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CS 470, section 001

Programming Assignment (Optimization Search)

1.

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| --- | --- | --- | --- |
| heuristics used: | none | mrv | mrv+degree |
| none | Solved 1 puzzles in 23.1216079 seconds.  Average Solve Time = 23.1216079 seconds. | Solved 100 puzzles in 101.5457793 seconds.  Average Solve Time = 1.015457793 seconds. | Solved 100 puzzles in 34.6135085 seconds.  Average Solve Time = 0.346135085 seconds. |
| lcv | Solved 1 puzzles in 24.1852308 seconds.  Average Solve Time = 24.1852308 seconds. | Solved 100 puzzles in 185.9759925 seconds.  Average Solve Time = 1.859759925 seconds. | Solved 100 puzzles in 40.6070621 seconds.  Average Solve Time = 0.406070621 seconds. |

The fastest heuristic combo is the mrv+degree (with no lcv) combo.

2.

What I learned:

-How to implement a Sudoku-solving algorithm:

--How to implement a forward check function:

---How to implement a normal (removing) forward check function.

---How to implement a counting forward check function.

--How to implement a constraint-counting function.

--How to implement a minimum remaining values heuristic function.

--How to implement a least-constraining value heuristic-based ordering function.

--How to implement a backtracking search algorithm for Sudoku using various functions.

-How to alter a Sudoku-solving algorithm:

--How to alter a Sudoku-solving algorithm to use/not\_use an MRV heuristic function.

--How to alter a Sudoku-solving algorithm to use/not\_use a degree heuristic function.

--How to alter a Sudoku-solving algorithm to use/not\_use an LCV heuristic function.

-How well different versions of a Sudoku-solving algorithm perform:

--LCV performs the worst.

--No heuristics is in 5th place.

--MRV+LCV is in 4th place.

--MRV is in 3rd place.

--MRV+degree+LCV is in 2nd place.

--MRV+degree performs the best.