Experiment 3 : Flask Application

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AIM : To develop a basic Flask application with multiple routes and demonstrate the handling of GET and POST requests.

PROBLEM STATEMENT :

Design a Flask web application with the following features:

1. A homepage (/) that provides a welcome message and a link to a contact form.

a. Create routes for the homepage (/), contact form (/contact), and thank-you page (/thank_you).

2. A contact page (/contact) where users can fill out a form with their name and email.
3. Handle the form submission using the POST method and display the submitted data on a thank-you page (/thank_you).

a. On the contact page, create a form to accept user details (name and email).

b. Use the POST method to handle form submission and pass data to the thank-you page

4. Demonstrate the use of GET requests by showing a dynamic welcome message on the homepage when the user accesses it with a query parameter, e.g., /welcome?name=<user_name>.

a. On the homepage (/), use a query parameter (name) to display a personalized welcome message.

Theory:-

1. Core Features of Flask

Flask is a lightweight and flexible web framework for Python. It is widely used for developing web applications due to its simplicity and scalability. The core features of Flask include:

1. **Lightweight and Modular** – Flask has a small core and allows developers to add extensions as needed.
2. **Built-in Development Server and Debugger** – It provides an interactive debugger and a development server for testing applications.
3. **Routing Mechanism** – It allows defining URL patterns for handling different types of requests.
4. **Jinja2 Templating Engine** – Flask supports Jinja2, which enables dynamic HTML rendering with the use of variables and logic.
5. **Integrated Unit Testing Support** – Flask includes features to test applications efficiently.
6. **Support for HTTP Methods** – Flask handles different HTTP methods such as GET, POST, PUT, and DELETE.
7. **Session and Cookie Management** – Flask allows managing user sessions and cookies securely.
8. **Blueprints for Modular Applications** – It enables breaking large applications into smaller, reusable modules.

2. Why do we use Flask(__name__)in Flask?

In Flask, the statement Flask(_____name___)is used to create an instance of the Flask application. The ___name____parameter is essential for the following reasons:

1. **Determining the Root Path** – Flask uses _____name____to locate resources such as templates and static files.
2. **Enabling Debugging Features** – It helps in identifying the correct module name when debugging errors.
3. **Handling Routing Properly** – It ensures that Flask knows where the application is being executed from.

Thus, Flask(_____name___)plays a crucial role in setting up a Flask application correctly.

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3. What is Template and Template Inheritance in Flask?

Flask uses the **Jinja2 templating engine** to separate logic from presentation, making HTML files more dynamic and reusable.

Template Inheritance allows a developer to create a base template and extend it in child templates. This helps in maintaining a consistent layout across multiple pages.

Base Template (base.html)
html
CopyEdit

```
<!DOCTYPE html>
<html>
<head><title>{% block title %}My Website{% endblock
%}</title></head>
<body>
    <header>Header Section</header>
    <main>{% block content %}{% endblock %}</main>
</body>
</html>
```

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Child Template (index.html)
html
CopyEdit

```
{% extends "base.html" %}
{% block title %}Home Page{% endblock %}
{% block content %}<p>Welcome to my website!</p>{% endblock %}
```

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This mechanism ensures code reusability and efficient web page management

4. What HTTP Methods are Implemented in Flask?

Flask supports multiple HTTP methods, primarily:

1. **GET** – Retrieves data from the server.

2. **POST** – Sends data to the server, often used for form submissions.
3. **PUT** – Updates existing resources on the server.
4. **DELETE** – Deletes a resource from the server.

Example in Flask:

python
CopyEdit
from flask import Flask, request app = Flask(

_____name___)

@app.route('/data', methods=['GET', 'POST']) def handle_request():
    if request.method == 'GET':
        return "This is a GET request" elif
    request.method == 'POST':
        return "This is a POST request"

5. Difference Between Flask and Django

Flask and Django are both popular Python web frameworks, but they have key differences:

Feature	Flask	Django
Type	Micro-framework	Full-stack framework
Flexibility	More flexible, requires external libraries	Comes with built-in features
Routing	Manually defined	Automatic routing support
ORM Support	Needs extensions like SQLAlchemy	Comes with Django ORM
Template Engine	Jinja2	Django Template Language (DTL)
Best For	Small to medium applications	Large-scale applications

Flask is preferred for lightweight applications, while Django is suitable for complex projects requiring built-in functionalities.

6. Routing in Flask

Routing in Flask refers to mapping a URL to a specific function. It helps in handling different requests and serving appropriate responses.

Example:

```
python
CopyEdit
@app.route('/home') def
home():
    return "Welcome to the Home Page"
```

This means that when a user visits /home, the home()function executes.

7. URL Building in Flask

Flask provides url_for()to dynamically generate URLs based on function names. Example:

```
python
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from flask import url_for
@app.route('/profile/<username>') def
profile(username):
    return f"Profile Page of {username}"

# Generating URL
url_for('profile', username='JohnDoe')                    # Output:
/profile/JohnDoe
```

This ensures flexibility and avoids hardcoding URLs.

8. GET Request in Flask

A **GET request** is used to fetch data from a server.

Example:

```
python
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@app.route('/user',methods=['GET']) def get_user():
    return "User Information"
```

Visiting /userin a browser triggers the get_user()function, which returns user details.

9. POST Request in Flask

A **POST request** is used to send data to the server.

Example:

```
python
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@app.route('/submit',methods=['POST']) def submit_data():
    data = request.form['name'] return
    f"Received: {data}"
```

When a user submits a form, the server processes the data and returns a response.

OUTPUT:-

app1.py

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

app = Flask(__name__)

# Step 3: Create the Homepage Route (/)
@app.route('/')
def home():
    name = request.args.get('name')  # Get the 'name' query parameter
    if name:
        welcome_message = f"Welcome, {name}!"
    else:
        welcome_message = "Welcome to our website!"
    return render_template('home.html', message=welcome_message)

# Step 4: Create the Contact Form Route (/contact)
@app.route('/contact', methods=['GET', 'POST'])
def contact():
    if request.method == 'POST':
        name = request.form['name']
        email = request.form['email']
        return redirect(url_for('thank_you', name=name, email=email))
    return render_template('contact.html')

# Step 5: Create the Thank-You Page Route (/thank_you)
@app.route('/thank_you')
def thank_you():
    name = request.args.get('name')
    email = request.args.get('email')
    return render_template('thank_you.html', name=name, email=email)

# Step 6: Run the Application
if __name___== '__main__':
    app.run(debug=True)
```

Templates

1. contact.html

```
<!DOCTYPE html>
<html>
<head>
   <title>Contact Us</title>
</head>
<body>
   <h1>Contact Us</h1>
   <form method="POST" action="{{ url_for('contact') }}">
      <label for="name">Name:</label><br>
      <input type="text" id="name" name="name" required><br><br>
      <label for="email">Email:</label><br>
      <input type="email" id="email" name="email" required><br><br>
      <input type="submit" value="Submit">
   </form>
</body>
</html>
```

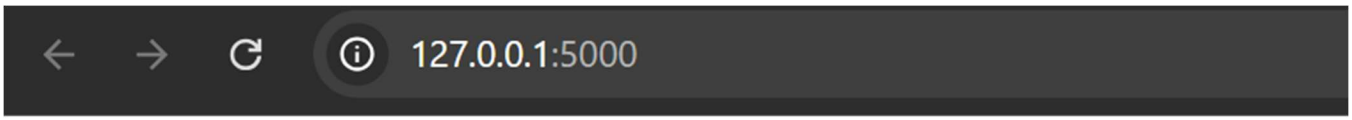
2. home.html

```
<!DOCTYPE html>
<html>
<head>
   <title>Homepage</title>
</head>
<body>
   <h1>{{ message }}</h1>
   <p>Please <a href="{{ url_for('contact') }}">contact us</a>.</p>
</body>
</html>
```

3.thank_you.html

```
<!DOCTYPE html>
<html>
<head>
   <title>Thank You</title>
</head>
<body>
   <h1>Thank You!</h1>
   <p>Thank you, {{ name }}, for contacting us.</p>
   <p>We will reach out to you at {{ email }}.</p>
</body>
</html>
```

Results:-



Welcome to our website!

This is a simple Flask web application made by Atharva Prabhu D15A 42.

Contact Us

Contact Us

Name: pipeline1
Email: atharvaprabhu17@gmail.cc
Submit

Back to Home

127.0.0.1:5000/thank_you?name=pipeline1&email=atharvaprabhu17@gmail.com

Thank You!

We have received your submission.

Name: pipeline1

Email: atharvaprabhu17@gmail.com

Back to Home

```
PS C:\webx> python app.py
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a prod
uction deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with watchdog (windowsapi)
 * Debugger is active!
 * Debugger PIN: 400-578-325
127.0.0.1 - - [02/Apr/2025 10:50:46] "GET / HTTP/1.1" 200 -
```