CSCI 4560/6560 Evolutionary Computation

Assignment Number 4: Due 10/14/2019 **(in class)**

1. **[20 points][MID]: Short answers please!**

   (a) Why is edge recombination usually better than order crossover for the traveling salesperson problem?

   (b) Why is a (μ, λ) evolution strategy usually better than a $(\mu + \lambda)$ evolution strategy for optimization in a dynamically changing fitness landscape?

   (c) Identify **one** point of similarity and **two** points of difference between Evolution Strategies and modern Evolutionary Programming when used for continuous functional optimization.

2. **[20 points][MID]: Short answers please!**

   (a) Define selection pressure and mention two ways to measure it.

   (b) Mention **one** way to reduce selection pressure in modern Evolutionary Programming when used for continuous functional optimization.

   (c) Identify **two** points of difference between Genetic Algorithms and classical Evolutionary Programming using finite state machines.

3. **[20 points][MID]:**

   (a) What is the difference between a $(\mu + \lambda)$ evolution strategy and a (μ, λ) evolution strategy? Give one advantage for using each of these two methods over the other.

   (b) Which of the following strategies has the highest selection pressure for survival to the next generation:

      i. a (10,10) evolution strategy
      ii. a (5+10) evolution strategy
      iii. a (5,10) evolution strategy

      Briefly justify your answer.

   (c) **For 6560 Students only** What is wrong with a (μ, μ) evolution strategy? Very breifly propose a way to fix it.