import tkinter as tk

from tkinter import messagebox

import random

Sudoku puzzle generator using backtracking algorithm

def generate_sudoku():

  def is_valid(board, row, col, num):

    for i in range(9):

      if board[row][i] == num or board[i][col] == num:

        return False

    start_row, start_col = 3 * (row // 3), 3 * (col // 3)

    for i in range(3):

      for j in range(3):

        if board[start_row + i][start_col + j] == num:

          return False

    return True

```python
    def solve(board):
        for row in range(9):
            for col in range(9):
                if board[row][col] == 0:
                    for num in range(1, 10):
                        if is_valid(board, row, col, num):
                            board[row][col] = num
                            if solve(board):
                                return True
                            board[row][col] = 0
                    return False
        return True

    # Generate a full solved Sudoku board
    board = [[0 for _ in range(9)] for _ in range(9)]
    solve(board)

    # Remove numbers to create a puzzle
    for _ in range(random.randint(35, 50)):  # Number of cells to remove
        row, col = random.randint(0, 8), random.randint(0, 8)
        board[row][col] = 0

    return board

# Create a GUI for the Sudoku game
class SudokuGame:
```

```python
    def _init_(self, root):

        self.root = root

        self.root.title("Sudoku Game")


        self.board = generate_sudoku()

        self.entries = [[None for _ in range(9)] for _ in range(9)]


        self.create_grid()

        self.create_buttons()


    def create_grid(self):

        for row in range(9):

            for col in range(9):

                entry = tk.Entry(self.root, width=5, font=('Arial', 18), justify='center')

                entry.grid(row=row, column=col, padx=5, pady=5)

                self.entries[row][col] = entry

                if self.board[row][col] != 0:

                    entry.insert(tk.END, str(self.board[row][col]))

                    entry.config(state="disabled")  # Disable pre-filled cells


    def create_buttons(self):

        check_button = tk.Button(self.root, text="Check Solution", font=('Arial', 14),
command=self.check_solution)

        check_button.grid(row=9, column=0, columnspan=9)


    def check_solution(self):
```

```python
        for row in range(9):

            for col in range(9):

                user_input = self.entries[row][col].get()

                if user_input:

                    if not user_input.isdigit() or int(user_input) != self.board[row][col]:

                        messagebox.showinfo("Incorrect", f"Wrong value at row {row+1}, column {col+1}")

                        return

        messagebox.showinfo("Correct", "Congratulations! Your solution is correct!")


# Initialize the Tkinter window

root = tk.Tk()

game = SudokuGame(root)

root.mainloop()
```