**CSCE A412: Evolutionary Computing**

**Project 3: Evolutionary Programming**

**Due Friday, April 8, 2022, at 11:59 PM**

This project is intended to be a gentle introduction to Evolutionary Programming (EP). Although the Eiben and Smith textbook and notes present modern EP (“metaEP”) as a numeric optimization technique similar to ES, earlier implementations of EP provided a much more malleable framework.

For this assignment, implement an EP solution of the Traveling Salesperson Problem from Assignment 1. You should be able to reuse a lot of your solution from Assignment 1, including code to create the initial population, evaluate fitness, and display the optimized result. Before proceeding, look carefully at your results from Assignment 1 and select the best permutation mutation for use in your EP solution.

To apply EP to the TSP, create an initial population of µ tours. For each tour, apply a selected permutation mutation to create an offspring. Select the µ best tours from the combination of µ parents and their µ offspring, and repeat.

When you are satisfied with your implementation, create three different random cost grids. For each cost grid, run your EP three times to evolve optimized tours. Then write a brief report that includes each of the following items:

1. The name and email address of each team member.
2. A table showing the best-of-run tour and its fitness value for each of the nine runs. Comment upon any major differences that you see in the quality of the three best-of-run solutions for each cost grid.
3. A brief summary of the results of this programming assignment.

As with any programming project, your program should exemplify principles of high-quality computer software design. Program-level documentation should indicate the name and email address of each author.

Submit your report and software project (including source code and executable) via email. I will read your report, examine your source code, run your program, and return commented and graded reports to you via email.