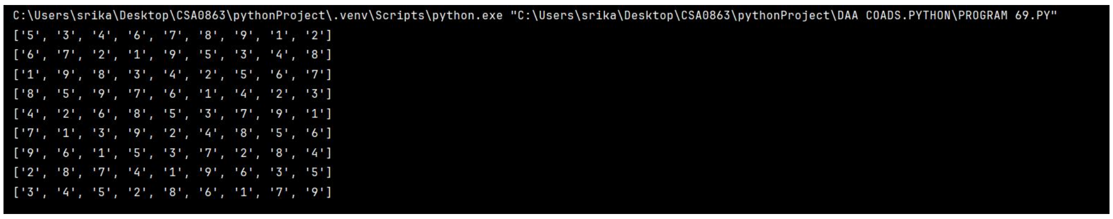
Sudoku Solver
Write a program to solve a Sudoku puzzle by filling the empty cells.
A sudoku solution must satisfy all of the following rules:
1.Each of the digits 1-9 must occur exactly once in each row.
2.Each of the digits 1-9 must occur exactly once in each column.
3.Each of the digits 1-9 must occur exactly once in each of the 9 3x3 sub-boxes of the grid.
The '.' character indicates empty cells.

Example 1:

Input: board =
```
[["5","3",".",".","7",".",".",".","."],["6",".",".","1","9","5",".",".","."],[".","9","8",".",".",".",".","6",".
"],["8",".",".",".","6",".",".",".","3"],["4",".",".","8",".","3",".",".","1"],["7",".",".",".","2",".",".",".",
"6"],[".","6",".",".",".",".","2","8","."],[".",".",".","4","1","9",".",".","5"],[".",".",".",".","8",".",".","
7","9"]]
```
Output:
```
[["5","3","4","6","7","8","9","1","2"],["6","7","2","1","9","5","3","4","8"],["1","9","8","3","4","
2","5","6","7"],["8","5","9","7","6","1","4","2","3"],["4","2","6","8","5","3","7","9","1"],["7","1
","3","9","2","4","8","5","6"],["9","6","1","5","3","7","2","8","4"],["2","8","7","4","1","9","6","
3","5"],["3","4","5","2","8","6","1","7","9"]]
```
Program:
```
def solveSudoku(board):
    def is_valid(board, row, col, num):
        # Check if the number is already in the row
        for i in range(9):
            if board[row][i] == num:
                return False
        # Check if the number is already in the column
        for i in range(9):
            if board[i][col] == num:
                return False
        # Check if the number is in the 3x3 sub-box
        box_row, box_col = 3 * (row // 3), 3 * (col // 3)
        for i in range(box_row, box_row + 3):
            for j in range(box_col, box_col + 3):
                if board[i][j] == num:
                    return False
        return True

    def solve(board):
        for row in range(9):
            for col in range(9):
                if board[row][col] == '.':
                    for num in '123456789':
                        if is_valid(board, row, col, num):
                            board[row][col] = num
                            if solve(board):
                                return True
                            board[row][col] = '.'
                    return False
        return True

    solve(board)

# Example usage
board = [
    ["5","3",".",".","7",".",".",".","."],
    ["6",".",".","1","9","5",".",".","."],
    [".","9","8",".",".",".",".","6","."],
    ["8",".",".",".","6",".",".",".","3"],
    ["4",".",".","8",".","3",".",".","1"],
    ["7",".",".",".","2",".",".",".","6"],
    [".","6",".",".",".",".","2","8","."],
    [".",".",".","4","1","9",".",".","5"],
    [".",".",".",".","8",".",".","7","9"]
]

solveSudoku(board)
for row in board:
    print(row)
```

Output:



```
C:\Users\srika\Desktop\CSA0863\pythonProject\.venv\Scripts\python.exe "C:\Users\srika\Desktop\CSA0863\pythonProject\DAA COADS.PYTHON\PROGRAM 69.PY"
['5', '3', '4', '6', '7', '8', '9', '1', '2']
['6', '7', '2', '1', '9', '5', '3', '4', '8']
['1', '9', '8', '3', '4', '2', '5', '6', '7']
['8', '5', '9', '7', '6', '1', '4', '2', '3']
['4', '2', '6', '8', '5', '3', '7', '9', '1']
['7', '1', '3', '9', '2', '4', '8', '5', '6']
['9', '6', '1', '5', '3', '7', '2', '8', '4']
['2', '8', '7', '4', '1', '9', '6', '3', '5']
['3', '4', '5', '2', '8', '6', '1', '7', '9']
```

Time complexity:

O(n)