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[22-23\_SEM1\_CS313\_A] Intermediate Computer Programming

Reflection on Individual Project One

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The requirement of this project was to write a flight routing program with information from data files in csv format. The data files contained information regarding airports, airlines, and routes. The program was to find an optimal route between two cities. The skillset this project tests are Error handling, File I/O, Java documentation, and the understanding of object-oriented programming and data structures.

To tackle this problem, I defined airport, airline and route classes based on the data file provided containing constructors, getters and toString methods for each of the classes. I also defined a file reader class that contains methods that read the airport and airline data files, split each line by the comma and stored the lines in an array. The items in this array were used to create objects by calling the constructors of their respective classes. The objects created were then stored as values in a hash map with their IDs as keys. A route map was generated in my readRouteFile method. The data structure that represented this was a hash Map. A dominant data structure in my program is a hash map, this is because, it allows insertion of key value pair and faster access of elements. Array lists were also used due to the quick random access of elements and the option of not defining their size during creation.

To search for the shortest path, an optimized form of the breadth first search algorithm was used where children of a node were checked to see if they were the goal state before being put on the frontier. My frontier and explored sets were presented by the linked list and hash set data structures respectively. From this project, I learned more about the details of object-oriented programming and how it can be used to model everyday systems. I also learned a programmer has to make many design decisions in the implementation of a solution to a challenge. Every design decision has its advantages and disadvantages, and it is up to the programmer to weight these pros and cons in relation to the goal he or she hopes to achieve. Java documentation and code commenting are also very relevant because it makes the code readable.

***References***

*BFS Graph Algorithm(With code in C, C++, Java and Python)*. (n.d.). <https://www.programiz.com/dsa/graph-bfs>

GeeksforGeeks. (2022, July 11). *Object Oriented Programming (OOPs) Concept in Java*. <https://www.geeksforgeeks.org/object-oriented-programming-oops-concept-in-java/>

*HashMap in Java - javatpoint*. (n.d.). www.javatpoint.com. <https://www.javatpoint.com/java-hashmap>

*Java Classes and Objects*. (n.d.). <https://www.w3schools.com/java/java_classes.asp>