Summary of Exploration for AI Lab 3

The first methods of improvement I tried were increasing the population size and number of generations. This showed that increasing the population was more beneficial to the overall fitness than a large number of generations because it allows for more different strategies to be tried. When I had a good strategy get lost due to randomness and mutation I decided to implement elitism to force good strategies into future generations and avoid their loss in the population. Through experimentation I found 10% elitism to be a good number to preserve the best %10 of the population and put it into the next generation. This keeps up a high population fitness and ensures that the best don't go backwards. I kept the same level of random mutation throughout as this seemed to do well.

One of the factors that I changed that didn't show meaningful change in outcomes was the number of sessions over which to determine the strategy fitness. The default number of 100 worked out the best when compared to 200 or 50. The number of steps in each session showed that slightly higher fitness values were possible with the full length of 200 steps when compared to shorter sessions of just 100 steps. This might be obvious for strategies with fitness values greater than 0 because it would increase the expected outcome and so I held it at a value of 200 for most of the trials I ran.

In addition to the above methods of experimentation I implemented uniform crossover and used the crossover parameter to choose with the given probability between uniform and single point crossover. In the best strategy I found I used uniform crossover which I believe better mixed the population because it results in offspring having a more diverse set of genes when compared to single point crossover when going back a number of generations.

The parameters I found for the best strategy where
Population: 500
Generations: 150
Steps: 200
Sessions: 100
Elitism: 0.1
Crossover: 0