

Jason Gao, John Wei, Junkai Wu, Richard Deng

Brad Solomon and G Carl Evans

CS 225

Dec. 8, 2020

## Final Report

As stated in project goal, our project is designed to find the minimum distance traveling from one airport to another, and to make a graph on the map indicating the related paths. Our development and code successfully achieved this goal and got expected results.

Once the user gave the correct input, the outputs will be saved under “RESULTS” directory. We tried several locations and got reasonable results. For example, if we are trying to find the minimum distance by airplane from FNJ to JFK, the output will return the related paths, in this case “Shortest flight route from FNJ to JFK is: FNJ PEK JFK” and “The corresponding shortest distance is 11761” will be saved to “RESULTS/result.txt”. It will also show the same message when you run the main file in the console. In addition, a map indicating the flight routes will be saved to “result.png” (see Figure 1). The distance calculated agrees with the actual flights within reasonable error. We also used several other inputs and got expected shortest distance value, and the route line on the map is visible and clear. To reproduce any wanted inputs, simply follow the instruction in “README.md” and the user will get similar results.

During the development of our project, we also discovered several interesting facts. One thing is that since the earth is a sphere and the latitude and longitude is not straight lines, we found that it is hard to calculate the actual distance between two points, and it is hard to draw the route on a flat map, and it will take a long time computing a path from a huge number of possible paths. We also found that, when testing random airports, there are actually some airports that are

not connected to each other, for example there is no routes from DJO to SKO. If those two airports are the input then the output will show “No flight available from DJO to SKO” and “No direct flight from DJO to SKO”. By traversing the graph with BFS, we found that airports like JFK, PVG, and many other ones in well-known cities are connected to 3192 other airports. While some like DJO is separated from all other airports.

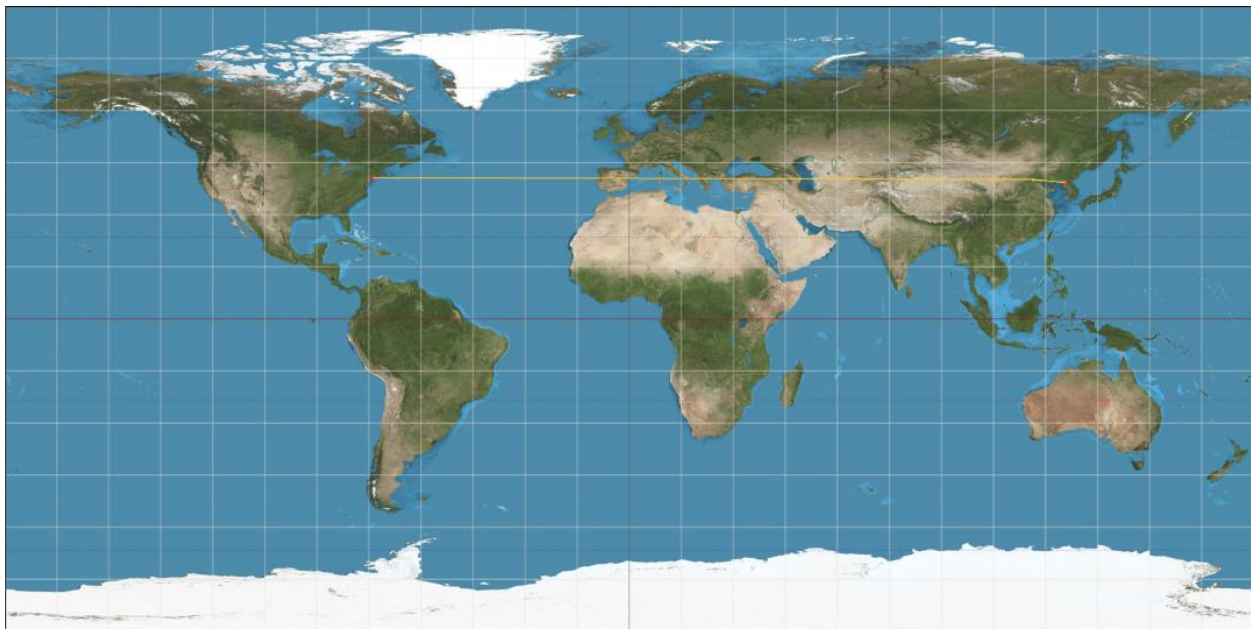


Figure 1