Quiz

CSC301 Algorithms and Data Structures

30 March 2015

1. A heap is a kind of a tree. We can use an array to hold the elements of the heap and indices on that array to locate the nodes of the tree.
   (a) If k is the index a node, what is the index of that node's left child?
   (b) If k is the index of a node, what is the index of that node's right child?
   (c) If k is the index of a node, what is the index of that node's parent?
   (d) What is the ordering rule that relates the value in a node to the values in its children?
2. We can use one data structure to make another. For example, we built stacks and queues on top of arrays and linked lists.
   (a) Explain how a priority queue could be used as the basis for a stack.
   (b) Explain how a priority queue could be used as the basis for a queue.
3. Draw the binary search tree that results when integers are added to an empty tree in the following order: 4–2–1–3–6–5–7
4. Draw the binary search tree that results when integers are added to an empty tree in the following order: 1–2–3–4–5–6–7
5. What is the minimum height of a binary search tree that contains N elements?
6. What is the maximum height of a binary search tree that contains N elements?