

## Exercise 8

### CSE2012 DAA Lab

**Slot: L31+L32**

**Faculty: Dr M Janaki Meena**

1. A subsequence of sequence 's' is a sequence which is same as 's' with few symbols removed. For example, if 's' is apple then the subsequences are 'a', 'ap', 'ap', 'al', 'ae', 'pp', 'pl', 'le', 'app', 'ppl', 'ple', 'appl', 'pple', 'apple'. If there are two strings s1 = 'apple' and s2 = 'ball' then the subsequences of s1 are as shown above and subsequences for s2 are 'b', 'a', 'l', 'l', 'ba', 'al', 'll', 'bal', 'all' and 'ball'. Subsequences common to s1 and s2 are 'a', 'l' and 'al'. Longest common subsequence is 'al'. Given two strings s1 and s2, write a C++ program to find the length of the longest common subsequence (LCS) between s1 and s2.
2. Develop a bottom up dynamic programming algorithm for Longest Common Subsequence (LCS) problem and implement using C++. Print the length of the LCS and the LCS as well.
3. Develop a top down dynamic programming algorithm for Longest Common Subsequence problem and implement using C++. Print the length of the LCS and the LCS as well.

4. Modify the bottom up dynamic programming algorithm for LCS to maintain only length table (c table) and print the LCS by examining the neighboring entries of the cell and print 'No common subsequence' if no such sequence exist.
5. Modify the bottom up dynamic programming algorithm for LCS to print the length of the LCS by maintaining only recent two rows of 'b' table.
6. Rewrite the print LCS routine to print all the LCSs of two sequences
7. Given two strings s1 and s2, develop an algorithm to print the positions of the symbols to be swapped to get s2 from s1 with a constraint that symbol in any position 'p' can be changed only once. For example, if s1 = 'abcd' and s2 = 'cdab' then two swaps are required so print 1 3, 2 4. If s1 = 'abcd' and s2 = 'cdba' then print 'Not possible' since the string cannot be transformed by just swapping symbols in a position only once.