**Final Project Proposal**: N-Queens constraint satisfaction problem (CSP) using minimum-conflict heuristic

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The N-Queens problem is a constraint satisfaction problem where there is a board of size n x n with n queens placed on the board. The objective of the search is to find a placement for all queens such that there is no queen threatening another based on the rules of chess. This means that for any given queen, there will be no other queen in the vertical, horizontal, or angled direction.

To solve this problem, we will be using the idea of minimum-conflict heuristic. This algorithm begins with a random, initial assignment to all of the variables in the CSP. In the n-queens problem, this will be a random position for all queens. Then the algorithm will pick an arbitrary queen that is conflicting with the other queens. It will then pick a new position that minimizes the number of conflicts with the other queens. This process of selecting a random variable and min-conflict value assignment to this selected variable it continued until a solution is found or a pre-selected maximum number of iterations is reached.

This project will be developed in C++ and will be run on different machines to get an accurate representation of the time it takes for the algorithm to generate a valid solution. Our main focus for this project is to examine the time it takes for different size n. We will attempt to find the largest number of n that will still find a valid solution in a predetermined amount of time. By doing so, we can see how effective the minimum-conflict heuristic is as the number of n increases. If time permits, we will then look at the time taken for the minimum-conflict heuristic compared to other well-known solutions for this search problem.