Experiment – 3 Flask

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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. List some of the core features of Flask \

   Core Features of Flask

- Flask is a lightweight and flexible web framework for Python. Some of its core features include:
- Micro-framework – Flask is minimalistic and does not include built-in ORM, authentication, or admin panels.

- Lightweight and Modular – Developers can add only the necessary components, keeping applications efficient.
- Built-in Development Server and Debugger – Provides an interactive debugger for error tracking.
- Jinja2 Templating Engine – Supports dynamic HTML rendering with template inheritance.
  Routing System – Allows handling multiple URLs using route decorators.
- WSGI Compliance – Uses Werkzeug as its WSGI toolkit for handling requests.
- Support for RESTful APIs – Simplifies API development with built-in support for request handling.
- Extensible with Extensions – Many third-party extensions are available for ORM, authentication, and other features.

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

The Flask(__name__) function initializes a Flask application. The parameter __name__ helps:

- Identify the App's Module – Flask uses it to locate resources, templates, and static files.
- Enable Debugging and Error Handling – Helps in logging and debugging by determining the root path of the application.
- Allow Different Import Configurations – Ensures Flask works correctly whether run as a script or imported as a module.

3. What is Template (Template Inheritance) in Flask?

Flask uses Jinja2 as its templating engine, allowing developers to create dynamic HTML pages.

- Templates: HTML files that contain dynamic placeholders ({{ }} for variables and {% %} for control structures like loops and conditions).

- Template Inheritance: A feature where a base template is created with common elements (like headers and footers), and child templates extend it.

- Benefit: Avoids code duplication by keeping the layout consistent across multiple pages.

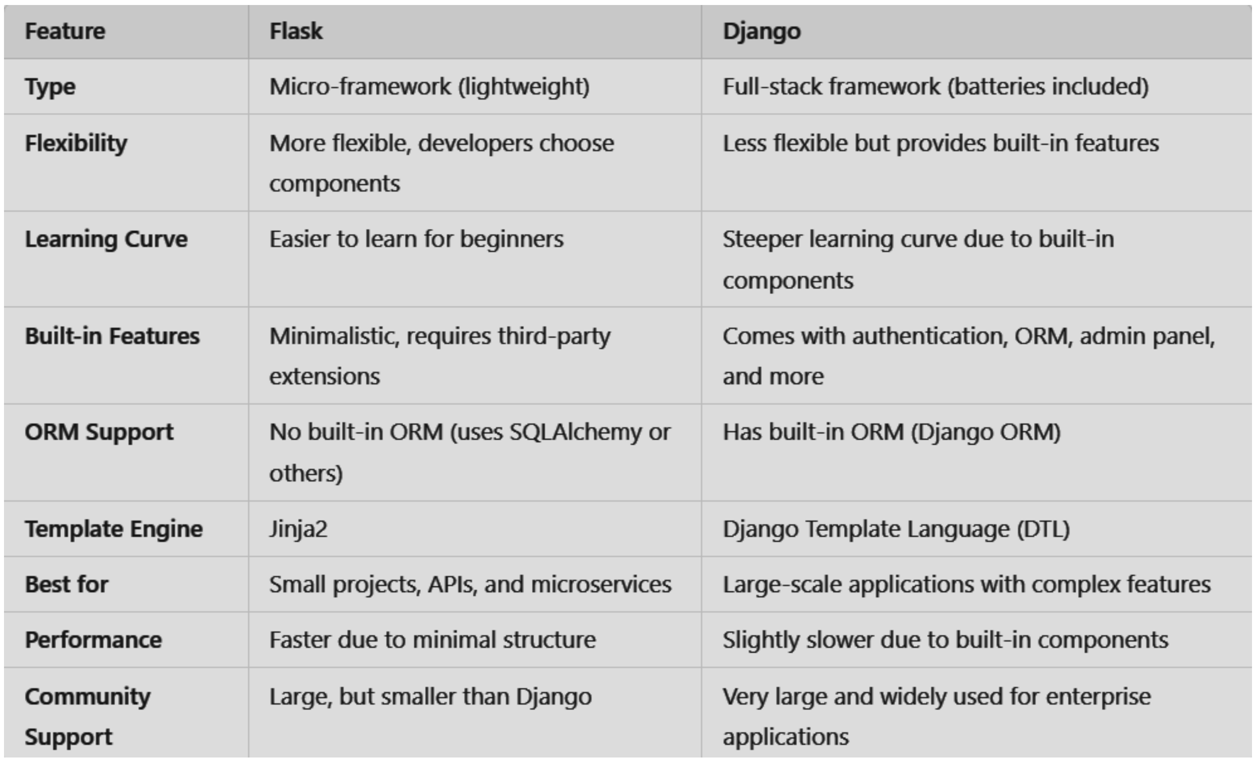
4. What methods of HTTP are implemented in Flask.

Flask supports multiple HTTP methods, including:

- GET – Retrieves data from the server.
- POST – Submits data to the server (e.g., form submission).
- PUT – Updates an existing resource.
- DELETE – Deletes a resource.
- PATCH – Partially updates an existing resource.

- HEAD – Similar to GET but retrieves only headers.
- OPTIONS – Returns the allowed HTTP methods for a resource.

5. What is difference between Flask and Django framework



Feature	Flask	Django
Type	Micro-framework (lightweight)	Full-stack framework (batteries included)
Flexibility	More flexible, developers choose components	Less flexible but provides built-in features
Learning Curve	Easier to learn for beginners	Steeper learning curve due to built-in components
Built-in Features	Minimalistic, requires third-party extensions	Comes with authentication, ORM, admin panel, and more
ORM Support	No built-in ORM (uses SQLAlchemy or others)	Has built-in ORM (Django ORM)
Template Engine	Jinja2	Django Template Language (DTL)
Best for	Small projects, APIs, and microservices	Large-scale applications with complex features
Performance	Faster due to minimal structure	Slightly slower due to built-in components
Community Support	Large, but smaller than Django	Very large and widely used for enterprise applications

Routing

```
@app.route('/')
def home():
    name = request.args.get('name', 'Guest')  # Default to 'Guest' if no name is provided
    return render_template('index.html', name=name)
```

URL building

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

Instead of hardcoding URLs, Flask provides url_for():

```
url_for('user_profile', username='Alice')
```

GET REQUEST

```
@app.route('/')
def home():
    name = request.args.get('name', 'Guest')  # Default to 'Guest' if no name is provided
    return f"Welcome, {name}!"
```

POST REQUEST

```
@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', username=name, email=email))
    return render_template('contact.html')
```

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')  # Default to 'Guest' if no name is provided
    return render_template('index.html', name=name)

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

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

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

Index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>Home</title>
</head>
<body style="font-family: Arial, sans-serif; background-color: #f4f4f4; text-align: center; 
padding: 20px;">
   <div style="max-width: 500px; background: white; padding: 20px; margin: auto; 
border-radius: 10px; box-shadow: 0 0 10px rgba(0, 0, 0, 0.1);">
      <h1 style="color: #333;">Welcome, {{ name }}!</h1>
      <p>This is the homepage.</p>
      <a href="{{ url_for('contact', username=name) }}" style="display: inline-block; 
background-color: #28a745; color: white; padding: 10px; text-decoration: none; border-radius: 
5px;">Go to Contact Form</a>
   </div>
</body>
</html>
```

Contact.html

```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>Contact</title>
</head>
<body style="font-family: Arial, sans-serif; background-color: #f4f4f4; text-align: center; 
padding: 20px;">
   <div style="max-width: 500px; background: white; padding: 20px; margin: auto; 
border-radius: 10px; box-shadow: 0 0 10px rgba(0, 0, 0, 0.1);">
      <h1 style="color: #333;">Contact Us, {{ username }}</h1>
      <form action="{{ url_for('contact', username=username) }}" method="post" style="display: 
flex; flex-direction: column; align-items: center;">
         <label for="name" style="margin: 10px 0;">Name:</label>
         <input type="text" id="name" name="name" required value="{{ username }}" 
style="padding: 8px; border: 1px solid #ccc; border-radius: 5px; width: 80%;">
```

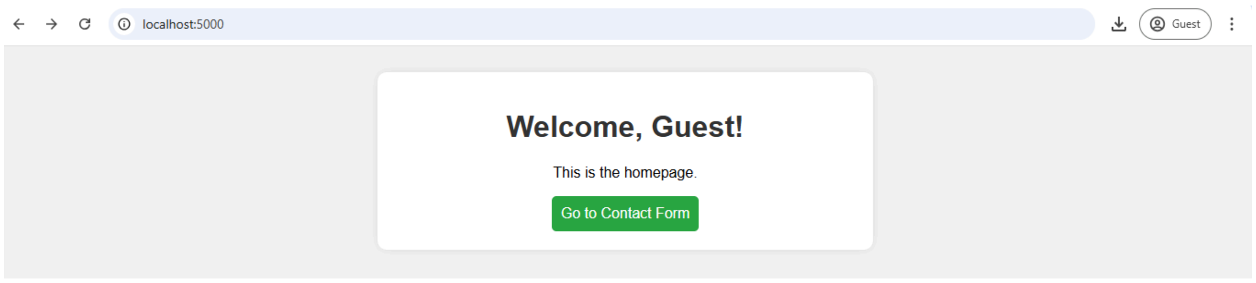
```
            <label for="email" style="margin: 10px 0;">Email:</label>
            <input type="email" id="email" name="email" required style="padding: 8px; border: 1px
solid #ccc; border-radius: 5px; width: 80%;">

            <button type="submit" style="background-color: #28a745; color: white; padding: 10px;
border: none; border-radius: 5px; cursor: pointer; margin-top: 15px;">Submit</button>
        </form>
    </div>
</body>
</html>
```

Thank_you.html

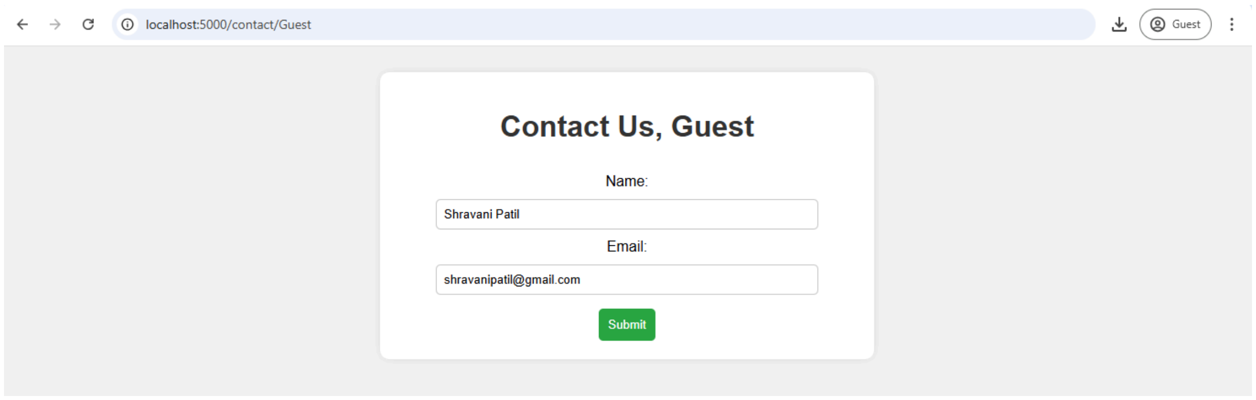
```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Thank You</title>
</head>
<body style="font-family: Arial, sans-serif; background-color: #f4f4f4; text-align: center;
padding: 20px;">
    <div style="max-width: 500px; background: white; padding: 20px; margin: auto;
border-radius: 10px; box-shadow: 0 0 10px rgba(0, 0, 0, 0.1);">
        <h1 style="color: #333;">Thank You, {{ username }}!</h1>
        <p>Your email ({{ email }}) has been received.</p>
        <a href="{{ url_for('home') }}" style="display: inline-block; background-color: #007bff;
color: white; padding: 10px; text-decoration: none; border-radius: 5px;">Go Back to Home</a>
    </div>
</body>
</html>
```

OUTPUT:


localhost:5000

Welcome, Guest!

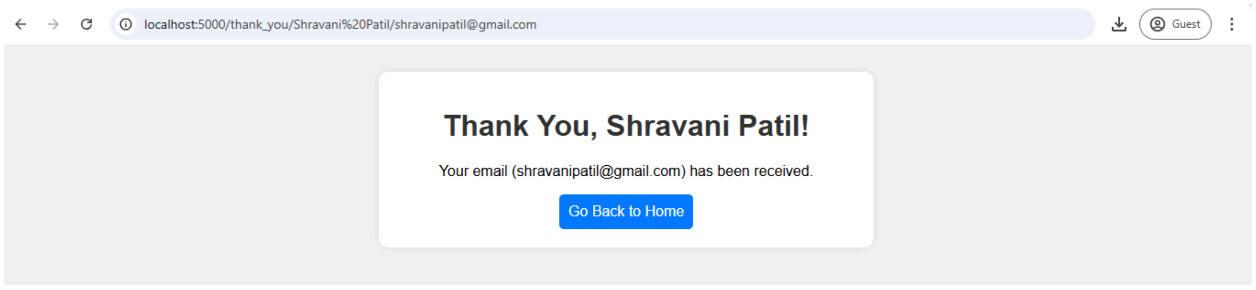
This is the homepage.


localhost:5000/contact/Guest

Contact Us, Guest

Name: Shravani Patil

Email: shravanipatil@gmail.com


localhost:5000/thank_you/Shravani%20Patil/shravanipatil@gmail.com

Thank You, Shravani Patil!

Your email (shravanipatil@gmail.com) has been received.