931 minimum Faeling Path Sum

eg:

2	1	3
6	5	4
7	8	9

soln:

initialize

$$\min \left(\begin{array}{c} \\ \swarrow \downarrow \searrow \end{array} \right) + \text{value (in matrix)}$$

$$\min (\infty, 7, 8) + 6 = 13$$

$$\min (7, 8, 9) + 5 = 12$$

$$\min (8, 9, \infty) + 4 = 12$$

Recursion formula

$$dp(x)(y) = \min \begin{pmatrix} dp(x-1)(y-1), \\ dp(x-1)(y), \\ dp(x-1)(y+1) \end{pmatrix} + \text{Matrix}(x)(y)$$

Initialize 2 ∞ columns and use recursion
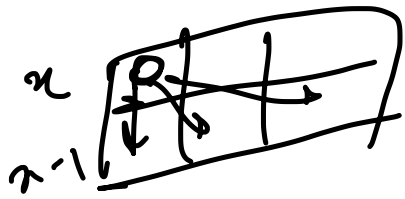
for x in range (1, n+1)
    for y in range (1, n+1)
        <u>Rec formula</u>

return minimum from last column

$O(n^2)$

This solution can be made space efficient

As values in row 'x' will only depend upon values of row 'x-1'

∴ instead of n×n array we can have n×2 array

y:

initialization

[7,4]

step 2