CE221 – Data Structures & Algorithms 15.12.2022
Fall 2022

Lab 4 – Heaps

Download Heap.java and Main.java from Blackboard. Create a Java Project; put all downloaded Java files in the same package.

In this assignment, you are already given an array implementation of a Heap. You need to modify both *Heap.java* and *Main.java* files.

1. Instantiate a new Heap object in the main function. **[5 pts]**
2. Heap class has an `insert(int value)` method which inserts the given value to the heap. Use that method to build your heap with random numbers. You can use any value to test whether the method works properly or not. **[10 pts]**
3. Print the elements that you have inserted using the method `printHeap()`. **[5 pts]**
4. Implement `getMinValue()` method which returns the minimum element of the heap. Use it and print the minimum value. **[10 pts]**
5. Implement `getHeight()` method which returns the height of the heap. Use it and print the height of the heap. **[10 pts]**
6. Implement the `buildHeap(int value)` method this time which builds a binary min heap from the given array `arrayC[]`. **[20 pts]**
   - **6.1.** You will need to implement `percolateDown(int hole)` helper method for `buildHeap` method to work. It moves down the hole to the correct position without violating the heap order property. **[25 pts]**
7. Print the heap elements using `printHeap()` again. **[5 pts]**
8. Implement a `deleteMin()` method which deletes the root of the heap and organizes the heap accordingly. Print this new heap after this operation. This method should also use `percolateDown(int hole)` method to work. **[10 pts]**
9. Submit your *Heap.java* and *Main.java* files through Blackboard.

HONOR CODE:
On my honor, as an Izmir University of Economics student, I affirm that I will not give or receive any unauthorized help on this exam, and that all work will be my own. The effort in the exam belongs completely to me.