Name	RITIK SINGH
UID no.	2021700061
Experiment No.	4

AIM:	To implement Longest Common Subsequence
Program 1	
PROBLEM STATEMENT :	To implement Longest Common Subsequence
ALGORITHM/ THEORY:	X and Y be two given sequences Initialize a table LCS of dimension X.length * Y.length X.label = X Y.label = Y LCS[0][] = 0 LCS[][0] = 0 Start from LCS[1][1] Compare X[i] and Y[j] If X[i] = Y[j] LCS[i][j] = 1 + LCS[i-1, j-1] Point an arrow to LCS[i][j] Else LCS[i][j] = max(LCS[i-1][j], LCS[i][j-1]) Point an arrow to max(LCS[i-1][j], LCS[i][j-1])

PROGRAM:

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

int i, j, m, n, c[20][20];
char x[20], y[20], b[20][20];

void print(int i, int j)
{
    if (i == 0 || j == 0)
        return;
    if (b[i][j] == 'c')
    {
        print(i - 1, j - 1);
        printf("%c", x[i - 1]);
    }
    else if (b[i]

              [j] == 'u')
        print(i - 1, j);
    else
        print(i, j - 1);
}

void lcs()
{
    m = strlen(x);
    n = strlen(y);
    for (i = 0; i <= m; i++)
        c[i][0] = 0;
    for (i = 0; i <= n; i++)
        c[0][i] = 0;

    // c, u and l denotes cross, upward and downward directions
respectively
    for (i = 1; i <= m; i++)
        for (j = 1; j <= n; j++)
        {
            if (x[i - 1] == y[j - 1])
            {
                c[i][j] = c[i - 1][j - 1] + 1;
                b[i][j] = 'c';
            }
            else if (c[i - 1][j] >= c[i][j - 1])
            {
```

```
                c[i][j] = c[i - 1][j];
                b[i][j] = 'u';
            }
            else
            {
                c[i][j] = c[i][j - 1];
                b[i][j] = 'l';
            }
        }
}
int main()
{
    printf("Enter 1st sequence:");
    scanf("%s", x);
    printf("Enter 2nd sequence:");
    scanf("%s", y);
    printf("\nThe Longest Common Subsequence is ");
    lcs();
    print(m, n);
    return 0;
}
```

RESULT:

```
/tmp/4yVAEHj7Os.o
Enter 1st sequence:ABCDABA
Enter 2nd sequence:ABCDBBA
The Longest Common Subsequence is ABCDBA
```

CONCLUSION: Successfully understood Longest Common Subsequence algorithm and implemented it in C program.