Ryan Helmlinger

Period 3

5/10/16

Size: 54

Fitness: 0

Number of generations: 5931

Run time: 2941.362044751443

Solution:

[5, 48, 43, 13, 18, 21, 23, 50, 33, 39,

14, 45, 24, 7, 41, 37, 42, 30, 51, 25,

20, 10, 8, 0, 35, 26, 16, 47, 9, 32,

49, 2, 34, 6, 4, 27, 31, 46, 12, 15,

36, 40, 1, 3, 52, 28, 53, 38, 17, 29,

22, 44, 19, 11]

**What is your population size?**

Throughout the program, the population size remains the same, which was 52. This is the same size as n.

**How many children do you breed at a pass (is it 1, as in class, or some other scheme)?**

The program loops through the whole population and if a parent is selected it is added to a list of parents. Once it loops through the population, it then goes through the list and combines each set of two parents until none or one remain in the list. Therefore, the program breeds half of the total parents added to the list.

**How do you select the parents to breed?**

The program selects the parents based on how fit they are. It has a function that determines the best fitness number (described below) and the higher the fitness number, the worse fitness the parent has. The program then scales all the fitness values to where the best one is 1. Then it finds a random number from 0 to the scaled fitness of the parent. If the number ends up being 0, the program adds the parent to the list.

**How do you select the pivot point (for the gene splicing)?**

The program randomly chooses a number from a quarter of the length of the parents to three quarters of the length of the parents. This allows the pivot point to be somewhat close to the center in order to find a more effective pivot.

**How do you decide when to mutate?**

The program mutates 12.5% of the time.

**What is your mutation?**

The program swaps two random index values of the child.

**What happens if a child is produced that is identical to an already existing population member?**

The program keeps re-calling the function to breed the parents until a unique child is produced.

**What happens if the two parents selected have the same genes?**

The program doesn’t do anything about this. However, it would be rare to happen, since duplicate children are not created. Therefore this would only happen in the initial population.

**(If relevant) What is your derived fitness function and how are you using it?**

The program finds how many times each queen is intersected by other queens. Then all those intersections are added up to a total number and returned. Initially I just returned the number of the queen with the highest intersections, but returning the total sum of all intersections seemed to be more efficient.