**CSE 368, Summer2024**

**A2: Constraint Satisfaction Problem**

**Report**

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**Written Question (5 pts):**

Define Sudoku CSP: Clearly define the formulation of a CSP for a Sudoku problem, assuming only binary constraints. What are the variables, domains and constraints. How many are there of each? You can add a diagram if that helps.

A Constraint Satisfaction Problem for Sudoku consists of 81 variables (labeled 0 – 80) visually represented by dots on the board, each with a domain of values 1 – 9. The constraints of Sudoku are that the value of variable X cannot equal the value of variable Y if X and Y share a row, column, or grid on the board.

Example: Variable 0 is assigned the value 1. Variables 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 18, 19, 20, 27, 30, 33, 54, 57, 60 (given by the .neighbors() method) cannot be assigned the value 1, otherwise the assigned variable-value pairs would not satisfy the binary constraint.

CSP looks at the current state (the given variable-value assignments on a starting Sudoku board) and attempts a sequence of actions (assigning values to variables) that remain consistent with the constraints. If all possible actions lead to an inconsistency, we can backtrack to previous actions to attempt a different course of action.

**References**