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CSCI 402
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Assignment 2: Towers of Hanoi using a genetic algorithm.

In order to solve the Towers of Hanoi problem with a genetic algorithm I used two selection methods. The roulette method and the tournament selection method. I found the tournament selection to be significantly faster than the roulette method. I tested this on n values up to 10, which the tournament selection method is able to solve in under 10,000 iterations, where one iteration is one generation. I found having a tournament size between 10-20% of the population worked best. The roulette method on the other hand could only handle n values of up to 6 before reaching over 10,000 iterations.

I solved the problem using a Fitness function that simply compares the amount of movements each individual makes to that of one solution. The more matching movements, the higher than fitness value. After reaching a fitness percentage of 100%, any excess movements are taken off from the resulting genetic movement sequence set, leaving only the correct movements and nothing else.

When introducing variable mutation rates and inversion rates, there was a significant difference with accuracy with more mutations, to a small extent. Meaning if there are too few mutations, the algorithm is slower. However, it seems to cap off fairly quickly, with a smaller mutation rate being necessary for larger n values. I noticed little to no difference with inversion, other than it slowing down with a high inversion rate.

I did not test anything over 10, since the solution sets are hard coded into the program. I experimented with having a vastly different fitness function that attempted to find its own answer without using previous solutions as evaluation criteria, but it proved too slow and too time consuming to take it any further.