

Homework 10

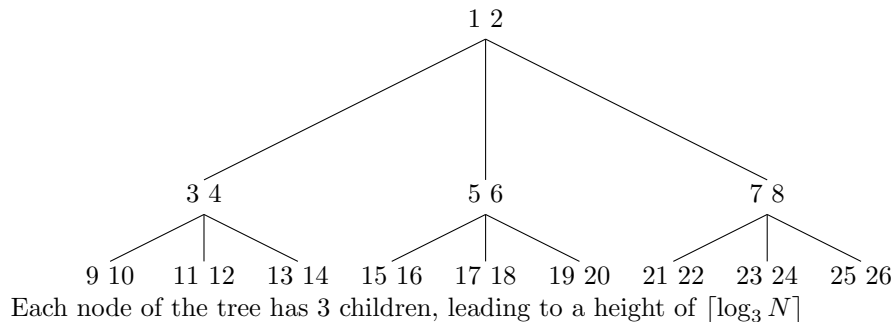
1. Study Guide Question

Given an LLRB, is there exactly one corresponding 2-3 tree? Given a 2-3 tree, is there exactly one corresponding LLRB?

2-3 trees and LLRBs have an exact 1-1 correspondence. For any 2-3 tree there is exactly one LLRB tree and vice versa.

2. Study Guide Question

Draw a 2-3 tree with all 3 nodes. Why is the height $\log_3(N)$?



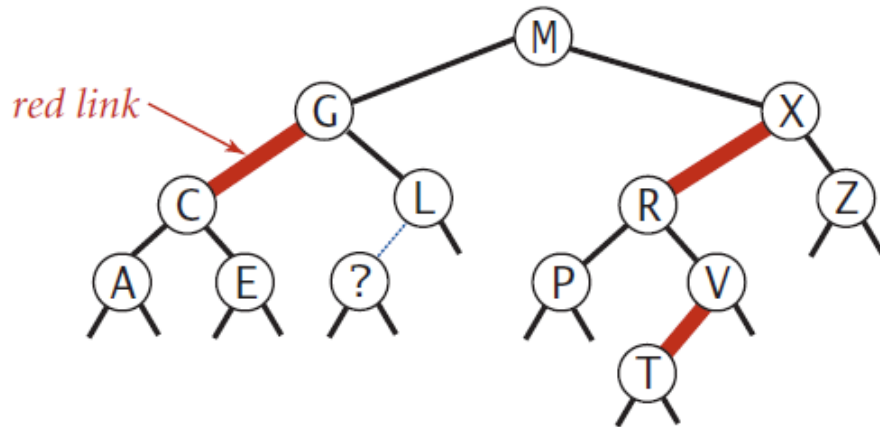
3. Study Guide Question

How many compares does it take in the worst case to decide whether to take the left, middle, or right link from a 3 node?

It takes 2 compares in the worst case as eliminating 2 of the three children is all that is necessary to decide to take the third.

4. One of the following: Fall 2010 Midterm Question 4, Fall 2011 Midterm Question 6, Spring 2012 Midterm Question 5, Spring 2013 Midterm Question 2, Fall 2008 Midterm Question 6, Fall 2009 Midterm Question 4

Consider the following left-leaning red-black BST.



- A. Which one or more of the keys below could be in the node labeled with a question mark?
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

H, I, J, and K

- B. What is the color of the link from the node labeled with a question mark to its parent?

Red

- C. Add the key U and draw the resulting left-leaning red-black BST.

