Question: https://leetcode.com/problems/range-sum-query-2d-immutable/submissions/

So what we can do maintain a running sum, i.e., dp[i][j] is sum of quardilateral starting from 0th to ith row, and oth column to jth column.

Now in order to find out sum of quardilateral starting from row1 and col1 till row2, col2. What we can do is

X=A-B-C+D

Where A is dp[row2][col2]

B is dp[row2][col1]

C is dp[row1][col2]

and D is dp[row1][col1]

GIF: https://i.imgur.com/tmTpvF5.gif

Code:  
class NumMatrix {

long[][] dp;

public NumMatrix(int[][] M) {

int ylen = M.length + 1, xlen = M[0].length + 1;

dp = new long[ylen][xlen];

for (int i = 1; i < ylen; i++)

for (int j = 1; j < xlen; j++)

dp[i][j] = M[i-1][j-1] + dp[i-1][j] + dp[i][j-1] - dp[i-1][j-1];

}

public int sumRegion(int R1, int C1, int R2, int C2) {

return (int)(dp[R2+1][C2+1] - dp[R2+1][C1] - dp[R1][C2+1] + dp[R1][C1]);

}

}

Github Link :<https://lnkd.in/ecwtJeaz>