Homework 1

<One more Puzzle with SMT Solver>

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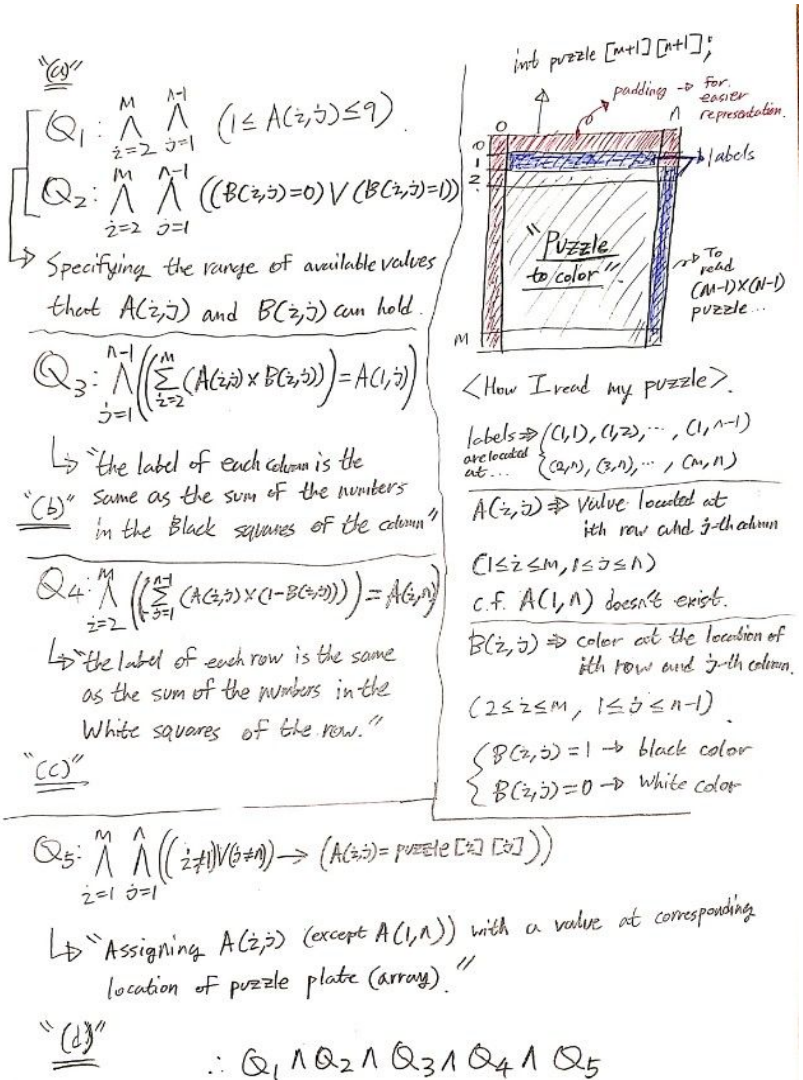
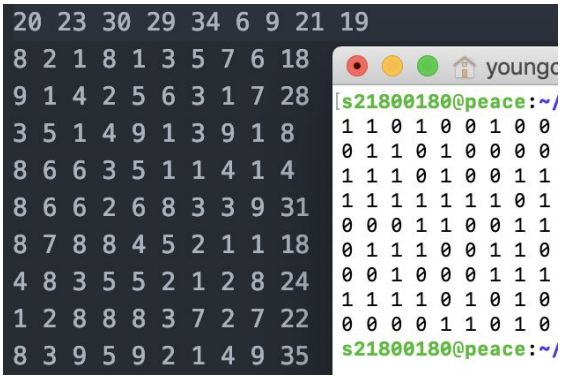
Description:

1. **Constraints:** I found about 4 constraints to solve this puzzle.
    a. Every cell in the puzzle should have a value between 1 and 9.
    b. The sum of Black-colored cells in a single column should be value of the label at its column.
    c. The sum of White-colored cells in a single row should be value of the label at its row.
    d. Every cell should have its value at its given puzzle.
2. **Constraints as logical formula:** I uploaded the picture below at my github repository for better reading. In, this write-up, I will explain about Q1~5, The conditions that are need to be satisfied.



3. **Demonstration**



<Test 1. Example given in the "homework+1.pdf">

<Test2. test case made by myself to check whether the program can solve rectangular puzzle>

Discussion:

1. While solving this puzzle, I found that there is a puzzle called "pixel puzzle" which is to fill pixels with the information give on the top side and left-most side. I think I can solve this puzzle by applying this puzzle's solution.
2. I learnt that using multiplication in the formula may result Z3 Solver cannot find the solution as multiplication makes the solution non-linear. I had an issue when I use multiply sign in the formula.

The Github Repository:

https://github.com/junhyung9985/NumberCross/blob/master/README.md