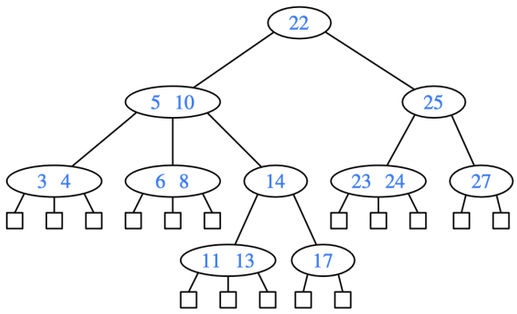
Data Structures: 8th Recitation Questions



1. Is the tree above a (2,4) Tree? Why or why not?
2. Dr. Amongus claims that a $(2, 4)$ tree storing a set of entries will always have the same structure, regardless of the order in which the entries are inserted. Show that he is wrong.
3. Consider the sequence of keys $(5, 16, 22, 45, 2, 10, 18, 30, 50, 12, 1)$. Draw the result of inserting entries with these keys (in the given order) into an initially empty $(2, 4)$ tree.
4. Consider the set of keys $K = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$.
   (a) Draw a $(2, 4)$ tree storing K as its keys using the fewest number of nodes.
   (b) Draw a $(2, 4)$ tree storing K as its keys using the greatest number of nodes.
5. Let T and U be $(2, 4)$ trees storing n and m entries, respectively, such that all the entries in T have keys less than the keys of all the entries in U. Describe an $O(\log n + \log m)$-time method for joining T and U into a single tree that stores all the entries in T and U.