Sean Reilly

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

Assignment 6.4

8.

a) There's no direct so using Dijstra's algorithm we see that the fastest way would be from NY to CHI as Boston is out of the way and ATL is redundant due to having to fly to CHI anyways. NY → CHI is 722 miles. CHI to DEN is the next shortest at 908 and DEN to LA is 834. 834 + 908 + 722 = 2464 miles

b) We see that BOS -> NY -> CHI and BOS -> CHI are the only initial options. BOS -> CHI is shorter at 860 miles. Next you can either go CHI -> DEN -> SF or CHI -> SF. It is close, but CHI to SF is shorter at 1855 miles. 1855 + 860 = 2715 miles

c) There's 2 options for the initial first step MIA -> NY or MIA -> ATL. To ATL is quicker so we take that one at 595 miles. NY would be going backwards as the next flight would lead to CHI, the next destination for both. ATL -> CHI is 606 miles. There's only one option now to get to DEN at 908 miles. 908 + 606 + 595 = 2109 miles

d) Take the same route as above and then add the 834 miles from DEN -> LA. Which is 2,943 miles.

14.

Each edge has a weight of 1. Per Dijkstra's algorithm we can find the length of the shortest path between two vertices in a connected weighted graph and since all the edges have the same weight, the shortest path is equivalent to the shortest edge.

18.

No. Consider a graph with vertices {a, b, c} and edges {(a, b),(b, c),(a, c)}. Say we weight (a, c) as 3 and weight (a, b) as 1 and (b, c) as 2. Then there are two shortest paths from a to c, namely (a, c) (which has total weight 3), and (a, b) followed by (b, c) (which again has total weight 3).