Task 2

1. What is a node and what is an edge in the context of air traffic? How many nodes and edges are present in the network?
   Nodes are airports, edges are connections from one airport to other.
   Total number of nodes are: 894
   Total number of edges are: 13760

2. What can you can infer from the visualization of the network? Speak about the structure of the network and describe it qualitatively.
   From the visualization of the network, we see that all there are more nodes at the edge of map of USA i.e. on east coast and west coast. Cluster of the nodes are present on both sides of network. There are scattered nodes in the central part of USA. The structure of the network looks like a pentagon shape, We see that there are large clusters on the east side of USA than the west side of USA, central.
   There are 47 strongly connected components, 6 weekly connected components.

3. What can you tell from the degree distribution and degree rank plots?
   The degree distribution with 0 has the highest density and reduces when the degree distribution increases by 100, which means that most of the nodes are not connected with others.
   Node with highest degree has the highest rank, similarly the lowest degree node has the lowest rank. There are number of nodes which have degree greater than 100 and are ranked 100.

4. How connected and dense is the network? What does this imply?
   The Network density is: 0.017235721031838486
   The Number of connected components are: 6
   The Average shortest path is: 3.1862068965517243
   The graph seems to connected fairly good, it means that to get from one node to other we will need an average of 3 hops.

5. What is the value of the average clustering coefficient? What does this imply?
   The Average Clustering Coefficient is 0.5151
   The clustering coefficient seems to be 0.5151 which means to say that the degree to which nodes in a graph tend to cluster together are less.

6. Which are the most important nodes based on the Pagerank score and what do you learn from this?
   Top 10 Stations By Pagerank [(11292, 0.01221494725476268), (11298, 0.011381590445025938), (13930, 0.00997962312402018), (10299, 0.00939511707467981), (10397, 0.009064999187123815), (11630, 0.009051601926279329), (11057, 0.0076106941137978265), (14107, 0.007596691365580076), (13244, 0.007578474594985932), (13487, 0.007464106315286927)]
   This means that these nodes as the most important and highly connected or using these nodes you can connect to other nodes.

7. Which are the most important hub and authority nodes and what do you infer from this?
   Top 10 Biggest Hubs [(10397, 0.011091413715196816), (11292, 0.010867112430822475), (13930, 0.010807784511584905), (11298, 0.010726201036589077), (13244,

0.010524371414726588), (14100, 0.009893463383107244), (12889, 0.009866177129818146), (11057, 0.009857304537613586), (13487, 0.009770138089794305), (12892, 0.009718608757415006)]

Top 10 Biggest Authorities [(11292, 0.010985791978555702), (10397, 0.01086412335941236), (11298, 0.010761317526652964), (13930, 0.010613211902404635), (13244, 0.010582992351075354), (12889, 0.010082646481226257), (14100, 0.010008257719157808), (10693, 0.009961046586770977), (13487, 0.009821757310018185), (14107, 0.009756191224934414)]

Hubs are nodes which connect to multiple nodes, biggest hubs are the nodes which have highest number of connected nodes.

Authorities are the nodes which are the end of the edge or the nodes which are to be reached finally.

8. What are the values of the various centrality measures? What can you infer from these scores?
   Degree centrality scores is 0.0 , Closeness centrality scores is 0.3, Betweenness centrality scores is 0.0
   Degree centrality score means that number of nodes which can be connected immediately or through one hop are 500.
   Closeness centrality means that number of nodes which are able to connect to other nodes are 0.3 with frequency of 300, has the closest nodes.
   Betweenness centrality is 0.0 which means that two nodes are connected by passing through this nodes, frequency off 800.

9. What can you infer from the strongly and weekly connected component plots?
   Strongly connected components are the nodes which can be connected to a large number of nodes. The number of strongly connected components is 47.
   Weekly connected components are the nodes which can be connected to a small number of nodes. The number of weakly connected components is 6.