Dynammic Programming-1

Assignment Questions

PW SKILLS

Q1. There are n stairs, a person standing at the bottom wants to reach the top. The person can climb either 1,2,3...m stairs at a time where m is a user given integer. Count the number of ways the person can reach the top.

Input 1 : n = 5 , m = 3
Output 1: 7

Q2. The Tribonacci sequence Tn is defined as follows:
T0 = 0, T1 = 1, T2 = 1, and Tn+3 = Tn + Tn+1 + Tn+2 for n >= 0.
Given n, return the value of nth tribonacci number.

Example 1:
Input: n = 4
Output: 4
Explanation:
T_3 = 0 + 1 + 1 = 2
T_4 = 1 + 1 + 2 = 4

Example 2:
Input: n = 25
Output: 1389537

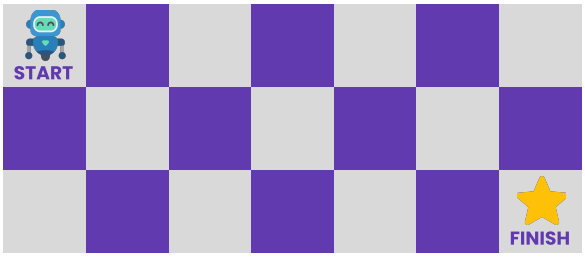
Q3. You are a professional robber planning to rob houses along a street. Each house has a certain amount of money stashed, the only constraint stopping you from robbing each of them is that adjacent houses have security systems connected and it will automatically contact the police if two adjacent houses were broken into on the same night.
Given an integer array nums representing the amount of money of each house, return the maximum amount of money you can rob tonight without alerting the police.

Example 1:
Input: nums = [1,2,3,1]
Output: 4
Explanation: Rob house 1 (money = 1) and then rob house 3 (money = 3).
Total amount you can rob = 1 + 3 = 4.

Example 2:
Input: nums = [2,7,9,3,1]
Output: 12
Explanation: Rob house 1 (money = 2), rob house 3 (money = 9) and rob house 5 (money = 1).
Total amount you can rob = 2 + 9 + 1 = 12.

Q4. There is a robot on an m x n grid. The robot is initially located at the top-left corner (i.e., grid[0][0]). The robot tries to move to the bottom-right corner (i.e., grid[m - 1][n - 1]). The robot can only move either down or right at any point in time.
Given the two integers m and n, return the number of possible unique paths that the robot can take to reach the bottom-right corner.

Example 1:



Input: m = 3, n = 7
Output: 28

Example 2:
Input: m = 3, n = 2
Output: 3
Explanation: From the top-left corner, there are a total of 3 ways to reach the bottom-right corner:
1. Right -> Down -> Down
2. Down -> Down -> Right
3. Down -> Right -> Down

Q5. Given a triangle array, return the minimum path sum from top to bottom.For each step, you may move to an adjacent number of the row below. More formally, if you are on index i on the current row, you may move to either index i or index i + 1 on the next row.

Example 1:
Input: triangle = [[2],[3,4],[6,5,7],[4,1,8,3]]
Output: 11
Explanation: The triangle looks like:
```
   2
  3 4
 6 5 7
4 1 8 3
```
The minimum path sum from top to bottom is 2 + 3 + 5 + 1 = 11 (underlined above).

Example 2:
Input: triangle = [[-10]]
Output: -10