why is it important for a binary search tree to remain balanced?

5. (5 points) Write the pseudocode implementation for finding the minimum element in a binary search tree. You may write either a recursive or iterative implementation.

6. (5 points) Insert the following items into an empty binary search tree in order: $\{30, 40, 23, 58, 48, 26, 11, 13\}$.

7. For each question use this binary search tree, in this state.

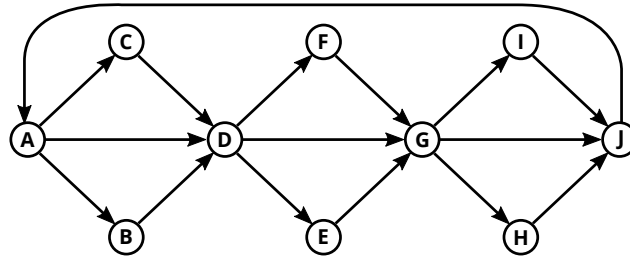


(a) (5 points) Draw the above binary search tree after removing **H**.

(b) (5 points) Draw the above binary search tree after removing **G**.

(c) (5 points) Draw the above binary search tree after removing **T**.

8. Use the following graph to answer the questions below.



- (a) (5 points) List the nodes in the order they would be visited with **depth-first** search starting at **A**. When choosing a node to explore next, break ties in favor of *lesser* letter. Partial credit will be given if you show the state of any auxiliary data structures.
- (b) (5 points) List the nodes in the order they would be visited with **breadth-first** search starting at **A**. When choosing a node to explore next, break ties in favor of *lesser* letter. Partial credit will be given if you show the state of any auxiliary data structures.