Hunter Leise

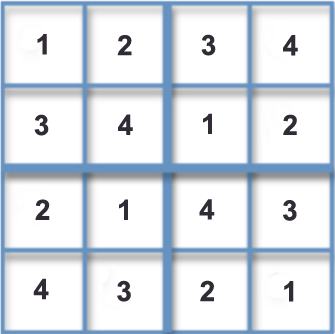
CSCI 3202

Problem Set 2

**Problem 2.1**

**Problem 2.2**

**Problem 3**



1. Ensure there is exactly one “3” in the fourth column of the puzzle:

S143 OR S243 OR S343 OR S443

NOT(S143 AND S243)

NOT(S143 AND S343)

NOT(S143 AND S443)

NOT(S243 AND S343)

NOT(S243 AND S443)

NOT(S343 AND S443)

Ensure that S343 is true:

# Starting Constraints

S111 AND S144 AND S242 AND S312 AND S423 AND S441

# Rules to ensure exactly one “3” is in the fourth column

S143 OR S243 OR S343 OR S443

NOT(S143 AND S243) AND NOT(S143 AND S343) AND NOT(S143 AND S443)

NOT(S243 AND S343) AND NOT(S243 AND S443)

NOT(S343 AND S443)

# Rules to ensure that only one number is in each row of the fourth column

S141 OR S142 OR S143 OR S144

NOT(S141 AND S142) AND NOT(S141 AND S143) AND NOT(S141 AND S144)

NOT(S142 AND S143) AND NOT(S142 AND S144)

NOT(S143 AND S144)

S241 OR S242 OR S243 OR S244

NOT(S241 AND S242) AND NOT(S241 AND S243) AND NOT(S241 AND S244)

NOT(S242 AND S243) AND NOT(S242 AND S244)

NOT(S243 AND S244)

S341 OR S342 OR S343 OR S344

NOT(S341 AND S342) AND NOT(S341 AND S343) AND NOT(S341 AND S344)

NOT(S342 AND S343) AND NOT(S342 AND S344)

NOT(S343 AND S344)

S441 OR S442 OR S443 OR S444

NOT(S441 AND S442) AND NOT(S441 AND S443) AND NOT(S441 AND S444)

NOT(S442 AND S443) AND NOT(S442 AND S444)

NOT(S443 AND S444)

Resolution from the rules above:

S144 🡪 NOT(S143) # Based on the rules ensuring only one number in a spot

S242 🡪 NOT(S243) # Based on the rules ensuring only one number in a spot

S441 🡪 NOT(S443) # Based on the rules ensuring only one number in a spot

🡪 S343 # Based on the rules ensuring exactly one “3” in the 4th column

**Problem 4**

This strategy could technically work for a large-scale Mastermind game, but it would take drastically more computing power, in which case, it would probably be more optimal to use another strategy. With 30 colors and 25 positions, there would be 3025 (which is 8.4728861 x 1036) “open” possibilities at the beginning of the game. This is way too many to consider this strategy practical.