

2020. 4. 19. 오후 8:37

	0	A	C	C	6	6	T	C	6	A	6	"T
0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	1	1	1	1	1	1
T	0	0	0	0	0	1	1	1	2	2	2	2
C	0	0	1	1	1	1	1	2	3	3	3	3
6	0	0	1	1	2	2	2	3	4	4	4	4
T	0	0	1	1	2	2	2	3	4	4	4	5
T	0	0	1	1	2	2	3	3	4	4	4	5
C	0	0	1	1	2	2	2	3	4	4	4	5
6	0	0	1	2	3	3	4	4	4	4	5	5
6	0	0	1	2	3	3	4	4	4	4	5	6
10A	0	1	1	2	3	3	4	4	4	4	5	6

Correct.

→ 6GTCGG

<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
<u>1</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>
<u>0</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>
<u>1</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>4</u>
<u>1</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>5</u>
<u>1</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>5</u>
<u>0</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>5</u>
<u>1</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>5</u>
<u>1</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>6</u>

$$\begin{array}{ccccccccc}
 & A & B & C & \underline{B} & \underline{D} & \underline{A} & \underline{B} \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Rightarrow B D A B \\
 0 & 0 & 0 & 0 & 1 & 0 & 1 & 1 & \\
 B & 0 & 0 & 1 & 1 & 1 & 2 & 2 & \Rightarrow B C A B \\
 D & 0 & 0 & 1 & 1 & 1 & 2 & 2 & \\
 C & 0 & 0 & 1 & 2 & 2 & 2 & 2 & \\
 A & 0 & 1 & 1 & 2 & 2 & 2 & 3 & \\
 B & 0 & 1 & 2 & 2 & 3 & 3 & 4 & \Rightarrow B C B A \\
 A & 0 & 1 & 2 & 2 & 3 & 3 & 4 &
 \end{array}$$

(3)

$$\begin{array}{ccccccccc}
 & A & B & C & \underline{B} & \underline{D} & \underline{A} & \underline{B} \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \Rightarrow B C B A \\
 B & 0 & 0 & 0 & 1 & 1 & 1 & 1 & \\
 D & 0 & 0 & 1 & 1 & 1 & 2 & 2 & \\
 C & 0 & 0 & 1 & 2 & 2 & 2 & 2 & \\
 A & 0 & 1 & 2 & 2 & 2 & 2 & 3 & \\
 B & 0 & 1 & 2 & 2 & 3 & 3 & 4 & \\
 A & 0 & 1 & 2 & 2 & 3 & 3 & 4 &
 \end{array}$$

2. Memoized Longest Common Subsequence (10 pts)

Give a pseudocode for a top-down memoized version of the LCS - LENGTH procedure TOP - DOWN - LCS - LENGTH. Your code should run in $O(mn)$ time.

(Do not write in actual programming language, like Java or Python)

LCS - LENGTH (X, Y)

$m = X.length$

$n = Y.length$

let $c[0..m, 0..n]$ be new tables,

for $i = 0$ to m

$c[i, 0] = 0$

for $j = 0$ to n

$c[0, j] = 0$

return Top-Down-LCS-LENGTH (X, m, Y, n)

Top-Down-LCS-LENGTH (X, m, Y, n)

if $m == 0$ or $n == 0$
return 0

$c[m, n] = 0$

if $c[m, n] \neq null$
return $c[m, n]$

if $X_m == Y_n$
 $c[m, n] = \text{Top-Down-LCS-LENGTH}(X, m-1, Y, n-1) + 1$

else
 $c[m, n] = \max(\text{Top-Down-LCS-LENGTH}(X, m-1, Y, n),$
 $\text{Top-Down-LCS-LENGTH}(X, m, Y, n-1))$

return $c[m, n]$