

Clojure Heap

I. Introduction

In order to force the order of the result file in Clojask, the implementation of heap in Clojure may be necessary.

A heap is a tree-based data structure that satisfies the heap property, which is argued as one maximally efficient implementation of a priority queue. There are two different types of heaps:

- In a min-heap: for any given node C , if P is a parent node of C , then the key of P is less than or equal to the key of C . Mathematically, $\text{heap}[k] \leq \text{heap}[2k+1]$ and $\text{heap}[k] \leq \text{heap}[2k+2]$, for all k , counting from zero.
- In a max-heap: for any given node C , if P is a parent node of C , then the key of P is greater than or equal to the key of C . Mathematically, $\text{heap}[k] \geq \text{heap}[2k+1]$ and $\text{heap}[k] \geq \text{heap}[2k+2]$, for all k , counting from zero.

II. Project Question Breakdown

1. Learn about basics in data structures and algorithms, including concepts like ADT, stack, queue, priority queue and heap;
2. Get familiar with OOP (Object-Oriented Programming);
3. Understand the class-object-method in Java, and how PriorityQueue is implemented in Java;
4. Learn about functional programming and Clojure: syntax, data types etc.

III. Methodology: a Clojure wrapper of java.util.PriorityQueue

IV. Work Schedule

1. To mid-Feb: be familiar with basic knowledge about data structures, Java PriorityQueue implementation and fundamentals in Clojure;
2. To end-Feb: work on the wrapping and commit to GitHub periodically;
3. To mid-Mar: debugging and consolidation!
4. To end-Mar: summarize the project; write the report and design a poster.

Reference

Black (ed.), Paul E. (2004, December 14). Entry for *heap* in [Dictionary of Algorithms and Data Structures](#). Online version. U.S. National Institute of Standards and Technology, 14 December 2004. Retrieved March 23, 2022, from <https://xlinux.nist.gov/dads/HTML/heap.html>

Wikimedia Foundation. (2022, March 11). *Heap (data structure)*. Wikipedia. Retrieved March 23, 2022, from [https://en.wikipedia.org/wiki/Heap_\(data_structure\)#cite_note-2](https://en.wikipedia.org/wiki/Heap_(data_structure)#cite_note-2)