CMPS 101
Final Review Problems

1. Let T be a binary tree, and let $n(T)$ and $h(T)$ denote its number of nodes and height, respectively. Show that $h(T) \geq \lfloor \lg(n(T)) \rfloor$. (Hint: this was proved in the solutions to hw7.)

2. Trace HeapSort on the following arrays
   a. (9, 3, 5, 4, 8, 2, 5, 10, 12, 2, 7, 4)
   b. (5, 3, 7, 1, 10, 12, 19, 24, 5, 7, 2, 6)
   c. (9, 8, 7, 6, 5, 4, 3, 2, 1)

3. Draw the Binary Search Tree resulting from inserting the keys: 5 8 3 4 6 1 9 2 7 (in that order) into an initially empty tree. Write pseudo-code for the following recursive algorithms, and write their output when run on this tree.
   a. InOrderTreeWalk()
   b. PreOrderTreeWalk()
   c. PostOrderTreeWalk()

4. State the following properties:
   a. The Binary Search Tree Properties.
   b. Min Heap Property.
   c. Max Heap Property