MAXIMAL RECTANGLE

We are given a 2D array of size m x n which only contains 0's and 1's and our job is to return the area of the largest rectangle with only 1's in it.

If we consider a column of consecutive ones as a histogram's bar, we can just apply logic of largest rectangle in histogram logic at each row.

To convert it to an array that can be passed into histogram function, we need to convert it to a prefix sum array

1	0	1	0	1
1	0	1	1	1
1	1	1	1	1
1	0	0	1	0

→

1	0	1	0	1
2	0	2	1	2
3	1	3	2	3
4	0	0	3	0

Apply at each row

Pseudocode :

```
maximalRectangle(mat, M, N) {
    maxArea = 0;
    pSum[M][N];
    for(j = 0 → N-1) {
        sum = 0;
```

```
        for(j = 0 → M − 1) {
            sum += mat[i][j];
            if (mat[i][j] == 0) {
                sum = 0;
            }
            pSum[i][j] = sum;
        }
    }
    for(i = 0 → M − 1) {
        maxArea = max(maxArea, LHist(pSum[i]))
    }
    return maxArea;
}
```