CS598 Project Proposal: Parallel Sudoku Solver

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Sudoku puzzles consists of partially filled matrix NN. The algorithm needs to fill the blank positions with values 1 through N such that no number is repeated on each of the N rows, N columns or the squares of $\sqrt{N} \times \sqrt{N}$ cells that split the original matrix. The goal will be to solve the grid using parallelization strategies provided by Charm++.

From a mathematical perspective, it has been proven that the total number of valid Sudoku grids, for $N = 9$, is $6,670,903,752,021,072,936,960$ or approximately 6.671×10^{21}. Trying to populate all these grids is itself a difficult problem because of the huge number. This large number also directly eliminates the possibility of solving the puzzle with brute force technique in a reasonable amount of time. Therefore, a method for solving the puzzle quickly will be derived that takes advantage of some "logical' properties of Sudoku to reduce the search space and optimize the running time of the algorithm. Our goal off course, is to allow for that algorithm to take advantage of the manycore architecture to further reduce its running time.

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