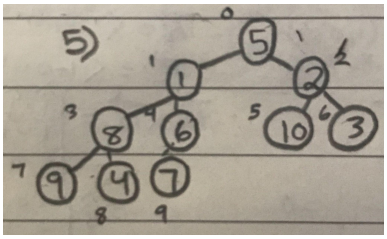
Chapter 17 Checkpoint Questions

1. The complete binary tree in figure 16-16 is not a heap. It is not a maxheap because the item in the root is 30, and one of its children has a value greater than it (50). It is not a minheap either, because one of the children of the root has a value less than it (20). Hence, it is not a heap.

2.
0 1 2 3 4 5
10 9 6 3 2 5

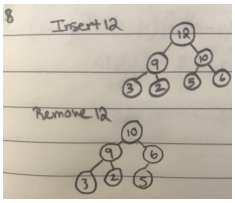
3.
0 1 2 3 4 5
2 3 5 9 6 10

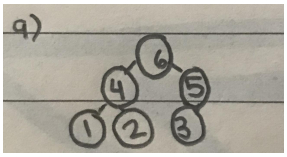
4. You can tell that the node in items[i] is a leaf by checking whether the array index of its left child (2 * i + 1) exceeds numItems - 1 (which is the index containing the “last” item, i.e. the rightmost item on the final level of the complete binary tree representing the heap). If this condition is true, it means that the node contained in items[i] possesses no children (because if a node has no left child, it must have no right child either).

5. 

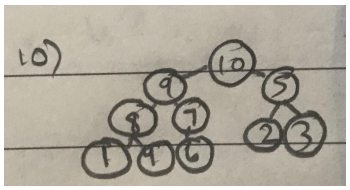
6. The array doesn’t represent a maxheap or a minheap.

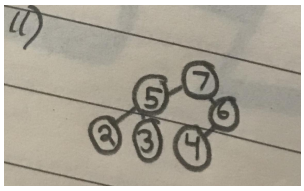
7. A semiheap is where the root is out of place and its children are both heaps. Following this definition, figure 16-16 is not a semiheap, because the two children of the root are not heaps.

8. 

9. 

10. for (index = numItems - 1 down to 0)
        heapRebuild(index)



11. 

Chapter 17 Exercises