

CS341 Artificial Intelligence – Spring 2015  
Project 1 - Sudoku as CSP  
50 points  
Due: Feb. 18

**Overview:** For this project you will investigate four strategies for solving sudoku puzzles:

1. Straightforward backtracking search
2. Backtracking using the minimum-remaining-values (MRV) heuristic
3. Backtracking using forward checking
4. Backtracking using the MRV heuristic and forward checking

Any algorithm not using the MRV heuristic should fill in values going left to right across rows, starting in the uppermost row. The straightforward algorithm should select allowed values in ascending order.

**What I will provide** In `~/bonomo/public/cs341` you will find an executable file called `sudokuGen`. This code should be run as follows

```
sudokuGen fname
```

and (after a few seconds) will create two files: `fname.in` and `fname.sol`, which will contain a sudoku puzzle and it's solution. You can use these files to test you code and run experiments.

**What to Hand In :** You will hand in two things for this project:

1. A report which describes how you implement each of the techniques, and a discussion on what (if any) improvements are obtained using the MRV heuristic and/or forward checking. You will need to determine what statistics to gather in order to measure the improvement. These should be described in your report, as well as the details of any experiments you run.
2. Four separate programs implementing the four algorithms listed above. Each should take as a command line argument the name of a sudoku input file (using just `fname`, not `fname.in`) and output a solution along with any statistics you generated for your report.

You may work in groups of two for this project.