CSCI 230 – Homework 5

Heaps

Objectives

- Implement a min heap with modifications.
- Implement traversal methods for the heap.
- Test the implementation thoroughly with tests that cover all possible use cases.

Background information

Heaps from Shaffer textbook

Assignment

Implement a 3-ary min heap that includes traversal methods

Details:

Start with Shaffer's MaxHeap class that is implemented in the textbook.

Note: As you modify Shaffer's code, document your modifications. Do not remove the header that says it is part of his collection, but make it clear that your code is a modified version of it, and specify how you modified it.

Modify the (binary) MaxHeap to be a 3-ary MinHeap.
*Suggestion***:** Modify the binary MaxHeap to be a binary MinHeap (including changing its name to MinHeap and changing the name of methods as appropriate, for example removemax would become removemin), then modify the binary minheap to be a 3-ary minheap. (Keep the name as MinHeap.)

Add the two traversal methods described below:

1. A breadth-first traversal member method, name it **printBreadthFirst,** that prints the contents of the 3-ary MinHeap in level order, with appropriate newlines, so one can see the level of each node. For example, for the 3-ary minheap below, this method prints
   1

   10 18 22

   15 30 51 25 19

2. A depth-first pre-order traversal member method, name it **printDepthFirst**, that prints the contents of the 3- ary MinHeap in in pre-order. For example, for the 3-ary minheap below, this method prints the nodes in the order: 1, 10, 15, 30, 51, 18, 25, 19, 42, 22
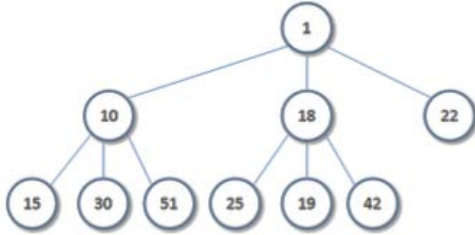
What to submit:
- A zipped folder containing all of your java files **and no subdirectories/folders**.
- One of the files must contain the **MinHeap** class in a file naturally named **MinHeap.java** The filename and class name must match exactly what is in bold.
- One class named **HW5** stored in a file named **HW5.java** that contains a main method that demos your ordered list and what works and specifies in comments what doesn't.
- Any other java files required of your solution. // There might not be any.
- Put MinHeap.java, HW5.java, and any other java files needed in a directory named YourLastNameFirstInitial_HW5. Then compress (zip) that directory. Then you will have a folder YourLastNameFirstInitial_HW5.zip. This is what you need to submit for HW5.