

W4701 - Artificial Intelligence HW4

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1. AC-3 algorithm:

In my result, AC3 can only solve 3 out of 500 sudokus, this is because without assigning value to some tiles, the constraint is not strong enough to let AC-3 reduce the puzzle to be only one possible value on all tiles.

AC3 execution time: 5.00304293633 seconds

2. Backtracking + minimum remaining value + forward checking

The all 500 sudokus can be solved with this implementation.

I use recursive function to implement Backtracking algorithm. The heuristic "minimum remaining value" is used to choose the next tile to assign value, I use a sorted list of available values for unassigned variables to choose the target tile.

Forward checking is done with updating the available values of all tiles whenever finish assigning a value to a tile.

To validate the sudoku output, I implement a function to check if all variables in the result can only have one available value.

Backtracking execution time: 356.981137037

HOW TO EXECUTE:

Python hw4_cw2952.py