

CS 260

Programming Assignment 9

This lab is worth a total of 100 points; 10 points are the self-evaluation, 50 points for the basic lab, then 20 points each for minCostTree and minCostPaths.

This lab should follow the course coding requirements and be split into multiple files as per your chosen language. There is a driver provided for this lab; test the code as it is developed.

Basic Lab

Create a non-directed weighted graph class named WGraph. It needs to have the following methods: addNode, addEdge, listNodes, displayAdjacency, displayMatrix, breadthFirst and depthFirst. These methods are all like those used in Lab 8 for the non-weighted graph, although there will be some required changes since WGraph is non-directed and weighted.

Use the provided driver to test the WGraph class and verify that the output matches that expected.

Advanced Lab

For the advanced lab, add the following methods to the WGraph class and test them with the provided driver.

minCostTree

Add a method to WGraph named minCostTree that accepts a starting node as a parameter and returns a string showing a minimum cost spanning tree with the starting node as root. The output should appear in the form shown below.

A: A-B B-C C-D B-E B-F F-G

The starting node is before the colon and the edges traversed are in order after it.

minCostPaths

Add a method to WGraph named minCostPaths that accepts a starting node as a parameter and returns a string showing the minimum cost to reach each other nodes in the tree. The output should appear in the form shown below.

A: B(3) C(5) D(12) E(20) F(inf)

The starting node is before the colon and the nodes and distances are after it. A distance of **inf** indicates that the node is not reachable.