Homework 4 Problem 3

Glen Madsen

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To represent my graph, I chose to create an adjacency list in the form a HashMap of String keys and an ArrayList of String value nested within another HashMap of String keys. Essentially I stored all of my nodes in the outer HashMap and had another HashMap of all of it's children with a list of all the edges (edge labels) associated with that child. An advantage of an adjacency list in this case was quick access to each node and their children, which was vital since the methods we were implementing involved looking at these components. Another option I could have pursued was a collection of edges. While this form of data structure would have been the easy to implement and taken the smallest amount of memory, I thought it would be tough to work with and have lots of annoying cases (such as adding a node with no edges). A different, but more similar avenue would have been an adjacency matrix. This would have taken more time to develop the data structure, but would have provided access to all the information I needed and more once completed (would be faster to determine parent nodes for instance). However, I chose to go the middle of the road when it came to difficulty to implement and usefulness of the data structure and picked an adjacency list. Ultimately it was not much more difficult to implement than a collection of edges, much easier to work with, and had all the tools I needed for the assignment (did not need everything in an adjacency matrix), so it was clearly the best choice in the short-term.