This is a closed-book test. Answer all questions on the paper provided. Use the backs of the provided paper if you need extra space.
1. What is a derived class? Give an example of such a class? What benefits come from using derived classes?
2. What is a virtual member function? What features do these functions give us?
3. Given the following tree. If visiting a node causes the character value at the node to be printed, give the output of a preorder, inorder and postorder search of the tree.
4. Given the list of integers

4, 7, 1, 3, 5, 9, 8

exhibit a balanced binary tree that, when traversed in inorder, outputs the list in ascending order.
7. Given the list of integers

6, 7, 1, 10, 2, 9, 3, 5, 12

Add each of these integers to a Max heap. Show the structure of the heap before and after each insertion. Note: We want the maximum value at the top.