Full Stack Development – Lab Programs
(AD2604-1)

Program 1: Design and Style a Webpage using HTML and CSS

Aim: Write an HTML and CSS program to create a styled webpage for Nitte University with the following elements:

- A heading titled "Nitte University" (centre-aligned).
- A paragraph describing the university.
- A hyperlink that redirects to the official Nitte website.
- A list of courses offered by the university, with each list item styled in a different color.
- An image representing the university.

Additionally, use CSS to:

- Change the background colour of the webpage.
- Set a specific font for all text.
- Add padding around the paragraph.
- Style the list items with different colours.

Code:

HTML

```
<html lang="en">  <!-- Set language to English -->

<head>
  <meta charset="UTF-8"> <!-- Character encoding -->
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <!-- Responsive design -->
  <title>Nitte University</title> <!-- Webpage title -->
  <link rel="stylesheet" href="style.css">
  <!-- Link to CSS -->
</head>

<body>
  <h2>Nitte University</h2> <!-- Main heading -->
  <p>NMAMIT is a top engineering college in Nitte.</p>
  <!-- College description -->
  <a href="https://nitte.edu.in/nmamit/" target="_blank">Visit Nitte Website</a>
  <!-- Link to official website -->

  <h2>Courses Offered:</h2> <!-- Subheading -->
  <ul> <!-- Course list -->
   <li>Computer Science and Engineering</li>
   <li>Electronics and Communication Engineering</li>
```

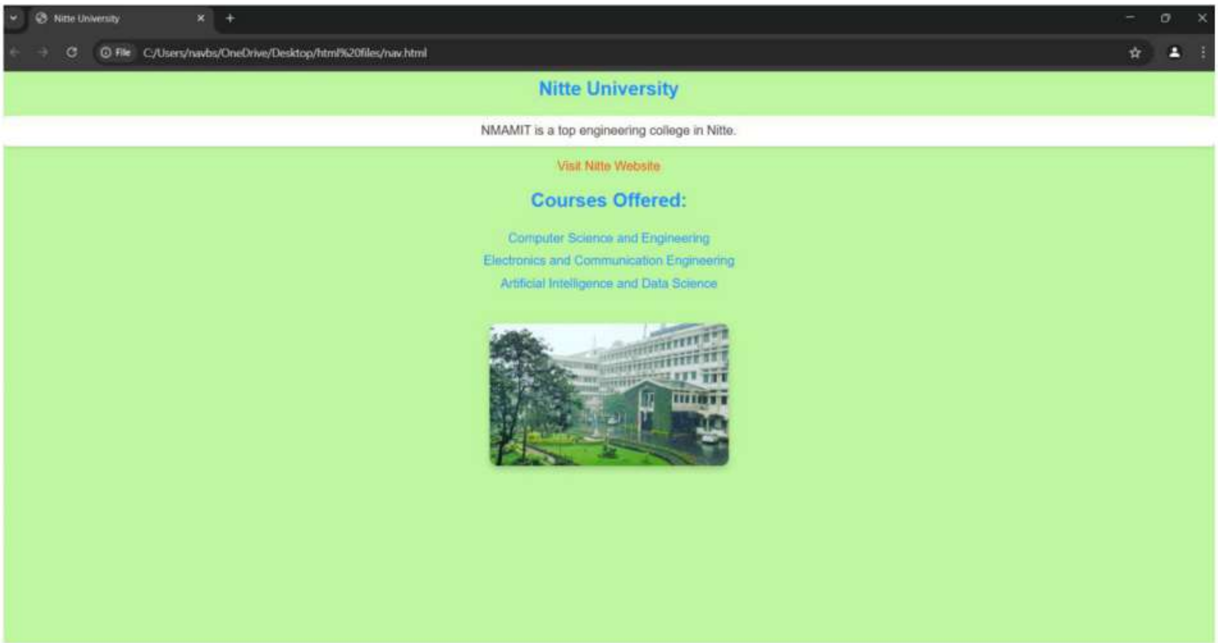
```
    <li>Artificial Intelligence and Data Science</li>

  </ul>
  <img src="clg.jpg" alt="College Image">
  <!-- College image -->
</body>
</html>
```

CSS

```
/* Page styling */
body {
    background-color: #bff7a0; /* Light green */
    font-family: Arial, sans-serif; /* Font */
    text-align: center; /* Center text */
    color: #333; /* Dark gray */
}

/* Heading */
h2 {
    color: #1e90ff; /* Blue */
}

/* Paragraph */
p {
    background: #fff; /* White bg */
    padding: 10px; /* Spacing */
    border-radius: 5px; /* Rounded */
    box-shadow: 0 2px 4px rgba(0, 0, 0, 0.1);
    /* Light shadow */
}

/* Link */
a {
    color: #ff4500; /* Orange */
    text-decoration: none; /* No underline */
    display: block; /* Block element */
    margin: 10px 0; /* Spacing */
}

a:hover {
    text-decoration: underline; /* Underline on hover */
}
```

```
/* List */
ul {
   list-style: none; /* No bullets */
   padding: 0;
}

ul li {
   color: #1e90ff; /* Blue */
   padding: 5px;
}

/* Image */
img {
   width: 300px; /* Fixed size */
   border-radius: 10px; /* Rounded */
   box-shadow: 0 4px 8px rgba(0, 0, 0, 0.2);
   /* Shadow */
   margin: 20px auto; /* Center */
}
```

Output:



Nitte University

NMAMIT is a top engineering college in Nitte.

Visit Nitte Website

Courses Offered:

Computer Science and Engineering
Electronics and Communication Engineering
Artificial Intelligence and Data Science

Program 2: Implementation of JavaScript Objects and Generators using a Calculator

Aim: To demonstrate the concept of JavaScript objects by creating a calculator with arithmetic operations and to use generators for step-by-step execution of calculations.

Code:

```
// Calculator object with basic operations
const calculator = {
  add: (a, b) => a + b, // Addition
  subtract: (a, b) => a - b, // Subtraction
  multiply: (a, b) => a * b, // Multiplication
  divide: (a, b) => (b !== 0 ? a / b : 'Error: Division by zero') // Division with zero check
};

// Generator function for step-by-step calculations
function* calculatorGenerator(a, b) {
  yield `Addition: ${calculator.add(a, b)}`; // Yield addition
  yield `Subtraction: ${calculator.subtract(a, b)}`; // Yield subtraction
  yield `Multiplication: ${calculator.multiply(a, b)}`; // Yield multiplication
  yield `Division: ${calculator.divide(a, b)}`; // Yield division
}

// Define numbers
const num1 = 10, num2 = 5;
// Create generator instance
const calcGen = calculatorGenerator(num1, num2);

// Log results step-by-step
console.log(calcGen.next().value);
console.log(calcGen.next().value);
console.log(calcGen.next().value);
console.log(calcGen.next().value);
```

Output:

```
Addition: 15
Subtraction: 5
Multiplication: 50
Division: 2
```

Program 3: Demonstration of Advanced Iteration Techniques and JavaScript Modules

Aim: To demonstrate iteration methods (for-of, for-in, and forEach) for traversing arrays and objects in JavaScript and to implement modular programming by organizing reusable functions in a separate JavaScript module.

Code:

mathModule.js (JavaScript Module)

```
// Function to calculate the square of a number
export function square(num) {
  return num * num;
}

// Function to calculate the cube of a number
export function cube(num) {
  return num * num * num;
}
```

main.js (Main Program)

```
// Import functions from the math module
import { square, cube } from "./mathModule.js";

// Define an array of numbers
const numbers = [2, 4, 6, 8];

// Define an object with student details
const student = {
  name: "John Doe",  // Student's name
  age: 20,          // Student's age
  course: "Computer Science" // Course enrolled
};

// Using `for-of` loop to iterate over array elements
console.log("Squares of Numbers:");
for (const num of numbers) {
  console.log(`Square of ${num}: ${square(num)}`); // Call square function
}

// Using `for-in` loop to iterate over object properties
console.log("\nStudent Details:");
for (const key in student) {
  console.log(`${key}: ${student[key]}`); // Print key-value pairs
}

// Using `forEach` loop to iterate over array elements
console.log("\nCubes of Numbers:");
numbers.forEach(num => console.log(`Cube of ${num}: ${cube(num)}`)); // Call cube function
```

Output:

```
Squares of Numbers:
Square of 2: 4
Square of 4: 16
Square of 6: 36
Square of 8: 64

Student Details:
name: John Doe
age: 20
course: Computer Science

Cubes of Numbers:
Cube of 2: 8
Cube of 4: 64
Cube of 6: 216
Cube of 8: 512
```