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CS-499

Professor Bryant

**Milestone Three Narrative**

**Artifact Description and Justification**

The artifact that I chose to work on for displaying my algorithms and data structure enhancement is the TaskService assignment from a previous class. In this assignment, we created a Java project that contained code to create task objects and perform common functions with them, such as creating new objects, returning a list of the objects, updating the task parameters, and deleting existing tasks. These tasks were stored in a hash map data structure, and while that was convenient for simply storing and updating the tasks, it provides no built-in functionality for sorting. I used this artifact because I can demonstrate my understanding of algorithms and data structures by including a more appropriate data structure with a built-in sorting algorithm to handle the sorting functionality that I was looking for. In this case, I implemented a TreeMap that automatically sorts the task entries based on the comparators that I use to create each map. With the first map, the tasks will just be returned by taskID. For the second map, the tasks are sorted by priority first, then by deadline. Finally, the final map sorts by deadline first, then by priority. In this sense, TaskService becomes much more usable because if it is being used to enter many tasks, it is likely that seeing the tasks in order of deadline or priority would be beneficial.

**Implementation of TreeMaps:**

**A computer code with text

Description automatically generated with medium confidence**

**Task parameters:**

**A screenshot of a computer

Description automatically generated**

**TaskUI:**

**A screenshot of a computer program

Description automatically generated**

**Reflection**

I believe that I met the intended course outcomes from module 1 by displaying my ability to implement a data structure that was better suited for the functionality of the program. With the implementation of TreeMaps that use customized comparators, I am able to set up self-sorting binary trees that automatically sort the tasks upon being entered. This allows for the quick retrieval of tasks in a specific order.

While creating this project and researching the TreeMap data structure, I refreshed and improved my understanding of binary trees and how they work. There are several data structures that I have not used frequently, with this being one of them. Improving my understanding of data structures helps me be better prepared for future projects by having a more in-depth understanding of what structure to use and when. The largest challenge that I faced while working on this project was learning about the implementation of the TreeMap, followed by altering the code to allow it to be functional with the tree map as well. Following that, it had also been a while since I created a basic UI in Java, so there was some additional reading that I had to do to refresh my memory for that.