Week 13- Day 3 : Coding Challenge

(Maximum marks -15)

Q-1) Maximum path sum in matrix - solve with DP

https://practice.geeksforgeeks.org/problems/path-in-matrix3805/1

(5 marks)

(Medium)

Given a NxN matrix of positive integers. There are only three possible moves from a cell **Matrix[r][c]**.

1. Matrix [r+1] [c]
2. Matrix [r+1] [c-1]
3. Matrix [r+1] [c+1]

Starting from any column in row 0 return the largest sum of any of the paths up to row N-1.

Example 1:

Input: N = 2

Matrix = {{348, 391},

{618, 193}}

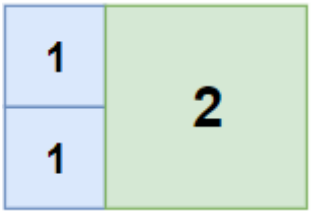
Output: 1009

Explaination: The best path is 391 -> 618.

It gives the sum = 1009.

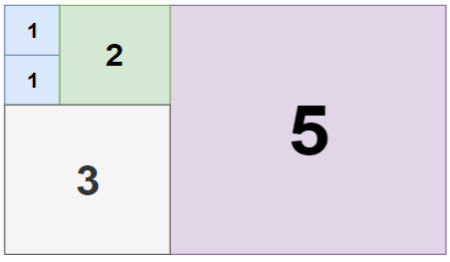
Q-2) Tiling a Rectangle with the Fewest Squares - Solve with DP
(5 marks)
(Easy-since we solved it in recursion topic)
https://leetcode.com/problems/tiling-a-rectangle-with-the-fewest-squares/
Given a rectangle of size n x m, find the minimum number of integer-sided squares that tile the rectangle.

Example 1:



Input: n = 2, m = 3
Output: 3
Explanation: 3 squares are necessary to cover the rectangle.
2 (squares of 1x1)
1 (square of 2x2)

Example 2:



Input: n = 5, m = 8
Output: 5

Q-3) Divisor Game (solve with DP)

Easy **(5 marks)**

https://leetcode.com/problems/divisor-game/

Alice and Bob take turns playing a game, with Alice starting first.

Initially, there is a number n on the chalkboard. On each player's turn, that player makes a move consisting of:

- Choosing any x with 0 < x < n and n % x == 0.
- Replacing the number n on the chalkboard with n - x.

Also, if a player cannot make a move, they lose the game.

Return true *if and only if Alice wins the game, assuming both players play optimally*.

Example 1:

Input: n = 2

Output: true

Explanation: Alice chooses 1, and Bob has no more moves.

Example 2:

Input: n = 3

Output: false

Explanation: Alice chooses 1, Bob chooses 1, and Alice has no more moves.

Marks distribution:
Question 1,2 and 3 carry 5 marks each.