CS182 Assignment 3

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5: Analyzing performance of solvers

Solver	Time (s)	Explored
CSP	15.96	56734
CSP + Forward	5.99	7095
CSP + Constrained	0.39	787
CSP + Constrained + Forward	0.65	734

The ordering of the search states according to the minimum constrained heuristic brought about the largest improvement in terms of speed. Adding the forward checking component decreased the number of expanded states, but the additional computational overhead of calculating the factor constraints caused the algorithm to be slower. A way to circumvent this issue would be to have the ability to pass the factor domains hash in the constructor for a new Sudoku object. Similarly, because the structure of the code was in such a way that a lot of it was shared among these methods, the basic CSP algorithm had the same updateAllFactors() call that the subsequent solvers had. This isn't necessary as only the row/column/box for the variable in question needs to be updated at any iteration, and when that was removed the speed improved to 6.95 seconds (the number of search states remains the same as this is only reducing computational overhead).