

Experiment – 4: Flask

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Aim: To design a Flask application that showcases URL building and demonstrates the use of HTTP methods (GET and POST) for handling user input and processing data.

Problem Statement:

Create a Flask application with the following requirements:

1. A homepage (/) with links to a "Profile" page and a "Submit" page using the `url_for()` function.
2. The "Profile" page (/profile/<username>) dynamically displays a user's name passed in the URL.
3. A "Submit" page (/submit) displays a form to collect the user's name and age. The form uses the POST method to send the data, and the server displays a confirmation message with the input.

Theory:

1. What is a route in Flask, and how is it defined?

A route in Flask is a URL pattern that is mapped to a function. It determines what happens when a user visits a specific URL in a web application. Defining a route:

In Flask, routes are created using the `@app.route()` decorator, which binds a URL to a function.

Example:

```
from flask import Flask

app = Flask(__name__)

@app.route('/') # This route maps the root URL ("/") to the home function
def home():
    return "Welcome to the Flask Web Application!"
```

Here, visiting `http://127.0.0.1:5000/` will execute the `home()` function and return "Welcome to the Flask Web Application!".

2. How can you pass parameters in a URL route?

Flask allows passing dynamic values through the URL route using angle brackets `< >`. These values are captured as function parameters.

Example:

```
@app.route('/profile/<username>')
def profile(username):
    return f"Hello, {username}! Welcome to your profile."
```

Output:

Hello, Alex! Welcome to your profile.

Flask automatically extracts Alex from the URL and passes it to the `profile(username)` function.

3. What happens if two routes in a Flask application have the same URL pattern?

If two routes have the same URL pattern, Flask will execute only the last defined route, overriding the previous one. This can lead to unexpected behavior.

Example:

```
@app.route('/about')
def about_v1():
```

```
return "About Page - Version 1"
```

```
@app.route('/about')
def about_v2():
    return "About Page - Version 2"
```

Here, only the second function (about_v2) will be executed, as it overrides about_v1.

Ensure each route has a unique path, or use different HTTP methods to differentiate them.

4. What are the commonly used HTTP methods in web applications?

The HTTP methods define the actions that can be performed on a web server. The most commonly used ones are:

1. GET – Retrieves data from the server (e.g., accessing a webpage).
2. POST – Sends data to the server (e.g., submitting a form).
3. PUT – Updates existing data on the server.
4. DELETE – Removes data from the server.

Example of using GET and POST in Flask:

```
@app.route('/submit', methods=['GET', 'POST'])
def submit():
    if request.method == 'POST':
        name = request.form['name']
        return f"Form submitted successfully! Hello, {name}."
    return '<form method="post"><input name="name"><input
type="submit"></form>'
```

5. What is a dynamic route in Flask?

A dynamic route in Flask allows a URL to accept variable parts, making the route more flexible. The variable is captured and passed to the view function.

Example:

```
@app.route('/user/<username>')
def greet_user(username):
    return f"Hello, {username}!"
```

- If a user visits `http://127.0.0.1:5000/user/Sam`, Flask captures "Sam" as the username parameter.

6. Write an example of a dynamic route that accepts a username as a parameter.

Code:

```
@app.route('/profile/<username>')
def profile(username):
    return f"Welcome to {username}'s profile!"
```

Visiting `http://127.0.0.1:5000/profile/Jane` will return output as:

Welcome to Jane's profile!

7. What is the purpose of enabling debug mode in Flask?

Enabling debug mode in Flask provides the following benefits:

1. Automatic Reloading – The server restarts whenever you change the code.
2. Detailed Error Messages – Flask shows interactive error messages, making debugging easier.

8. How do you enable debug mode in a Flask application?

To enable debug mode, set `debug=True` when running the Flask app.

Method 1: In Code

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

Method 2: Using Environment Variables

```
export FLASK_ENV=development
flask run
```

This allows Flask to reload automatically and display detailed error messages.

Output:

- **App.py**

```
from flask import Flask, render_template, request, redirect, url_for

app = Flask(__name__)

@app.route('/')
def home():
    name = request.args.get('name', 'Guest') # Get name from query parameter
    return render_template('home.html', name=name)

@app.route('/profile/<username>')
def profile(username):
    return render_template('profile.html', username=username)

@app.route('/submit', methods=['GET', 'POST'])
def submit():
    if request.method == 'POST':
        name = request.form['name']
        age = request.form['age']
        return render_template('confirmation.html', name=name, age=age)
    return render_template('submit.html')

@app.route('/contact', methods=['GET', 'POST'])
def contact():
    if request.method == 'POST':
        name = request.form['name']
        email = request.form['email']
        return render_template('thank_you.html', name=name, email=email)
    return render_template('contact.html')

@app.route('/thank_you')
def thank_you():
    return "Thank you for submitting the form!"

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

- **home.html**

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Flask App | Home</title>
  <link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">
  <style>
    body {
      background: linear-gradient(to right,rgb(0, 0, 0),rgb(6, 88, 87));
      color: white;
    }
    .container {
      max-width: 700px;
      margin-top: 50px;
      text-align: center;
    }
    .btn {
      margin: 10px;
    }
    .navbar {
      background: rgba(0, 0, 0, 0.6);
    }
    .a{
      margin-top: 500px;
    }
  </style>
</head>
<body>
  <nav class="navbar navbar-dark">
    <div class="container text-center">
      <a class="navbar-brand mx-auto " href="#" style="font-size: 2rem; font-
weight: bold;"></a>
    </div>
  </nav>
  <div class="container">
    <h1 class="display-4">Welcome, {{ name }}!</h1>
    <p class="lead">Explore the website:</p>
    <a href="{{ url_for('profile', username='Guest') }}" class="btn btn-light btn-
lg">Profile</a>
    <a href="{{ url_for('submit') }}" class="btn btn-light btn-lg">Submit Details</a>
    <a href="{{ url_for('contact') }}" class="btn btn-light btn-lg">Contact Us</a>
  </div>
</body>
</html>
```

- **profile.html**

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Profile | Flask App</title>
  <link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">
  <style>
    body {
      background: linear-gradient(to right,rgb(0, 0, 0),rgb(6, 88, 87));
      color: #333;
    }
    .container {
      max-width: 500px;
      margin-top: 100px;
      text-align: center;
      background: white;
      padding: 30px;
      border-radius: 10px;
      box-shadow: 0 5px 15px rgba(0, 0, 0, 0.2);
    }
  </style>
</head>
<body>
  <div class="container">
    <h2>Hello, {{ username }}!</h2>
    <p>This is your profile page.</p>
    <a href="{{ url_for('home') }}" class="btn btn-dark">Back to Home</a>
  </div>
</body>
</html>
```

- **submit.html**

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Submit Details | Flask App</title>
  <link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">
  <style>
    body {
      background: linear-gradient(to right,rgb(0, 0, 0),rgb(6, 88, 87));
    }
  </style>
```

```

    .form-container {
      max-width: 400px;
      margin: 100px auto;
      padding: 30px;
      background: white;
      border-radius: 10px;
      box-shadow: 0px 0px 10px rgba(0, 0, 0, 0.1);
    }
  </style>
</head>
<body>
  <div class="form-container">
    <h3 class="text-center">Submit Your Details</h3>
    <form method="POST">
      <div class="mb-3">
        <label class="form-label">Name:</label>
        <input type="text" name="name" class="form-control" required>
      </div>
      <div class="mb-3">
        <label class="form-label">Age:</label>
        <input type="number" name="age" class="form-control" required>
      </div>
      <button type="submit" class="btn btn-dark w-100">Submit</button>
    </form>
  </div>
</body>
</html>

```

- **confirmation.html**

```

<!DOCTYPE html>
<html lang="en">
<head>
  <title>Confirmation | Flask App</title>
  <link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">
  <style>
    body {
      background: linear-gradient(to right,rgb(0, 0, 0),rgb(6, 88, 87));
    }
    .container {
      max-width: 500px;
      margin-top: 100px;
      text-align: center;
      background: white;
      padding: 20px;
    }
  </style>
</head>
<body>
  <div class="container">
    <h2 class="text-center">Confirmation</h2>
    <div class="text-center">
      <div class="mb-3">
        <input type="text" name="name" class="form-control" required>
      </div>
      <div class="mb-3">
        <input type="password" name="password" class="form-control" required>
      </div>
      <div class="mb-3">
        <input type="password" name="confirm_password" class="form-control" required>
      </div>
      <button type="submit" class="btn btn-dark w-100">Submit</button>
    </div>
  </div>
</body>
</html>

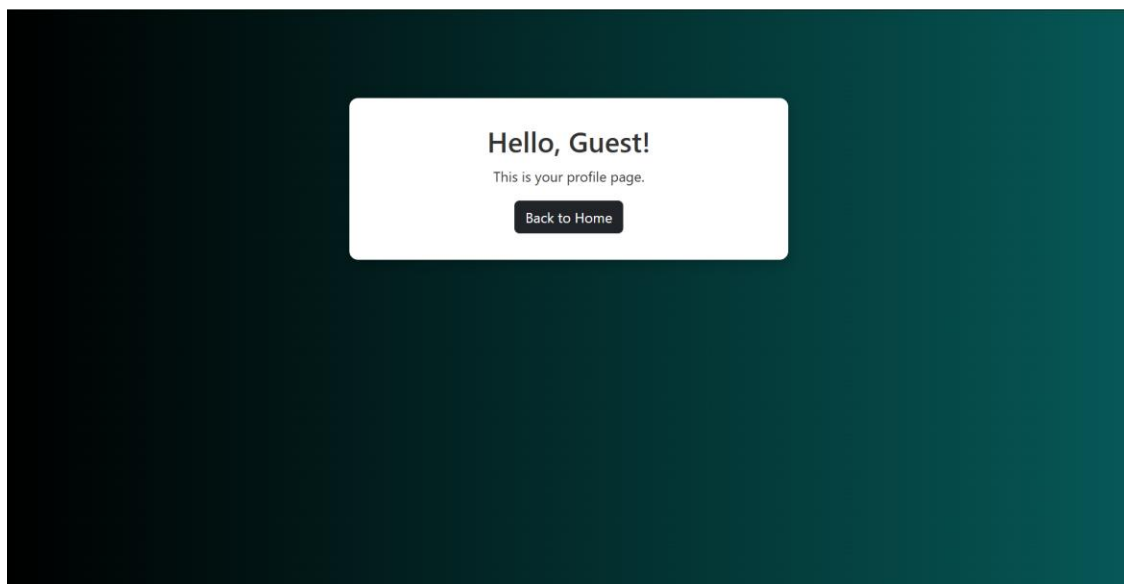
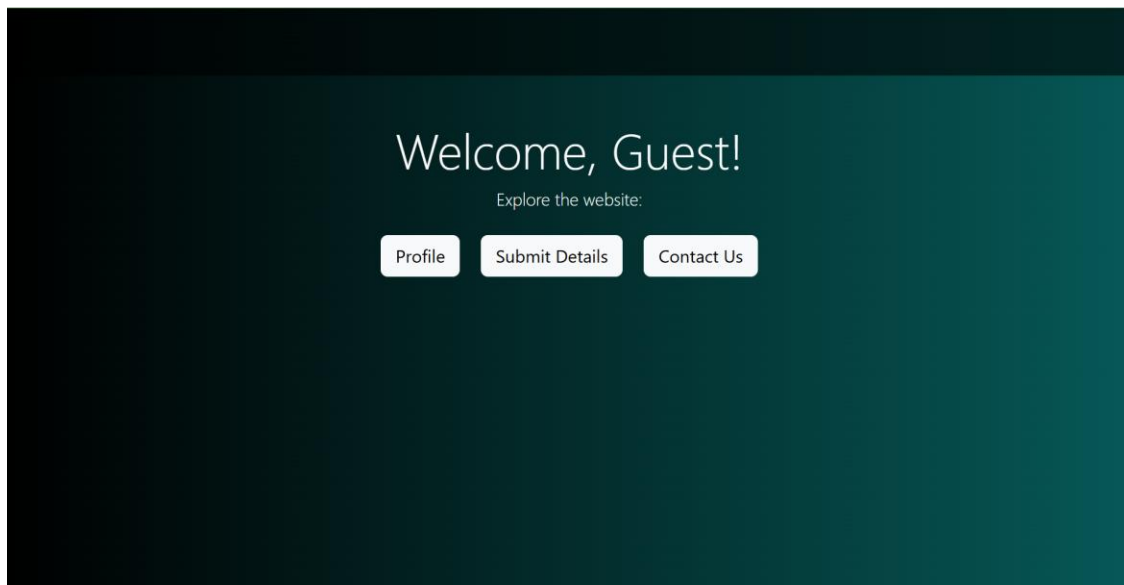
```



```

        border-radius: 10px;
        box-shadow: 0px 0px 10px rgba(0, 0, 0, 0.1);
    }
</style>
</head>
<body>
    <div class="container">
        <h2 class="text-success">Thank You!</h2>
        <p><strong>Name:</strong> {{ name }}</p>
        <p><strong>Age:</strong> {{ age }}</p>
        <a href="{{ url_for('home') }}" class="btn btn-dark">Back to Home</a>
    </div>
</body>
</html>

```



Submit Your Details

Name:

sannidhi

Age:

20

Submit

Thank You!

Name: sannidhi

Age: 20

Back to Home