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BTech CSE

Batch 52

Institute of Computer Technology
B. Tech Computer Science and Engineering

Sub: Algorithm Analysis and Design

Practical 8

A subsequence is a sequence that can be derived from another sequence by deleting some elements without changing the order of the remaining elements. Longest common subsequence (LCS) of 2 sequences is a subsequence, with maximal length, which is common to both the sequences.

Given two sequences of integers, P = <M, N, O, M> and Q = <M, L, N, O, M>, find any one longest common subsequence.

In case multiple solutions exist, print any of them. It is guaranteed that at least one non-empty common subsequence will exist.

```
import streamlit as st

# Function to find the Longest Common Subsequence (LCS)
def lcs(P, Q):
    m = len(P)
    n = len(Q)
    dp = [[0] * (n + 1) for _ in range(m + 1)]

    # Fill the dp table
    for i in range(1, m + 1):
        for j in range(1, n + 1):
            if P[i - 1] == Q[j - 1]:
                dp[i][j] = dp[i - 1][j - 1] + 1
            else:
                dp[i][j] = max(dp[i - 1][j], dp[i][j - 1])

    # Retrieve the LCS sequence
    lcs_sequence = []
    i, j = m, n
    while i > 0 and j > 0:
```

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```
        if P[i - 1] == Q[j - 1]:
            lcs_sequence.append(P[i - 1])
            i -= 1
            j -= 1
        elif dp[i - 1][j] > dp[i][j - 1]:
            i -= 1
        else:
            j -= 1

    # Return the sequence in reverse order to get the correct LCS
    return lcs_sequence[::-1]

# Streamlit UI
st.title("Longest Common Subsequence Finder")

# Input sequences
P = st.text_input("Enter first sequence (comma-separated):", "M,N,O,M")
Q = st.text_input("Enter second sequence (comma-separated):", "M,L,N,O,M")

# Find LCS when button is clicked
if st.button("Find LCS"):
    P = P.split(',')
    Q = Q.split(',')
    result = lcs(P, Q)
    st.write("Longest Common Subsequence:", result)
```

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