36. Valid Sudoku

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Difficulty	Medium
LC Url	https://leetcode.com/problems/valid-sudoku/
Importance	
Tag	Array&Sorting NEET
Video	

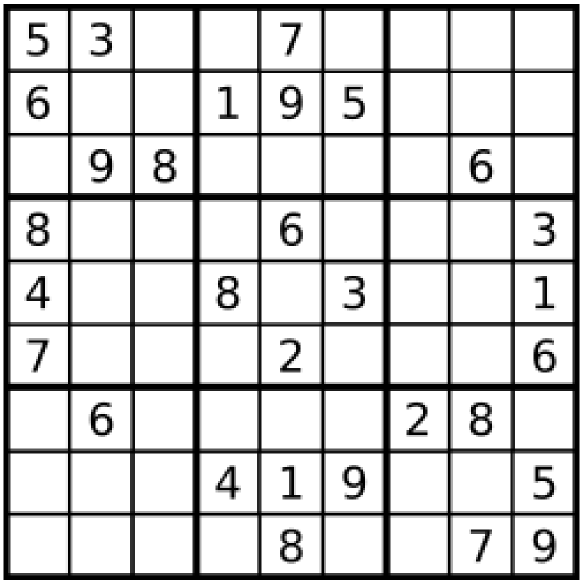
Determine if a `9 x 9` Sudoku board is valid. Only the filled cells need to be validated **according to the following rules**:

1. Each row must contain the digits `1-9` without repetition.
2. Each column must contain the digits `1-9` without repetition.
3. Each of the nine `3 x 3` sub-boxes of the grid must contain the digits `1-9` without repetition.

Note:

- A Sudoku board (partially filled) could be valid but is not necessarily solvable.
- Only the filled cells need to be validated according to the mentioned rules.

Example 1:



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

```
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: true
```

Example 2:

```
Input: board =
[["8","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: false
Explanation: Same as Example 1, except with the5 in the top left corner being modified to
8. Since there are two 8's in the top left 3x3 sub-box, it is invalid.
```

Constraints:

- `board.length == 9`
- `board[i].length == 9`
- `board[i][j]` is a digit `1-9` or `'.'`.

Solution

```
class Solution:
    def isValidSudoku(self, board: List[List[str]]) -> bool:
        cols = collections.defaultdict(set)
        rows = collections.defaultdict(set)
        squares = collections.defaultdict(set)  # key = (r // 3, c // 3)

        for r in range(9):
            for c in range(9):
                if board[r][c] == ".":
                    continue
                if (
                    board[r][c] in rows[r]
                    or board[r][c] in cols[c]
                    or board[r][c] in squares[(r // 3, c // 3)]
                ):
                    return False
                cols[c].add(board[r][c])
                rows[r].add(board[r][c])
                squares[(r // 3, c // 3)].add(board[r][c])

        return True
```