Game Design Document: Sudoku Puzzle

# 1. Game Overview

Title: Sudoku   
Genre: Puzzle   
Platform: PC, Android (cross-platform using Unity)  
Target Audience: Puzzle game enthusiasts, casual players, ages 10+

# 2. Game Description

Sudoku Puzzle is a digital version of the classic number-placement logic game. The player is presented with a 9x9 grid partially filled with digits. The objective is to fill the grid so that each row, column, and 3x3 subgrid contains all digits from 1 to 9, without repetition.

# 3. Core Gameplay Mechanics

- Grid: 9x9 matrix divided into nine 3x3 subgrids  
- Inputs: Click to select a cell; click on the number pad to insert digits  
- Validation: Game automatically checks for rule violations  
- Win Condition: Grid is completely and correctly filled

Gameplay Features:  
- Hint System: Player can reveal the correct digit for a selected cell (no limited use)  
- Undo/Redo: Tracks move history  
- Error Highlighting (optional): Highlights incorrect digits if enabled

# 4. User Interface (UI)

Main Menu:  
- Start New Game

In-Game HUD:  
- Home Button  
- Hint Button  
- Undo/Redo Button  
- Number Input Pad

# 5. Art and Visual Style

- Theme: Minimalist and clean interface  
- Color Scheme: Soft background colors with clear contrasting numbers  
- Animations: Smooth transitions between cell selections, hint highlights, and success celebrations

# 6. Technical Details

- Engine: Unity 2D  
- Programming Language: C#  
- Data Structure:  
 - 2D integer array to store the correct grid values  
 - An additional 2D array to store and display (given) cells   
- Puzzle Generator:  
 - Algorithm to generate valid Sudoku puzzles based on difficulty  
- Solver (Optional):  
 - Backtracking algorithm for the hint system and puzzle validation

# 7. Future Expansions

- Daily Puzzles  
- Challenge Mode (time-limited puzzles)  
- Pause/Resume/Continue from the last game  
- Difficulty Selector