



# Design & Analysis Of Algorithm

## Lab Experiment -11

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SUBJECT: DESIGN & ANALYSIS OF ALGORITHM

SUBJECT CODE: 19CSE302

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## EX NO:11

Longest Common Subsequence.

### AIM:

To write an algorithm to implement Longest Common Subsequence.

### ALGORITHM:

1. Suppose X and Y are the two given sequences
2. Initialize a table of LCS having a dimension of X.length \* Y.length
3. XX.label = X
4. YY.label = Y
5. LCS[0][] = 0
6. LCS[][0] = 0
7. Loop starts from the LCS[1][1]
8. Now we will compare X[i] and Y[j]
9. if X[i] is equal to Y[j] then
10.       LCS[i][j] = 1 + LCS[i-1][j-1]
11.       Point an arrow LCS[i][j]
12.   Else
13.       LCS[i][j] = max(LCS[i-1][j], LCS[i][j-1])

### CODE SCREEN:

```
def LCS(A, B, n, m):
    p = []
    LCS = [[0 for col in range(0, n+1)] for row in range(0, m+1)]
    for i in range(1, m+1):
        for j in range(1, n+1):
            if A[j-1] == B[i-1]:
                LCS[i][j] = 1 + LCS[i-1][j-1]
                p.append(A[j-1])
            else:
                LCS[i][j] = max(LCS[i-1][j], LCS[i][j-1])
    print("\nLCS Table: ")
    for i in range(0, m+1):
```

```

        for j in range(0, n+1):
            print(LCS[i][j], end=" ")
        print("")
    return p

A = list(input("First string: "))
B = list(input("Second string: "))
n = len(A)
m = len(B)
if n > m:
    result = LCS(A, B, n, m)
else:
    result = LCS(B, A, m, n)
print("\nLongest Common Subsequence: ", result)

```

## OUTPUT SCREEN :

The screenshot shows a terminal window with the following output:

```

PS D:\python> & C:/Users/HP/AppData/Local/Programs/Python/Python310/python.exe d:/python/DAA/LSC.py
First string: suriya
Second string: prakash

LCS Table:
0 0 0 0 0 0 0 0
0 0 0 0 0 0 1 1
0 0 0 0 0 0 0 1
0 0 1 0 0 0 0 1
0 0 0 0 0 0 0 1
0 0 0 0 0 0 0 1
0 0 0 1 0 1 0 1

Longest Common Subsequence: ['s', 'r', 'a', 'a']
PS D:\python>
PS D:\python>
PS D:\python>
PS D:\python>

```

## TIME COMPLEXITY:

$O(n*m)$

## LCS (Longest common subsequence?)

String 1 : SURIYA - A

String 2 : PRAKASH - B

A

		S	U	R	I	Y	A
0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1
3	0	0	0	0	1	1	2
4	0	0	0	0	1	1	3
5	0	0	0	1	1	1	3
6	0	1	1	1	1	1	3
7	0	1	1	1	1	1	1

B

$r[2,3]$

$a[3,6]$

$A[5,6]$

$S[6,1]$

Sub sequen %      ra . //

### RESULT:

I have studied and understood the Longest Common Subsequence program in python language and executed the program successfully.

THANK YOU !!