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**Individual Project Reflection**

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November 28, 2022

This assignment was challenging, just like any other. However, this project has offered me the chance to increase my C++ proficiency and, consequently, my programming language proficiency.

In order to complete this project, a lot of decisions had to be made. The first made use of classes. I decided to break down different objects I had identified into classes. Some of the objects were airport, airline, route, node, etc. Then, after using action words to pinpoint their functions, I created header files containing the function prototypes and .cpp files containing the actual implementation of these files. We studied file I/O in Java, so I performed input validation using a code block to determine if anyone using my program has provided a legitimate file. Error handling was also used in dealing with exceptions. To find the optimal path, I implemented the breadth-first-search algorithm. A **split** function, **contains** function, and other similar functions are not available in C++, in contrast to Java. I therefore built a helper file that contains functions I created to make my work more efficient and readable. Finally, I used the map, vector, and list effectively. Because a map prevents duplicates, allows for constant time insertion and lookup, it was among the best data structures to use.

I discovered several things when using this strategy. I discovered how to use structs because I needed a means to retrieve information from a class in a public way. I discovered that all members of structs are accessible to the public and that structs typically do not contain functions. I also gained knowledge of guardians. I was worried about the possibility of the same header file being included more than once due to #include when Dr. Sowah asked us to divide our program into .h and .cpp files. However, I discovered that guardians, which are often used in header files, assist the program in avoiding multiple inclusions of the same file. Finally, I learnt about class organization, encapsulation through the access modifiers used and modular coding.

**References**

Brown, J. (2019, November 16). *What is the advantage of using HashMap? – KnowledgeBurrow.com*. https://knowledgeburrow.com/what-is-the-advantage-of-using-hashmap/