308. Range Sum Query 2D - Mutable

Description

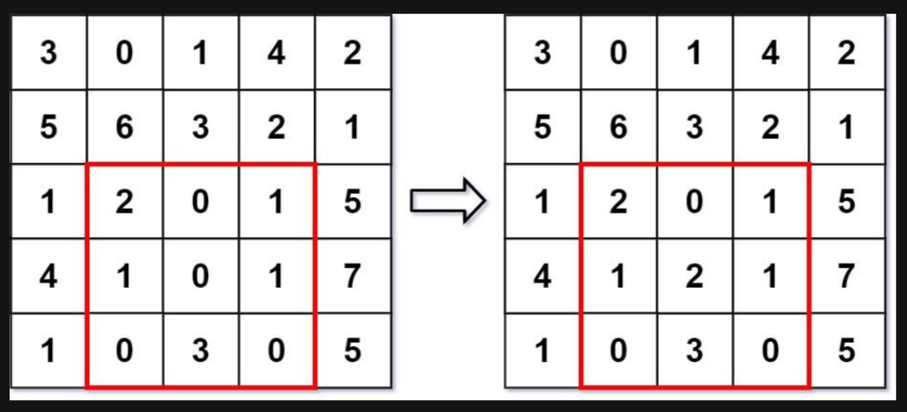
Given a 2D matrix `matrix`, handle multiple queries of the following types:

1. **Update** the value of a cell in `matrix`.
2. Calculate the **sum** of the elements of `matrix` inside the rectangle defined by its **upper left corner** `(row1, col1)` and **lower right corner** `(row2, col2)`.

Implement the NumMatrix class:

- `NumMatrix(int[][] matrix)` Initializes the object with the integer matrix `matrix`.
- `void update(int row, int col, int val)` **Updates** the value of `matrix[row][col]` to be `val`.
- `int sumRegion(int row1, int col1, int row2, int col2)` Returns the **sum** of the elements of `matrix` inside the rectangle defined by its **upper left corner** `(row1, col1)` and **lower right corner** `(row2, col2)`.

Example 1:




```
Input
["NumMatrix", "sumRegion", "update", "sumRegion"]
[[[[3, 0, 1, 4, 2], [5, 6, 3, 2, 1], [1, 2, 0, 1, 5], [4, 1, 0, 1, 7], [1, 0, 3, 0, 5]]], [2, 1, 4, 3], [3, 2, 2], [2, 1, 4, 3]]
Output
[null, 8, null, 10]

Explanation
NumMatrix numMatrix = new NumMatrix([[3, 0, 1, 4, 2], [5, 6, 3, 2, 1], [1, 2, 0, 1, 5], [4, 1, 0, 1, 7], [1, 0, 3, 0, 5]]);
numMatrix.sumRegion(2, 1, 4, 3); // return 8 (i.e. sum of the left red rectangle)
numMatrix.update(3, 2, 2); // matrix changes from left image to right image
numMatrix.sumRegion(2, 1, 4, 3); // return 10 (i.e. sum of the right red rectangle)
```

Constraints:

- `m == matrix.length`
- `n == matrix[i].length`
- `1 <= m, n <= 200`
- `-1000 <= matrix[i][j] <= 1000`
- `0 <= row < m`
- `0 <= col < n`
- `-1000 <= val <= 1000`
- `0 <= row1 <= row2 < m`
- `0 <= col1 <= col2 < n`
- At most `5000` calls will be made to `sumRegion` and `update`.