Polytechnic Tutoring Center

Final Exam Review - CS 1134, Spring 2020

Disclaimer: This mock exam is only for practice. It was made by tutors in the Polytechnic Tutoring Center and is not representative of the actual exam given by the CS Department.

1 Fill in the runtimes for the following table.

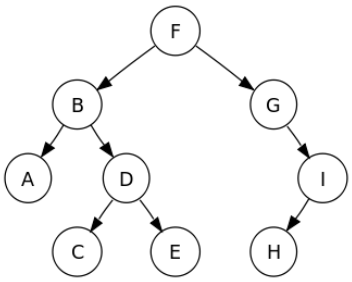
Data Structure	Insert	Search	Delete
Array			
Stack			
Queue			
Binary Search Tree			
Binary Heap			
Hashtable			

2 The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10. Using the hash function h(k) = k mod 10, draw the hash table using:

1.Chanining Approach

2. Open Addressing with linear Probing

3 Given the following tree write the preorder, postorder, and inorder traversal of nodes.



Preorder :

Inorder :

Postorder :

1. What is the runtime of the traversals?

2. Draw out the BST based on the following information:

Preorder: 15 8 11 9 20 17 16

Inorder: 8 9 11 15 16 17 20

4 Write code to Merge two sorted linked lists and return it as a new list. The new list should be made by splicing together the nodes of the first two lists

Example:
Input: 1->2->4, 1->3->4
Output: 1->1->2->3->4->4

```
.def mergeTwoLists(l1,l2):
```

5 Given a non-empty binary tree, check whether it is a mirror of itself (ie, symmetric around its center).

Symmetric tree examples:

```
        1                                   1                           1
      /   \                               /   \
     2     2                             2     2
    / \   / \                           /       \
   3   4 4   3                         3         3
```

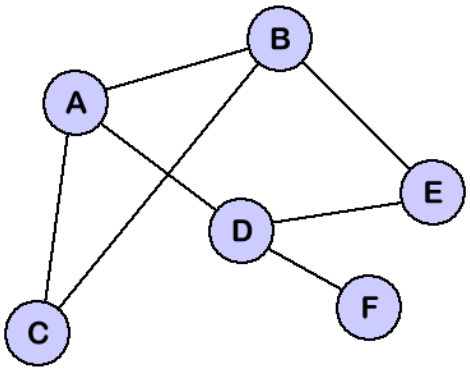
Code:

```
def is_symmetric(root):
```

6 Write the BFS and DFS going alphabetically when given multiple options.

BFS:

DFS:



7 Draw the corresponding max-heap from the given list: [50,19,36,17,3,25,1,2,7]

8 Using the above heap draw what happens step by step when you insert 23.

9 Using the above heap draw what happens step by step when you delete max.

10 Write a post-order traversal generator for a tree data structure class.

Code:

```
def post_order(node):
```

11 Given a binary search tree and the lowest and highest boundaries as L and R, trim the tree so that all its values lies in the interval [L, R] (R >= L). You might need to change the root of the tree, so the result should return the new root of the trimmed binary search tree.

Example 1:

```
                15
             /       \
          8            20
             \         /
             11     17
            /        /
        9        16


1. L = 11, R = 17

The tree will becomes:
                15
              /   \
             11     17
                    /
                  16

2. L = 16, R = 30

The tree will becomes:

          20
         /
        17
        /
      16
```

Code:

```
def trimBST(root,L,R):
```