Lab 7.1 – Priority Queue Implementation

Learning Goals

1. Develop your understanding of heaps and priority queues.
2. Practice implementing recursion and working with ArrayLists.

Provided Files

- **BCAQueue**.java:
  - No changes are required for this file.
  - Provides the definition of a Queue interface.

- **BCAMinPQ**.java
  - Definitions have been provided for all of the methods you need to implement. You can work through the file from top to bottom, implementing the methods.

- **BCAMinPQTest**.java
  - No changes are required for this file.
  - Use this class to verify if your implementation of BCAMinPQ is correct.

The Task

Implement BCAMinPQ as a min-priority queue. That is, the smallest value in the queue will be returned on each dequeue operation. You will implement the min-priority queue through the use of a min-heap, implemented with an ArrayList. See the PowerPoint from class for descriptions of the insert and dequeue operations.

Testing

Use **BCAMinPQTest** to verify your implementation. The results should be:

Passed 0.1
Passed 0.2
Passed 0.3
Passed 0.4
Passed 0.5
Passed 0.6
Passed 1a (peek)
Passed 1b (dequeue)
Passed 2
Passed 3
Passed 4 (size)
Passed 5 (isEmpty)
Passed 6.0
Passed 6.1
Passed 6.2
Passed 6.3
Passed 6.4
Passed 6.5
Passed 6.6
Passed 7 (isEmpty)
Passed 8 (dequeue Exception)
Passed HeapSort

Grading

This assignment will be scored out of 100 points. Points will be divided equally between the following methods:

- leftChildOf
- rightChildOf
- parentOf
- pushUp
- enqueue
- peek
- pushdown
- dequeue