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EXPERIMENT- 4

- **AIM:** FIND THE LONGEST COMMON SUBSEQUENCE FOR
  THE GIVEN STRINGS

- **ALGORITHM:**

- Suppose X and Y are the two given sequences
- Initialize a table of LCS having a dimension of X.length * Y.length
- XX.label = X
- YY.label = Y
- LCS[0][] = 0
- LCS[][0] = 0
- Loop starts from the LCS[1][1]
- Now we will compare X[i] and Y[j]
- if X[i] is equal to Y[j] then
- LCS[i][j] = 1 + LCS[i-1][j-1]
- Point an arrow LCS[i][j]
- Else
- LCS[i][j] = max(LCS[i-1][j], LCS[i][j-1])

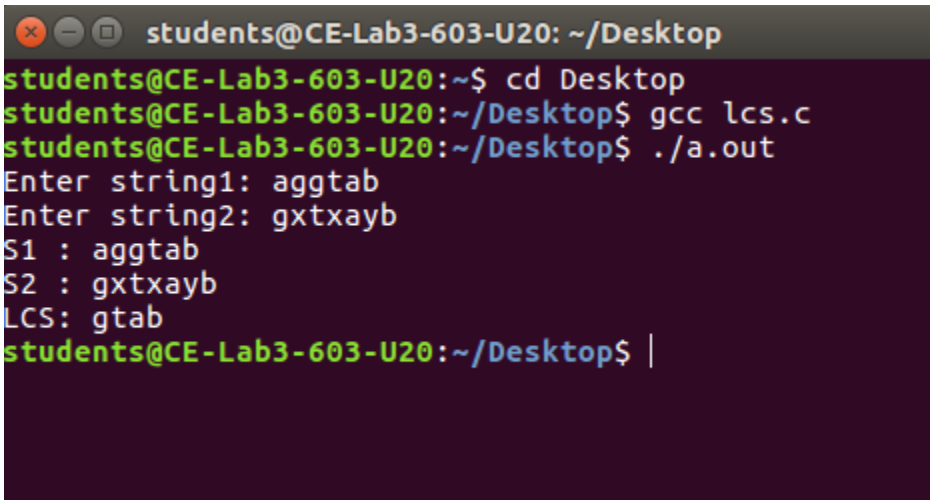
- **CODE:**

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

```
int i, j, m, n, LCS_table[20][20];
char S1[20], S2[20], b[20][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", lcsAlgo);
}

int main() {
   printf("Enter string1: ");
   scanf("%s",S1);
   printf("Enter string2: ");
   scanf("%s",S2);
            lcsAlgo();
            printf("\n");
}
```

- **RESULT:**



- **CONCLUSION:**

IN THIS EXPERIMENT I STUDIED THE IMPLEMENTATION OF LONGEST COMMON SUBSEQUENCE OF TWO STRINGS USING DYNAMIC PROGRAMMING.