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19BCE245

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# Design and Analysis of Algorithms

## Practical 8

### • Code :

```
/*
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DAA Practical 8 | Longest Common SubSequence
*/

/* Dynamic Programming C implementation of LCS problem */
#include <stdio.h>
#include <string.h>

//#define MIN(a,b) (((a)<(b))?(a):(b))
#define MAX(a,b) (((a)>(b))?(a):(b))

/* Returns length of LCS for X[0..m-1], Y[0..n-1] */
int lcs( char *X, char *Y, int m, int n )
{
    int L[m+1][n+1];
    int i, j;

    // Generating Matrix
    for (i=0; i<=m; i++)
    {
        for (j=0; j<=n; j++)
        {
            if (i == 0 || j == 0)
                L[i][j] = 0;

            else if (X[i-1] == Y[j-1])
```

```

        L[i][j] = L[i-1][j-1] + 1;

    else
        L[i][j] = MAX(L[i-1][j], L[i][j-1]);
    }
}

// Getting longest common subsequence
int index = L[m][n];

char lcs[index+1];
lcs[index] = '\0';

int row = m, col = n;
while (row > 0 && col > 0)
{
    if (X[row-1] == Y[col-1])
    {
        lcs[index-1] = X[row-1];
        row--; col--; index--;
    }

    else if (L[row-1][col] > L[row][col-1])
        row--;
    else
        col--;
}
printf("\t> Longest Common Subsequence : %s.\n", lcs);

return L[m][n];
}

int main()
{
    char str1[100], str2[100];
    printf("Enter first string : ");
    scanf("%s", str1);
    printf("Enter second string : ");
    scanf("%s", str2);

    int m = strlen(str1);
    int n = strlen(str2);

```

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        printf("\t> Length of LCS is %d.", lcs( str1, str2,
m, n ) );

    return 0;
}

```

• **Output :**

```

1  /*
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5  */
6
7  /* Dynamic Programming C implementation of LCS problem */
8  #include <stdio.h>
9  #include <string.h>
10
11  // #define MIN(a,b) (((a)<(b))?(a):(b))
12  #define MAX(a,b) (((a)>(b))?(a):(b))
13
14
15  /* Returns length of LCS for X[0..m-1], Y[0..n-1] */
16  int lcs( char *X, char *Y, int m, int n )
17  {
18      int L[m+1][n+1];
19      int i, j;
20
21  Enter first string : AGGTAB
22  Enter second string : GTXAYB
23      > Longest Common Subsequence : GTAB.
24      > Length of LCS is 4.

```

Run Succeeded | Time 15 ms | Peak Memory 729K | Symbol | Tabs: 4 | Line 15, Column 52