

- Dynamic Programming

A rat is located at the top-left corner of a $M \times N$ grid A . $M \geq 1, N \geq 1$. It can only move either down or right at any point in time. The rat is trying to reach the bottom-right corner of the grid. How many possible unique paths are there? For example, if $M = 2, N = 2$, there are two possible unique paths: $A[0][0] \rightarrow A[0][1] \rightarrow A[1][1]$, $A[0][0] \rightarrow A[1][0] \rightarrow A[1][1]$.

(a) Based on the recurrence relation, give a naive recursive way to solve this problem

(b) Use dynamic programming to solve this problem

(c) Now consider there are some obstacles in the grid A , the rat cannot go through the obstacles. An obstacle and empty space are marked as 1 and 0 respectively. How many unique paths?