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Project Proposal

Collection Libraries For Grace

My proposal is to work on one of the suggested projects, extending the collection libraries for Grace. Since I’ve spent so many hours working on assignment 3, I feel like I’ve gained a better understanding of how collection libraries are supposed to function in Grace and would have more knowledge here than in the other Grace-related projects. This would allow me to focus more on the design decisions and objected-oriented principles rather than algorithms and just getting a basic understanding of other modules.

The first goal or deliverable would be the multiset. I feel like this shouldn’t be too challenging to implement as it will share a lot of the behavior with the normal set, but will allow me to get an idea of how other collection libraries are structured and how to get my code integrated and tested.

The next would be a priority queue. This could behave similarly to the dictionary and be built as an interface (which includes the ‘priority’ of the collection items) with a binary tree as the backend. Again this would have something of an existing template to work with so I can focus on optimizations in the readability and modularity of the collections classes.

Finally the last deliverable or stretch goal would be the bi-directional dictionary. I hadn’t really thought of this as a concept until you mentioned it but it seems like an interesting idea. It would definitely build further on the goals of assignment 3 but provide additional ways to access and query the data. Again this could be implemented with a tree as the back end.

The reason I chose this project is by implementing similar, yet different libraries I would have a chance to repeat and refine the patterns as I continue to work on them and notice the small differences between them. I would also have a chance to practice refactoring my other libraries if I discover a better or more understandable way of implementing them. It would be more focused on the process and less on the product.

I also believe this would help improve the Grace language as a whole. Data structures are a key element to any programming language and having a variety of existing structures as libraries would certainly make some projects easier. While the standard collection library covers the most popular structures, these additional structures will also be helpful for providing any aspiring Grace developer with more options.

In conclusion, the project would be to work on three collection modules: a multiset, a priority queue, and a bi-directional dictionary. While I’m not sure that getting all three of these libraries done is feasible, I believe it would provide a good learning experience by working on similar classes three times to see how I can improve the object oriented design.