209. Write a program to solve a Sudoku puzzle by filling the empty cells.A sudoku solution must satisfy all of the following rules:Each of the digits 1-9 must occur exactly once in each row.Each of the digits 1-9 must occur exactly once in each column.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):
        for i in range(9):
            if board[row][i] == num or board[i][col] == num or board[3 * (row // 3) + i // 3][3 * (col // 3) + i
% 3] == num:
                return False
        return True

    def solve(board):
        for i in range(9):
            for j in range(9):
                if board[i][j] == '.':
                    for num in '123456789':
                        if is_valid(board, i, j, num):
                            board[i][j] = num
                            if solve(board):
                                return True
                            board[i][j] = '.'
```

```
                return False
        return True

    solve(board)
    return board

# Example
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"]]

print(solveSudoku(board))
```

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']]

=== Code Execution Successful ===
```

TIME COMPLEXITY:- $O(9^{81})$