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

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:

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):

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()