COMPLEX COMPUTING PROBLEM (CCP):

Project Title: Sudoku Validator

Course Name & Code: Programming Fundamentals (CT-175)

Instructor's Name: Muhammad Abdullah.

Group Members:

- Khadija Fasih (CT-160),
- Syeda Amna Hasnain (CT-164)
- Umme Hani Adeel (CT-151)

Group name: WeedCode.

Date of Submission: October 2, 2025.

Background:

Sudoku is a popular logic-based number puzzle that challenges players to fill a 9x9 grid so that each row, column, and 3x3 sub- grid contains all digits from 1 to 9 exactly once. It is well-known for its simple rules yet highly engaging problem-solving process. Verifying whether a completed Sudoku solution is correct can be time-consuming and difficult if done manually. Each row, column, and sub grid must be checked care to make sure that there are no repeated numbers and that all values are falling within the allowed range. As the difficulty level increases, so does the process of validating and verifying the sudoku board.

Problem statement:

The problem is to design and implement a program that takes a completed Sudoku board as input and checks if it satisfies all the rules. The program will then report if the board is valid or not.

Objectives:

The main objective is to design a program which:

- Validate a complete sudoku board.
- Ensures that all the rules are followed and make sure that no numbers are repeated in each row, column and subgrid.
- Gives clear output and report whether the board is valid or not.

Methodology:

- Take a complete sudoku board as input.
- Check each row to make sure any digit from 1-9 is not repeated. If it is repeated, it mark the board as invalid.
- Check each column to make sure any digit from 1-9 is not repeated. If it is repeated, it mark the board as invalid.
- Divide the board into nine 3x3 sub-grids. Then check each subgrid to make sure any digit from 1-9 is not repeated. If it is repeated, it mark the board as invalid.
- If the board follows all the rules, it validates the board.

Expected Outcomes:

- Can accurately determine if the sudoku board is valid or not.
- Simple and user-friendly which gives clear outputs.