**Project Information**

Project Title: Sudoku Solution Validator

Group Number: 12

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**Abstract:**

Sudoku is a puzzle game consisting of a 9x9 grid filled with several numbers randomly. The goal of the puzzle is to have a filled array where each of the 9 rows and 9 columns, as well as the 9 (3x3)  squares, have 1-9 in them without repeating in a single row, column or square. Finding a valid solution can be difficult as there could be multiple solutions to the same puzzle and validating a non-official solution could be challenging. Currently, the common method of validating the sudoku puzzle involves looking at the solution provided in the book and comparing each square of the solution with each square of the filled puzzle manually. Usually, only one solution is provided. The benefit of this method is that it is the most convenient and readily available. However, its flaw is that it wouldn't account for alternate solutions which would require a person to manually traverse the filled puzzle and validate the three criteria for a valid solution.

The solution to this problem that we would like to provide would be the development of a program to help validate the solution. The filled puzzle will be input into the program which would segment the data by the rows, the columns and the 3x3 square which is analyzed by the threads which the program will create. 1 thread will be implemented to validate that each row has all the values between 1-9 without repeat.  1 thread will be implemented to validate that each column has all the values between 1-9 without repeat. A set of 9 threads will be implemented to validate that each of the 9 squares also fulfills the above condition. Each of the threads will return a boolean value of true to the parent if the condition is valid and false if it is not. If all 11 threads return true, it would indicate that the solution is valid. The implementation of multithreading would allow for efficient utilization of the CPU resources and reduce time and user manual effort required for solution validation. The deliveries would be a program that would allow the user to input a filled sudoku puzzle, row by row, and have it output the validity of the solution

**Weekly Schedule:**

The weekly schedule is to meet 2 hours a day every Friday from 10-12 am to ensure that the week's goal was fulfilled during the week. The goals for each week are listed below

03/13/2020: Have the basics of the validator developed which validates the 3 conditions without the implementation of threads.

03/20/2020: Implement threading into the validator to implement the 27 threads in 3 groups of 9 parallel threads to validate each of the 3 criteria of the valid solution.

03/27/2020: Test and debug the validator.

04/03/2020: Write Ch 4 and Ch 5 of the report.

04/10/2020: Write Ch 5 and prepare the presentation.

04/17/2020: Write references and appendix and edit the paper and presentation.

04/24/2020: Submit the paper and finish up the presentation.