

CS 330 – Spring 2019 – CS 112 Data Structures Review

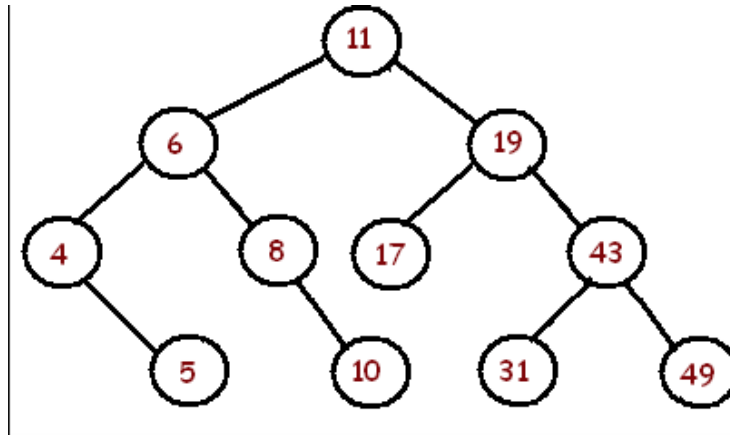
Question 1. Stacks and queues

Briefly explain the similarities and differences between stack and queue datastructures. In particular, what is the difference between the push and pop operations versus the enqueue and dequeue operations?

If you need a refresher: https://www.youtube.com/watch?v=6QS_Cup1YoI

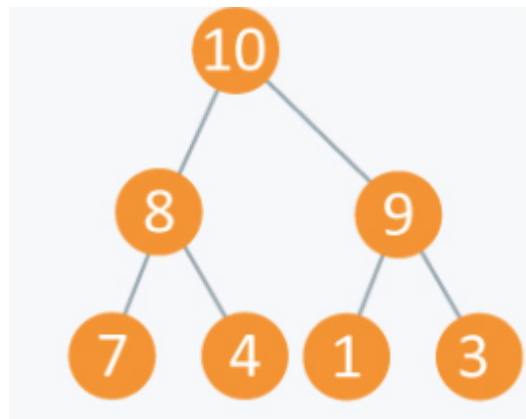
Question 2. Binary Trees, Binary Heaps, and Priority Queues

a) Represent the following binary tree in an array:



If you need a refresher: http://nptel.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/data_str_algo/modules_6_9_12/binary%20tree/array.html

b) Insert the number 9.5 into this binary max heap and draw what both the tree and array look like at each step:



If you need a refresher: <https://www.hackerearth.com/practice/notes/heaps-and-priority-queues/>

c) Define priority queue. Then briefly explain why a min binary heap an efficient data structure for storing a min priority queue.

If you need a refresher: <https://www.hackerearth.com/practice/notes/heaps-and-priority-queues/>

Question 3. Hash Tables

Consider a hash table with 13 slots. Draw the content of this hash table after hashing the values {72, 61, 80, 43, 17, 91, 13, 4, 10, 1} using the hash function $h(k) = (3k + 5) \% 13$. (Note: % means modulo)

If you need a refresher: <http://www.sparknotes.com/cs/searching/hashtables/section1/>