1074. Number of Submatrices That Sum to Target <Hard>

int numSubmatrixSumTarget(vector<vector<int>>& matrix, int target) {

int result = 0;

int H = matrix.size();

int W = matrix[0].size();

vector<vector<int>> preSum(H, vector<int>(W + 1));

for(int i = 0; i < H; i++){

for(int j = 1; j < W + 1; j++){

preSum[i][j] += preSum[i][j - 1] + matrix[i][j - 1];

}

}

unordered\_map<int, int> map;

for(int startCol = 1; startCol <= W; startCol++){

for(int endCol = startCol; endCol <= W; endCol++){

map.clear();

map[0] = 1;

int curSum = 0;

for(int row = 0; row < H; row++){

curSum += preSum[row][endCol] - preSum[row][startCol - 1];

if(map.find(curSum - target) != map.end()){

result += map[curSum - target];

}

map[curSum]++;

}

}

}

return result;

}