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ICP Project C++

Intermediate Computer Programming

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Developing this project was a challenging and exciting experience for me. I gained a lot of insights and worked on this project, especially in the domain of C++. Through this project, I have learned about some programming concepts and paradigms, such as Objects and Classes, Encapsulation, etc.

The project revolved around computing the optimal path a flight has taken from its start destination to the end destination using the dataset from <https://www.openflights.org>. To kick off, I started by outlining the necessary steps to meet the project requirements and specifications. The next step was to develop an efficient search algorithm that could optimally compute the valid route between two cities. After researching a couple of search algorithms, I finally settled on using Breadth-First Search since it suited the problem criteria the most and was relatively more optimal compared to other algorithms such as A*, Depth-First Search, etc.

Breadth-First Search (BFS) is an algorithm for searching a tree data structure for a node that satisfies a given property. It starts at the tree root and explores all nodes at the present depth before moving on to the nodes at the next depth level. I used the Reader module from the C++ Standard Library (STL) to read the files containing a flight's start and end destination. I then computed the valid routes a flight would typically take to reach its destination and the time it takes.

Furthermore, I read the input file and the airports.csv file and then split them into the start city and the destination city. I then split the airport file into five parts: the airport id, the airport name, the airport city, the airport country, and the IATA. I then checked to see if the airport city equals the start city. If it is, I set the start airport to its airport id, airport name, airport city, airport country, and the IATA. Lastly, I checked to see if the airport city equals the

destination city. The result after running the program would compute the optimal path a flight would take from the start airport (departure) to the end airport (arrival).

To conclude, working on this project has taught me a lot about algorithmic thinking and writing optimal code. I also learned a lot of C++ concepts and best practices along the way.