CS 225 Final Project Goals

Project members: lucianat, violaz2, vmanne3, suded2

Dataset

- OpenFlights
  - Airline route database (https://openflights.org/data.html)
  - Each data entry is formatted with information for the airline, airline ID, source airport, source airport ID, destination airport, destination airport ID, codeshare, stops, and equipment. If a certain heading in a data entry has no value, the special value \N is used.
  - The sections of the data entry that are of most interest to us are the source and destination airport IDs as this will help us to conduct searches on the shortest paths between cities.
  - We chose this database because we think it has real world applications. This database is also well documented. It provides directed data which is helpful for our traversals.
  - We will weigh the graph by using the method of counting the number of routes on an edge and then use (1/number of routes).

Traversals

- BFS
  - Since we will be working with flight routes, we have decided BFS makes the most sense since it uses a queue for finding the shortest path.
  - We will use BFS to traverse through each route a flight takes, where the nodes are the source and destination airports.
  - BFS will help us to find the minimum number of edges between two given vertices.

Algorithms

- Shortest Path (Dijkstra's Algorithm)
  - We chose Dijkstra's Algorithm over Floyd-Warshall's Algorithm, because we want to get the shortest path between a single pair of nodes (shortest path between two destinations), and Floyd-Warshall's Algorithm gets the shortest path between all pairs of nodes. Since we are not worried about negative edges, we will be able to safely run Dijkstra's.
  - We plan on implementing Dijkstra's Algorithm as BFS with a priority queue.
  - Runtime of Dijkstra's Algorithm: O(EV + V^2logV)
  - The real world application is finding connecting flights between two destinations.
- Landmark Path
  - We want to get the shortest path from the first destination (a) to the second destination (b) through the origin (c).
  - A real world application of this would be stopping at a particular airport for a connecting flight.