Homework 6

1 Question 1

Draw the stack data structure (for both the array and linked list implementation) for each step in the following swquence: push(1), push(2), pop(), push(3), push(4), pop(), pop(), push(5). Assume an initial size of 3 for the array implementation.

2 Question 2

Draw the queue data structure (for both the array and linked list implementation) for each step in the following swquence: enqueue(1), enqueue(2), dequeue(), enqueue(3), enqueue(4), dequeue(), dequeue(), enqueue(5). Assume an initial size of 3 for the array implementation.

3 Question 3

Suppose you have a stack S containing n elements and a queue Q that is initially empty. Describe how you can use Q to scan S to see if it contains a certain element x, with the additional constraint that your algorithm must return the elements back to S in their original order. You may not use an array or linked list—only S and Q and a constant number of reference variables.
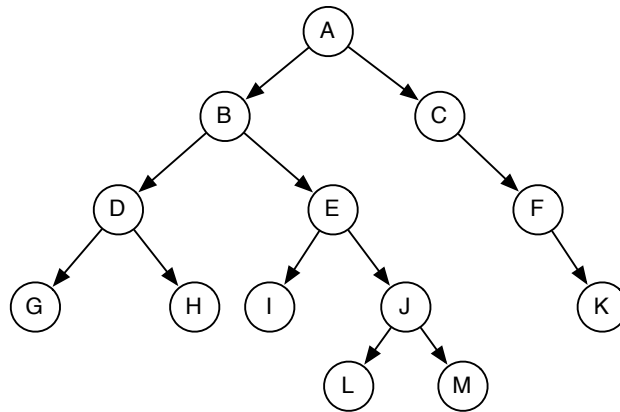

Figure 1: *A tree*

4 Question 4

For the tree shown in Figure 1, determine

1. Which node is the root
2. Which nodes are leaves
3. The tree's depth
4. The result of preorder, postorder, inorder, and level-order traversals

5 Question 5

For each node in the tree shown in Figure 1

1. Name the parent node
2. List the children
3. List the siblinges
4. Compute the height
5. Compute the depth
6. Compute the size