Project Goals

I.   Dataset:
       OpenFlights. This dataset provides us with the absolute location (latitude and longitude) and airlines of every airport. We can use the absolute location to calculate the distance between two airports. (https://openflights.org/data.html) The two datasets we will use are airport dataset and route dataset. The format of the dataset will be a .dat file where each line contains detailed information for an airline route.

II.   Data structure:
       Adjacency List, Adjacency Matrix
       Nodes: name of the airport, latitude and longitude. According to their latitude and longitude, putting them in the right place in the graph.
       Edges: two nodes are connected by an edge if there exist an airline between them

III.   Traversals:
       BFS. Because of the existence of the Arctic and Antarctica,most routes are along latitude rather than longitude. So we prefer to use BFS as the primary traversal of this graph.

IV.   Covered Algorithm:
       shortest path/Landmark(backup)

V.   Complex or uncovered option:
       Graph coloring(refer): using the number of incident edges connected to each node to decide its color. The color varies according to the degree of the node.
       Strongly connected component: The graph whose vertices are connected to all of its other vertices is said to be strongly connected. We can use this algorithm to determine what locations in the world are not reachable by the majority of the airlines.

VI.   Testcase
       Test cases help check the correctness and debug. Each function needs at least one test case. For example, randomly pick two cities a and b to check the output of short-path(a,b).