Michael Cataldo   10/04/2016
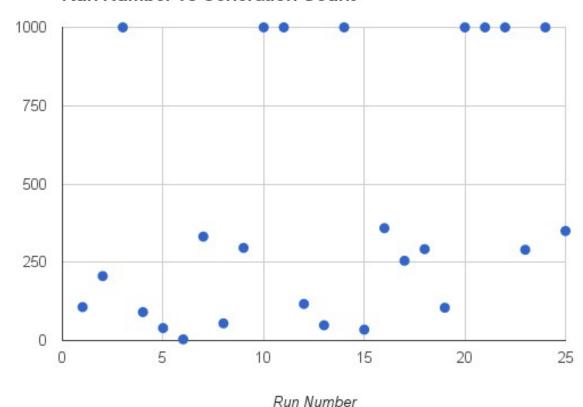Artificial Intelligence   Dr. Grabowski

Genetic Algorithm: N-Queens

During the twenty-five runs of my genetic algorithm, it was able to come up with seventeen different solutions at N=12. As far as basic parameters are concerned, I left them the same as described in the assignment. I kept my population size at N*10. The mutation rate for my implementation was left at 10%. For this genetic algorithm the crossover probability was left at 100% (crossover occurs every generation.) For parent selection, my genetic algorithm used sampling without replacement. Parents were then paired by fitness when crossover occurred. To identify conflicts between queens I used the slope formula. I used the value of the possibly conflicting queens as Y values and their position in the array as their X values. Computing $(Y2 - Y1)/(X2 - X1)$ would yield a 1 or -1 if the queens were conflicting. From there it was simply looping through and incrementing a variable for however many conflicts occurred. The survivor selection method I elected to use was fitness biased selection.

Run Number vs Generation Count

Maximum Generation	Minimum Generation	Average Generation Count
1000	4	439.32