

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
Vertices: a unique id of the airport, latitude, longitude, and some pointers.
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
Graph drawing: using the number of incident edges connected to each node to decide its color. The color varies according to the degree of the node.
- 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 (Dijkstra's Algorithm)
- V. Complex or uncovered option:
Clustering Finder: We can use this algorithm to determine what locations in the world are not reachable by the majority of the airlines - they are called minority. Minority, as opposed to majority, are defined as a connected graph component that has less than or equal to 10 airports.
- 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).