# Sudoku Solver

In this problem we must fill a 9×9 board with digits 1-9 such that all Sudoku rules are satisfied, using backtracking.

## Key Steps:

1. Find Empty Cell:
   - Scan the board to find the first '.'
2. Try Digits 1-9
   - For each digit:- Check if placing the digit is valid :
     - Not in current row
     - Not in current column
     - Not in current 3×3
3. Place Digit and Recurse
   - If valid, place digit and recursively solve the rest of the board.
4. Backtrack
   - If recursion fails, reset the cell to '.' and try next digit.
5. Base Case
   - If no empty cells remain → puzzle solved.

## Complexity:

- Worst case : $O(9^{81})$ theoretical, but pruning reduces drastically in practice.

## Why This Works:

- Fills cells one by one, ensuring validity at each step.
- Backtracking reverts incorrect placements and explores other options.
- Guaranteed to find the unique solution per constraints.