Consider the graph shown below.

1. Draw the following graph as a search tree, with node S at the top, and without having the same node in a branch more than once (i.e., no loops). Order nodes at each tree level alphabetically left-to-right. (Hints: #nodes = 45, max depth = 7 [root is depth 0], and lots and lots of nodes!) (8 pts)

2. For each of the following types of searches, 1) show the “search path”: which is how the search method “goes through” your tree (from part 1) from S to the goal G, and 2) give the final “solution path”. Compute and use the straight-line Euclidian distance (i.e., \( D = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \)) to sort candidates for search methods that need a heuristic function (the x-y coordinates of each city are given above in the graph). Round values to 3 decimals (do not round to integers). SHOW YOUR WORK IN THE TREE!
   a. Depth-first search (2 pts)
   b. Breadth-first search (2 pts)
   c. Greedy search (6 pts)
   d. A* search (7 pts)