

# Programming Semester Project Submission Form

## Student Information

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- Subject: Programming 2
- Date: May 16, 2023

## Project Overview

- Project Title: One-Player Sudoku Puzzle Game
- Brief Description of the Problem:
  - *(Please provide a summary of the problem you aim to solve, and why it is important or relevant.)*

In this project, I aim to develop a one-player puzzle-solving Sudoku game with a graphical interface. The game will provide the user with an interactive graphical interface that allows them to select and input numbers into the grid.

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## Problem Formalization

- *(Please describe the problem in formal terms, including any mathematical or logical expressions necessary to define the problem, constraints, and objectives.)*

Sudoku is a logic-based number placement puzzle where the objective is to fill a 9x9 grid with digits so that each column, each row, and each of the nine 3x3 sub-grids contains all of the digits from 1 to 9 without repetition. Sudoku puzzles can be solved using a backtracking algorithm, which is a common approach for solving constraint satisfaction problems. The backtracking algorithm explores all possible candidate solutions incrementally, backtracking when it encounters a contradiction or failure.

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## Problem-Solving Algorithm Design

- *(Please provide a high-level overview of the algorithm you plan to use to solve the problem. Include a description of the main steps, data structures, and techniques involved.)*

Choose an empty cell in the grid.

If all digits have been tried for the current cell without violating any constraints, move to the next empty cell and repeat steps.

The backtracking algorithm explores the solution space by systematically trying different combinations of digits until a valid solution is found. It utilizes the depth-first search strategy, where it explores each possible digit for a given cell before moving on to the next empty cell.

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### **Input and Output Formats**

- Input Format:
  - *(Please describe the expected format of the input data.)*

Integer 1-9

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- Output Format:
  - *(Please describe the format of the output data or results produced by your solution.)*

The Sudoku grid displayed in a graphical interface, where the cells are visually represented as a 9x9 grid. All cells filled with numbers.

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### **User Interface**

- Interface Type: Text-based Console
  - Interface Description:
    - *(Please specify the type of user interface you plan to implement for your project, such as GUI, console, web-based, etc. If possible, provide a brief description of the main components or features of the interface.)*
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### **Interactivity**

- *(Please describe any interactive elements or features your project will include, such as user input, real-time updates, or dynamic behavior in response to events.)*

The game will allow the player to interact with the Sudoku grid by selecting empty cells and inputting numbers from the keyboard or through a graphical interface. The player will be able to navigate the grid using arrow keys or mouse clicks.

As the player inputs numbers into the Sudoku grid, the game will provide real-time updates, such as highlighting the selected cell, updating the numbers in the grid, and displaying feedback on the correctness of the input.

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By submitting this form, I confirm that the information provided is accurate and represents my original work for the programming semester project.

- Signature: Maruna So Date: May 16, 2023