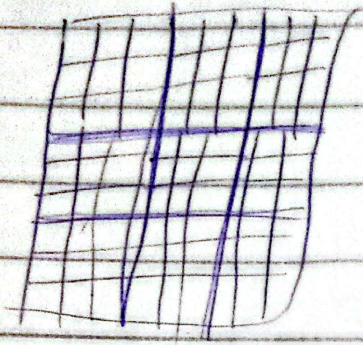


Sudoku Problem



Unique
Solution

Number to be place
must follow conditions

- ① Not exist Horizontal
- ② Not exist Vertical
- ③ Not exist in Grid

Pseudocode

```
bool ss(board[r][c], row, col) {  
    if (row == 9) return true;  
    if (board[row][col] != '.')  
        return ss(board, nextR, nextC);  
    for (dig = 1 to 9)  
        if (isSafe(board, row, col, dig)) {  
            board[row][col] = dig;  
            if (ss(board, nextR, nextC))  
                return true;  
            board[row][col] = '.';  
        }  
    return false;  
}
```

```
nextRow = row  
nextCol = col + 1  
if (nextCol == 9) {  
    nextRow = row + 1;  
    nextCol = 0;  
}
```

isSafe condition

Horizontal

```
for (int j = 0; j < 9; j++) {  
    if (board[row][j] == dig) {  
        return false;  
    }  
}
```

Vertical

```
for (int i = 0; i < 9; i++) {  
    if (board[i][col] == dig) {  
        return false;  
    }  
}
```

Grid Check

```
srow = (row / 3) * 3  
scol = (col / 3) * 3  
for (i = srow; i <= srow + 2; i++)  
    for (j = scol; j <= scol + 2; j++)  
        if (board[i][j] == dig)  
            return false;  
}
```

Time Complexity

$O(9^{empty\ cells})$