Longest common subsequence

(Quiz problem)

Determine a LCS of

(0, 1, 0, 1, 0, 1, 0, 1, 0)

(1, 0, 0, 1, 0, 1, 0, 1)

→ (1, 0, 1, 0, 1, 0)

common subsequence

Dynamic programming

Subproblems :

S[i,j] → find a longest common subsequence of the i-length prefix of the first string and the j-length prefix of the seond string

let $c[i,j]$ denote the length of an LCS for $S[i,j]$

Calculation for $c[i,j]$

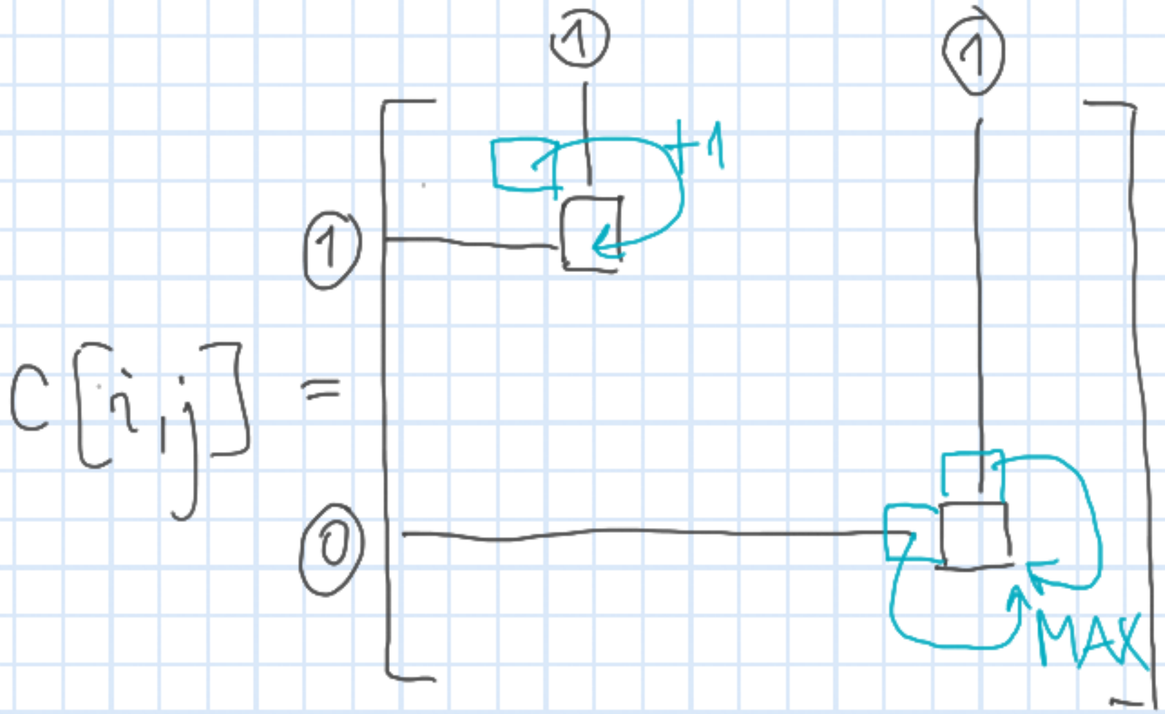
- if the i^{th} character of the first string coincides with the j^{th} character of the second one, then

$$c[i,j] = c[i-1, j-1] + 1$$

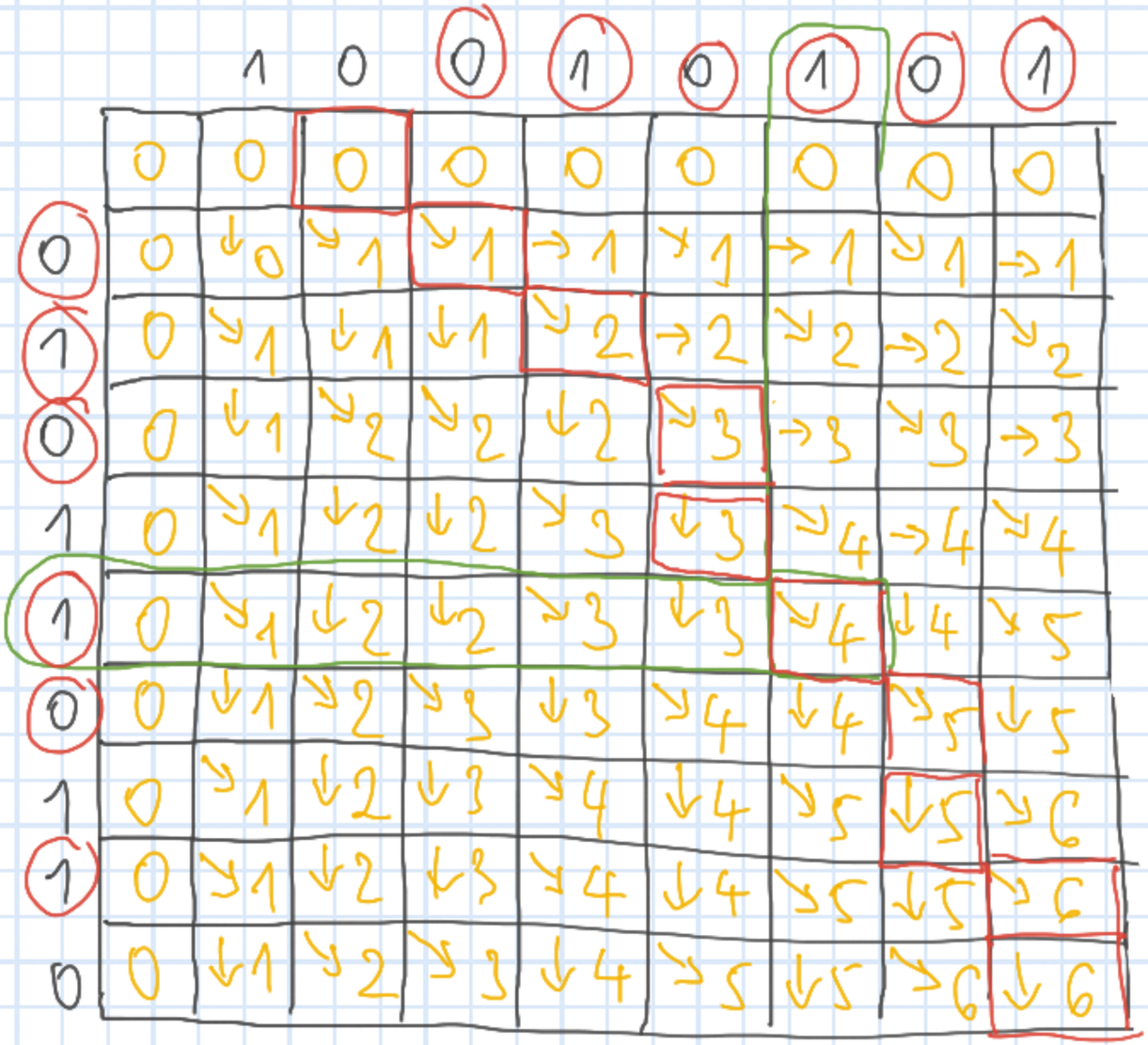
- if they are different, then

$$c[i,j] = \max\{ c[i-1,j], c[i,j-1] \}$$

"Base case": $c[i,0] = c[0,j] = 0$



In the "quiz problem"



4 is the length of a LCS of 01011 and 100101

AN opt. sol. 010101

opt. sol. length

Homework

You are given a sequence $X = (x_1, x_2, \ldots, x_n)$

Find a longest palindrom subsequence of X, where a palindrom is a sequence with the property that reading it from left to right is the same as reading it from right to left