Longest Common Substring Problem

Given strings $a_1a_2\cdots a_n$ and $b_1b_2\cdots b_m$, find their longest common substring.

The LCS of RICHARDLADNER and LARRYSNYDER is RRDER.

If $a_n = b_m$ then $LCS(a_1a_2\cdots a_n, b_1b_2\cdots b_m) = LCS(a_1a_2\cdots a_{n-1}, b_1b_2\cdots b_{m-1})a_n$. Is $a_n \neq b_m$, then the LCS is the longer of $LCS(a_1a_2\cdots a_{n-1}, b_1b_2\cdots b_m)$ and $LCS(a_1a_2\cdots a_n, b_1b_2\cdots b_{m-1})$.

Dynamic Programming

Longest Common Substring Problem

	R	I	C	H	A	R	D	L	A	D	N	E	R
L								X					
A					X				X				
R	X					X							X
R	X					X							X
Y													
S													
N											X		
Y													
D							X			X			
E												X	
R	X					X							X

for $i := 1$ to n
  for $j := 1$ to n
    $A[i,j] := \max(A[i-1,j], A[i,j-1],$
        $A[i-1,j-1] + B[i,j]);$

	R	I	C	H	A	R	D	L	A	D	N	E	R
L	0	0	0	0	0	0	0	1	1	1	1	1	1
A	0	0	0	0	1	1	1	1	2	2	2	2	2
R	1	1	1	1	1	2	2	2	2	2	2	2	3
R	1	1	1	1	1	2	2	2	2	2	2	2	3
Y	1	1	1	1	1	2	2	2	2	2	2	2	3
S	1	1	1	1	1	2	2	2	2	2	2	2	3
N	1	1	1	1	1	2	2	2	2	2	3	3	3
Y	1	1	1	1	1	2	2	2	2	2	3	3	3
D	1	1	1	1	1	2	3	3	3	3	3	3	3
E	1	1	1	1	1	2	3	3	3	3	3	4	4
R	1	1	1	1	1	2	3	3	3	3	3	4	5

	R	I	C	H	A	R	D	L	A	D	N	E	R
L	→	→	→	→	→	→	→	↘	→	→	→	→	→
A	→	→	→	→	↘	→	→	→	↘	→	→	→	→
R	↘	→	→	→	→	↘	→	→	→	→	→	→	↘
R	↓	→	→	→	→	↓	→	→	→	→	→	→	↓
Y	↓	→	→	→	→	↓	→	→	→	→	→	→	↓
S	↓	→	→	→	→	↓	→	→	→	→	→	→	↓
N	↓	→	→	→	→	↓	→	→	→	→	↘	→	→
Y	↓	→	→	→	→	↓	→	→	→	→	↓	→	→
D	↓	→	→	→	→	↓	↘	→	→	→	→	→	→
E	↓	→	→	→	→	↓	↓	→	→	→	→	↘	→
R	↓	→	→	→	→	↓	↓	→	→	→	→	↓	↘