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AIM:	**Dynamic Programming - Longest Common Subsequence**
Program 1	

ALGORITHM/ THEORY:	**To compute the length of an element the following algorithm is used. In this procedure, table C[m, n] is computed in row major order and another table B[m,n] is computed to construct optimal solution. This algorithm will print the longest common subsequence of X and Y.**
	
	Algorithm:
	m := length(X)
	n := length(Y)
	for i = 1 to m do
	C[i, 0] := 0
	for j = 1 to n do
	C[0, j] := 0
	for i = 1 to m do
	for j = 1 to n do
	if $x_i = y_j$
	C[i, j] := C[i - 1, j - 1] + 1
	B[i, j] := ‘D’
	else
	if C[i -1, j] ≥ C[i, j -1]
	C[i, j] := C[i - 1, j] + 1
	B[i, j] := ‘U’
	else
	C[i, j] := C[i, j - 1]
	B[i, j] := ‘L’
	return C and B

PROGRAM:

```
#include <stdio.h>
#include <string.h>

int i, j, m, n, LCS_table[20][20];
char b[20][20];
char S1[20],S2[20];
void lcsAlgo() {
m = strlen(S1);
n = strlen(S2);

for (i = 0; i <= m; i++)
LCS_table[i][0] = 0;
for (i = 0; i <= n; i++)
LCS_table[0][i] = 0;

for (i = 1; i <= m; i++)
for (j = 1; j <= n; j++) {
if (S1[i - 1] == S2[j - 1]) {
LCS_table[i][j] = LCS_table[i - 1][j - 1] + 1;
} else if (LCS_table[i - 1][j] >= LCS_table[i][j -
1]) {
LCS_table[i][j] = LCS_table[i - 1][j];
} else {
LCS_table[i][j] = LCS_table[i][j - 1];
}
}
int index = LCS_table[m][n];char lcsAlgo[index + 1];
lcsAlgo[index] = '\0';
int i = m, j = n;
while (i > 0 && j > 0) {
if (S1[i - 1] == S2[j - 1]) {
lcsAlgo[index - 1] = S1[i - 1];
i--;
j--;
index--;
}
else if (LCS_table[i - 1][j] > LCS_table[i][j - 1])
i--;
else
j--;
```

```
}

printf("S1 : %s \nS2 : %s \n", S1, S2);
printf("LCS: %s\n", lcsAlgo);
printf("Length of longest common subsequence: %zu", strlen(lcsAlgo));
}
int main() {
        printf("Enter first string: ");
        scanf("%s",S1);
        printf("Enter second string: ");
        scanf("%s",S2);
```

```
students@CE-Lab7-603-U10:~/Desktop$ ./a.out
Enter first string: omkar
Enter second string: deshmukh
S1 : omkar
S2 : deshmukh
LCS: mk
Length of longest common subsequence: 2
students@CE-Lab7-603-U10:~/Desktop$
```

RESULT:

CONCLUSION:
