

265 Paint House II

let $opt[i, j]$ = minimum value of coloring house 'i' with color 'j'

eg:

costs: $[[1, 5, 3], [2, 9, 4]]$

<u>opt</u>			
color	3	3	5
	2	5	10
	1	1	5
		1	2
			house

$opt[1][1] \rightarrow$ coloring house 1 with color 1

$opt[2][1] \rightarrow$ coloring house 2 with color 1
which means house 1 must have color 2 or color 3
as adjacent house do not have similar color

$$opt[2][1] = \min \left[\begin{array}{l} opt[1][2] + 2, \\ opt[1][3] + 2 \end{array} \right] = \min \left[\begin{array}{l} 5+2, \\ 3+2 \end{array} \right] = 5$$

$$\text{opt}(2)(2) = \min \begin{pmatrix} \text{opt}(1)(1) + 9 \\ \text{opt}(1)(3) + 9 \end{pmatrix}$$

$$= \min \begin{pmatrix} 1+9 \\ 3+9 \end{pmatrix} = 10$$

$$\text{opt}(2)(3) = \min \begin{pmatrix} \text{opt}(1)(1) + 4, \\ \text{opt}(1)(2) + 4 \end{pmatrix}$$

$$= \min \begin{pmatrix} 1+4, \\ 5+4 \end{pmatrix} = 5$$

opt

	1	5
5		
3		10
1		5

our answer is min of last column

In general

$$\text{opt}[i][j] = \min_{\substack{\text{for all} \\ k \text{ except} \\ j}}$$

Formula 1

$$\left[\text{opt}[i-1][j] + \text{costs}[i][j] \right]$$

$$n = \text{len}(\text{costs})$$

$$n_colors = \text{len}(\text{costs}[0])$$

$$dp = \left[[0] * n \right] * n_colors$$

initialization

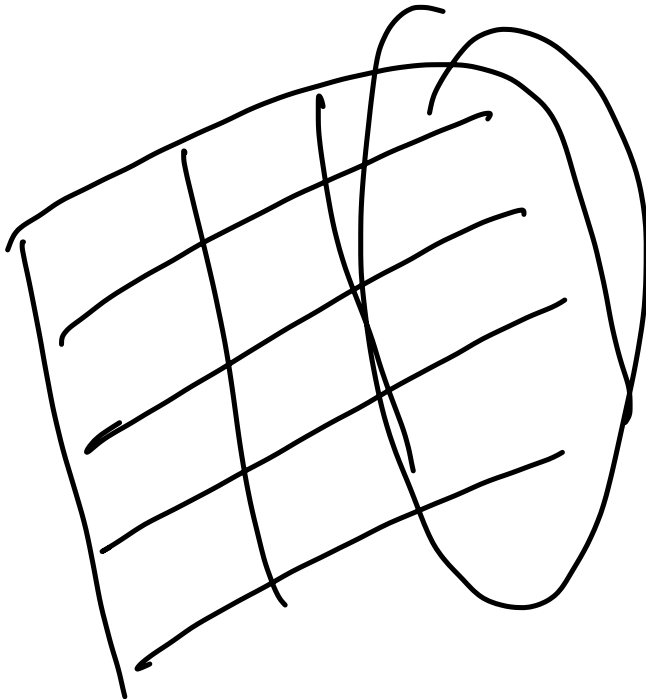
for x in range(n_colors):

$$dp[x][0] = \text{costs}[0][x]$$

For x in range $(1, n)$:

For y in range (n, cols) :

Use formula ①



return
last min of
column.

