Results

In general, our group meet the goals we set before. We successfully generate the output PNG as the product of our code and calculated the shortest path possible for the traveler. In order to make that happen we created seven main functions and several helper functions. Starting from dataset reading to algorithm implementation. We did encounter some difficulties but were able to solve it.

The first problem we encounter was implementation difficulties. For example, make and test files. None of us have the experience of writing a complete make file, and we did not know where to start other than the make file examples in the earlier MP and lab. We learnt how to implement the make file and remembered that each file needs to be linked to be able to make. We also didn't have any coding experience for 2 of the algorithms, during the process we learn how to use the internet to help us learn the concept and utilize those in our codes.

The second thing we learnt was how to calculate the distance at any given two points on Earth. We first assume that the shortest path would just be the length of the straight line connected the two dots, similar to how we calculate the length of a vector. However, after we did some calculation, we found out that Earth is not like the plots we draw in math class, and the line connecting the dots might not be the shortest. So, after we did some research, we discovered that the shortest path between two points is the inferior arc of great circle.

With those discovers, we were able to produce the code as what we originally hoped. The three pictures included below are the result of one of our test runs. As we put down "Beijing Capital International Airport" for the source airport, and "Chicago O'Hare International Airport". By running shortest path and determine if there are route between the airports, we got the

following output. The shortest path (distance wise) is for traveler first fly to “Guangzhou Baiyun International Airport”, and from there fly to the destination. In the graph we also marked the airport with a 5x5 pixel red dot, and also marked the path following the change in longitude and latitude. The first graph shows the flight from Beijing to Guangzhou. And the second graph representing the route from Guangzhou to Chicago.