Two character string may have many common substring. Substrings are required to be contiguous in the original string. For example, *photograph* and *tomography* have several common substring of length one (i.e. single letters) and common substring *ph*, *to* and *ograph* (as well as all substring of *ograph*). The maximum common substring length is 6. Let $X =< x_1, x_2, \cdots, x_n >$, $Y =< y_1, y_2, \cdots, y_m >$. Given an $O(mn)$ algorithm to find max common substring length for X and Y.

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Ans.

Let $c[i,j]$ 為 X_i 和 Y_j 的最長子字串的長度。

X_i : X 有 i 個元素時。

Y_j : Y 有 j 個元素時。

Input: X, Y

Output: length

```
1.  length ← 0
2.  for i ← 1 to n
3.      c[i,0] ← 0
4.  for j ← 1 to m
5.      c[0,j] ← 0

6.  for i ← 1 to n
7.      for j ← 1 to m
8.          if X[i] == Y[j]
9.              then c[i,j] ← c[i-1,j-1] + 1
10.                 length ← max(length, c[i,j])
11.         else
12.             c[i,j] ← 0   // 不相同表示有斷點，長度就重算。

13. return length
```