1) Show the result of inserting 10, 12, 1, 14, 6, 5, 8, 15, 3, 9, 7, 4, 11, 13, and 2 one at a time into an initially empty heap. Use the property that the root is to be the largest element. Draw 15 individual heaps.

2) Consider the heap shown below.

![Heap Diagram]

a) Draw the sequential representation of this heap (uses an array). Be sure to correctly indicate the index positions for each element.

b) Draw the heap after the element 7 has been inserted.

c) Using the original heap, draw the heap after performing a `A remove` operation.

3) Show the order of elements in the array after the first two passes of the `bottom-up mergesort` algorithm applied to the array:

   \[
   \text{int A[12] = \{3, 1, 4, 5, 25, 16, 10, 13, 22, 15, 2, 8\}}
   \]
Consider the tree shown below. Use it to answer questions 4-6.

4) Which node is the root? Which nodes are the leaf nodes?

5) What is the depth of the tree?

6) Give the results of processing the tree using:
   a) in-order traversal
   b) post-order traversal
   c) pre-order traversal

**Submission information:**
This assignment is due at the start of class on Monday, October 26th. Solutions must be *typed* unless figures and/or calculations are required. In those cases, **NEAT** hand-written solutions are acceptable.