NAME :- MARVIN PATEL
ER NO:- 22162101013
BATCH:- 51
SUB :- AAD

PRACTICAL - 8

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.

Code:-

```
from flask import Flask, render_template, request

app = Flask(__name__)

# Function to find the longest common subsequence (LCS)
def longest_common_subsequence(P, Q):
    m = len(P)
    n = len(Q)
```

NAME :- MARVIN PATEL
ER NO:- 22162101013
BATCH:- 51
SUB :- AAD

PRACTICAL - 8

```
    # Create a 2D table to store lengths of longest common
subsequence.
    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])

    # Backtrack to find one of the LCS
    i, j = m, n
    lcs = []

    while i > 0 and j > 0:
        if P[i - 1] == Q[j - 1]:
            lcs.append(P[i - 1])
            i -= 1
            j -= 1
        elif dp[i - 1][j] > dp[i][j - 1]:
            i -= 1
        else:
            j -= 1

    # The LCS is built in reverse order, so we need to reverse
it
    lcs.reverse()
    return lcs

@app.route('/')
```

NAME :- MARVIN PATEL
ER NO:- 22162101013
BATCH:- 51
SUB :- AAD

PRACTICAL - 8

```
def index():
    return render_template('index.html')

@app.route('/calculate', methods=['POST'])
def calculate():
    # Get user input from form
    P = request.form['sequence1'].strip().split(',')
    Q = request.form['sequence2'].strip().split(',')

    # Call the LCS function
    lcs = longest_common_subsequence(P, Q)

    return render_template('index.html', lcs=lcs, sequence1=P,
sequence2=Q)

if __name__ == '__main__':
    app.run(debug=True)
```

Index.html

```
<!DOCTYPE html>
<html>
<head>
    <title>Longest Common Subsequence (LCS) Finder</title>
    <style>
        body {
            font-family: Arial, sans-serif;
            background-color: #f4f4f4;
            color: #333;
            text-align: center;
            padding: 20px;
        }
```

NAME :- MARVIN PATEL
ER NO:- 22162101013
BATCH:- 51
SUB :- AAD

PRACTICAL - 8

```
        h1 {
            color: #005f73;
        }
        form {
            margin-bottom: 20px;
        }
        input[type="text"] {
            padding: 10px;
            width: 60%;
            margin-bottom: 10px;
            border: 1px solid #ccc;
            border-radius: 5px;
        }
        input[type="submit"] {
            padding: 10px 20px;
            background-color: #005f73;
            color: #fff;
            border: none;
            border-radius: 5px;
            cursor: pointer;
        }
        input[type="submit"]:hover {
            background-color: #0a9396;
        }
        .result {
            margin-top: 20px;
            padding: 10px;
            background-color: #e9f5f2;
            border: 1px solid #005f73;
            display: inline-block;
        }
    </style>
```

NAME :- MARVIN PATEL
ER NO:- 22162101013
BATCH:- 51
SUB :- AAD

PRACTICAL - 8

```
</head>
<body>
    <h1>Longest Common Subsequence (LCS) Finder</h1>
    <form action="/calculate" method="post">
        <input type="text" name="sequence1" placeholder="Enter
first sequence (comma-separated)" required><br>
        <input type="text" name="sequence2" placeholder="Enter
second sequence (comma-separated)" required><br>
        <input type="submit" value="Find LCS">
    </form>

    {% if lcs is not none %}
    <div class="result">
        <h2>Longest Common Subsequence:</h2>
        <p>{{ lcs }}</p>
    </div>
    {% endif %}
</body>
</html>
```

OUTPUT:-

NAME :- MARVIN PATEL
ER NO:- 22162101013
BATCH:- 51
SUB :- AAD

PRACTICAL - 8