CSC 382 Analysis of Algorithms

Assignment III

1. (10 points) **Find M Shortest Paths on a Tree**

   Here is a checklist for helping you complete this assignment:

   ☐ In this project, you need to implement an M shortest paths algorithm over a tree graph.

   ☐ To begin with, you first generate a random tree with 1000 nodes. (3 points)

   ☐ Apply random weights (could be a float number between 0 to 1) on each edge of this tree. (1 point)

   ☐ Randomly select a leaf as the source and all the other 999 leaves are the targets.

   ☐ Use a best-first algorithm to find the 10 shortest paths from the source to the targets. (3 points)

   ☐ Use a depth-first algorithm to find the same 10 shortest paths. (3 points)

   ☐ Add pruning technique for the depth-first algorithm. (3 points bonus)

   ☐ Warning: No points for using graph search algorithms, such as Dijsktra or Bellman-Ford.

   ☐ Due Date: 5/11/2023