Aung Kyaw

Dr. Daisy Tang

CS 4200

12 January 2022

Project 2 Report

Objective

The objective of this project is to solve the N-Queens problem using steepest-ascent hill climbing and genetic algorithms. I utilized the local search algorithm that we teach in class but we have two different algorithms from local search.

Approach

First of all, I utilized steepest-ascent hill climbing with sideway moves. Therefore, the percentage of solving problems is above 90% on my programs. For a genetic algorithm, the initial value of the boards in the population was row-col constrained. This way, the population is closer to a solution from the beginning. For reproduction, the regular method of choosing a pivot and choosing all elements less than the pivot from the parent A and all elements greater than the pivot from parent B. This didn't preserve row-col restraint, but it still allowed for the algorithm to continue without this added benefit.

Test Result

Success Rate	94.6%
Failure Rate	5.4%
Success Average	19
Failure Average	68

Table 1 Steepest-ascent hill climbing

Mutation Probability	0.25
Success Rate	76%
Total Time	256ms

Table 2 Genetic algorithm

Findings

Since we use hill climbing with sideways moves, the percentage is so high compared to the percentage that we want to have. In a genetic algorithm, the mutation probability that seemed to work the best was 0.25 with a success rate of 76%. As the iteration increase, the probability of success also increased.