CS3243 Assignment 2
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The algorithm used is CSP, where the following information define the sudoku problem:
- *variables*: A list of 81 cells representing the row-col positions of the puzzle
- *constraints*: A list of 27 constraints each of which has a scope of 9 variables.
- *domains*: A table of cells mapped to their corresponding domains. Each cell has a maximum of 9 values in its domain, ranging from integer 1 to 9.

Algorithm explanation:
The solver finds solutions using **domain splitting** technique (contrast to backtracking, naive search etc). It selects a variable and splits its domain into two and recursively solves each half using domain splitting again. In my algorithm, the heuristic I use for selecting variable is the one that is the **most constrained** - smaller domain - as I want it to fail fast to prevent unnecessary further splitting of the subtree. For each splitting, the **arc-consistency** algorithm is invoked to make the slightly smaller CSP arc consistent. This method is essentially a depth-first search and is no faster than backtracking asymptotically.

Analysis:
The algorithm to **revise** a variable has a time complexity of $O(d^8)$ as a constrain has a scoe of eight variables. A variable can be inserted into the *todo* set (to be revised again) $O(3d)$ times = $O(d)$, as each variable has only three constrains. Hence the arc-consistency algorithm has a time complexity of $O(d^9)$.