DESIGN AND ANALYSIS OF ALGORITHMS – 2CS503

Practical 7

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1. Longest Common Sequence

Code:

```
#include<stdio.h>
#include<string.h>
#define MAX(X, Y) (((X) > (Y)) ? (X) : (Y))

void main()
{
   char X[20], Y[20];
   printf("Enter 1st String : ");
   gets(X);
   printf("\nEnter 2nd String : ");
   gets(Y);
   printf("\n1st : %s",X);
   printf("\n2nd : %s",Y);
```

```
int m = strlen(X);
int n = strlen(Y);
printf("\n%d", m);
printf("\n%d\n", n);

int matrix[m+1][n+1];

for(int i = 0; i<m+1; i++)
{
   for(int j=0; j<n+1; j++)
   {
      if (i==0 || j==0)
      {
         matrix[i][j] =0;
      }
   }
}


for(int i = 0; i<m; i++)
{
```

```
    for(int j=0; j<n; j++)
    {
        if(X[i] == Y[j])
        {
            matrix[i+1][j+1] = matrix[i][j] + 1;
        }
        else
        {
            matrix[i+1][j+1] = MAX(matrix[i][j+1], matrix[i+1][j]);
        }
    }
}

printf("\nFinal Mat : \n");
for(int i=0; i<m+1; i++)
{
    printf("\n");
    for(int j=0; j<n+1; j++)
    {
        printf("%d ",matrix[i][j]);
    }
}
printf("\n\nLongest Common Sequence is : ");
```

```
//Back Propagation
int i = m; //6
int j = n; //4

do
{
   if(matrix[i][j] == matrix[i][j-1])
   {
      j--;
   }
   else if(matrix[i][j] == matrix[i-1][j])
   {
      i--;
   }
   else
   {
      printf("%c ", X[i-1]);
      i--;
      j--;
   }
}while(i!=0 && j!=0);
```

}
/*
Output:
Enter 1st String : abcdefghi
Enter 2nd String : cfiabdgh
1st : abcdefghi
2nd : cfiabdgh
9
8
Final Mat :
0 0 0 0 0 0 0 0 0
0 0 0 0 1 1 1 1 1
0 0 0 0 1 2 2 2 2
0 1 1 1 1 2 2 2 2
0 1 1 1 1 2 3 3 3
0 1 1 1 1 2 3 3 3
0 1 2 2 2 2 3 3 3

0 1 2 2 2 2 3 4 4
0 1 2 2 2 2 3 4 5
0 1 2 3 3 3 3 4 5
Longest Common Sequence is : h g d b a
*/