Discipline of Computing and IT
University of Newcastle

SENG1120/6120 – Semester 1, 2018
Lab 11 (Week 12)

This week's laboratory provides practice in sorting using heap sort. First, create the basic classes for a binary tree (not a binary search tree), which must include the additional variables necessary to implement a heap (e.g. a pointer to the node containing the last item inserted, plus all additional functionality – `isRoot`, `isLeftChild`, `expandExternal`, etc).

Then, create a class `HeapSort`, that contains a binary tree as the main data type. Add the functionality to add and remove elements from the heap. Please remember that this functionality must be implemented within the binary tree, instead of within `HeapSort`, since they need access to specific nodes within the binary tree. Remember that `HeapSort` should have minimal access to the inner workings of the binary tree, and will act just as an interface class.

Now, once the heap is working, proceed to the implementation of the following steps:

1. Input 10 numbers from the user and store them in the heap.
2. Remove all items from the heap and print them one at a time.

If the 10 items printed are sorted, even when the input sequence is not, then the heap is working.

If you want to learn more, try the following:

- Add the functionality of printing the structure of the binary tree, as shown in lectures.
- Print the tree using that function between steps 1 and 2.

Good Luck!