Assignment: Section 10.6: 8 (a,b,c,d), 14, 18 (explain your answer)

8) Find a shortest path (in mileage) between each of the following pairs of cities in the airline system shown in Figure 1.

a) New York and Los Angeles

> **New York – Los Angeles 2451**

b) Boston and San Francisco

> **Boston-Chicago-SF 2715**

c) Miami and Denver

> **Miami-Atlanta-Chicago-Denver 2109**

d) Miami and Los Angeles

> **Miami-Atlanta-Chicago-Denver-Los Angeles 2934**

14) Explain how to find a path with the least number of edges between two vertices in an undirected graph by considering it as a shortest path problem in a weighted graph

> **To find a path with the least number of edges between two vertices in an undirected graph, we use Dijkstra's algorithm. If we view the edges with an equal number of weight as 1, we can use the algorithm to find the shortest path in such a graph, where the shortest edge number corresponds to the shortest path.**

18) Is a shortest path between two vertices in a weighted graph unique if the weights of edges are distinct?

> **While it is possible that the shortest path may be unique, it is not required. Because the path is built from the summation of the smallest edges, it is possible that another set of edges could result in having the same summated edge number, even though their edge weight may be distinct.**