**Project Report**

I pair programmed with Nana Yaa Owusu and this project was based of off her algorithm she used for project 1. The novelty in this was the addition of a Path class which returns a flight path once a valid route between the source and destination city is found. The class has the path sequence which is a vector of Strings and a path cost in kilometers as instance variables. The create String method in the path class formats the data to be written into the output file. This is done by looping through the airport IDs in the airport sequence, getting the airline code, airport code of the next airport sequence, and creating a String out of all the data.

Again, the node class keeps track of the airports during the search for a flight. The node class has a state which is an airportID, a parent and a path cost which is the number of flights from the source airport to the current airport. There is a path method which returns the sequence of airports from the source to the current node. This is to help backtrack the airports visited to get to the destination.

Furthermore, the algo class defines the breadth-first search algorithm. The algorithm takes the sourceID, destination airportID and the route map. It uses deque for the open list and an unordered set for the closed set. These two variables record the airports that are yet to be explored and the airports that have already been explored. When a possible destination airport is generated, node objects are created out of them, and a goal test is performed to check if it is the destination airport. If it is not, it is added to the frontier, else, path method defined in the node class is called and it returns the. This is done till there are no more items to be explored in the open list or the destination airport is found.

Finally, methods defined in other classes are called in the main class to perform the search. The readFiles class is used to read the airport and route data and store the data in vectors. Vectors were used because they are stored in continuous memory. Also, the vector stores only the values unlike, list data structure which stores both the value and a pointer to the next item in the list. The readFiles class is also used to read the user input file. Then all possible source and destination airports in the city and country were generated. The possible source and destination airports were passed as arguments to the breadth-first search method. The data returned as a String and written into an output file.