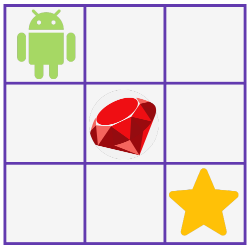
Dynammic Programming-2

Assignment Questions

SKILLS

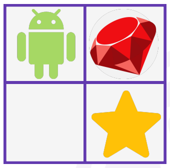
Q1. You are given an m x n integer array grid. There is a robot initially located at the top-left corner (i.e., grid[0][0]). The robot tries to move to the bottom-right corner (i.e., grid[m - 1][n - 1]). The robot can only move either down or right at any point in time.
An obstacle and space are marked as 1 or 0 respectively in the grid. A path that the robot takes cannot include any square that is an obstacle.
Return the number of possible unique paths that the robot can take to reach the bottom-right corner.

Example 1:



Input: obstacleGrid = [[0,0,0],[0,1,0],[0,0,0]]
Output: 2
Explanation: There is one obstacle in the middle of the 3x3 grid above.
There are two ways to reach the bottom-right corner:
1. Right -> Right -> Down -> Down
2. Down -> Down -> Right -> Right

Example 2:



Input: obstacleGrid = [[0,1],[0,0]]
Output: 1

Q2. You are a professional robber planning to rob houses along a street. Each house has a certain amount of money stashed. All houses at this place are arranged in a circle. That means the first house is the neighbor of the last one. Meanwhile, adjacent houses have a security system 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 = [2,3,2]
Output: 3
Explanation: You cannot rob house 1 (money = 2) and then rob house 3 (money = 2), because they are adjacent houses.

Example 2:
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 3:
Input: nums = [1,2,3]
Output: 3

Q3. Given a m x n grid filled with non-negative numbers, find a path from top left to bottom right, which minimizes the sum of all numbers along its path.
Note: You can only move either down or right at any point in time.

Example 1:

1	3	1
1	5	1
4	2	1

Input: grid = [[1,3,1],[1,5,1],[4,2,1]]
Output: 7
Explanation: Because the path 1 → 3 → 1 → 1 → 1 minimizes the sum.

Example 2:
Input: grid = [[1,2,3],[4,5,6]]
Output: 12

Q4. Given an integer array nums, return true if you can partition the array into two subsets such that the sum of the elements in both subsets is equal or false otherwise.

Example 1:
Input: nums = [1,5,11,5]
Output: true
Explanation: The array can be partitioned as [1, 5, 5] and [11].

Example 2:
Input: nums = [1,2,3,5]
Output: false
Explanation: The array cannot be partitioned into equal sum subsets.

Q5.You are given an integer array of coins representing coins of different denominations and an integer amount representing a total amount of money.
Return the number of combinations that make up that amount. If that amount of money cannot be made up by any combination of the coins, return 0.
You may assume that you have an infinite number of each kind of coin.

Example 1:
Input: amount = 5, coins = [1,2,5]
Output: 4

Explanation: there are four ways to make up the amount:
5=5
5=2+2+1
5=2+1+1+1
5=1+1+1+1+1

Example 2:
Input: amount = 3, coins = [2]
Output: 0
Explanation: the amount of 3 cannot be made up just with coins of 2.

Example 3:
Input: amount = 10, coins = [10]
Output: 1