

Experiment 5 : Flask Application using `render_template()` function.

Name of Student	Sanket More
Class Roll No	D15A_29
D.O.P.	06/03/2025
D.O.S.	13/03/2025
Sign and Grade	

AIM : To create a Flask application that demonstrates template rendering by dynamically generating HTML content using the `render_template()` function.

PROBLEM STATEMENT :

Develop a Flask application that includes:

1. A homepage route (`/`) displaying a welcome message with links to additional pages.
2. A dynamic route (`/user/<username>`) that renders an HTML template with a personalized greeting.
3. Use Jinja2 templating features, such as variables and control structures, to enhance the templates.

Theory:

1. What does the `render_template()` function do in a Flask application?

The `render_template()` function in Flask is used to render HTML templates and return them as responses to client requests. Instead of returning plain text or manually writing HTML inside the Python code, Flask allows the use of separate HTML files stored in the `templates` folder.

Usage Example:

```
python
CopyEdit
from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')
def home():
```

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

Here, `render_template('index.html')` loads the `index.html` file from the `templates` folder and sends it as a response. This helps in separating logic from presentation, making web applications more organized and maintainable.

Additionally, `render_template()` supports passing dynamic data to templates:

```
python
CopyEdit
@app.route('/user/<name>')
def user(name):
    return render_template('user.html', username=name)
```

In `user.html`, we can access `username` using Jinja2 templating:

```
html
CopyEdit
<p>Hello, {{ username }}!</p>
```

2. What is the significance of the `templates` folder in a Flask project?

The `templates` folder holds all the HTML files used for rendering web pages in a Flask application. Flask automatically looks for template files inside this directory, making it a convention that helps in maintaining a well-structured project.

Key Significance:

1. **Separation of Concerns** – Keeps the HTML structure separate from Python logic, improving code readability.
2. **Easy Management** – All templates are stored in one location, simplifying maintenance.
3. **Supports Jinja2** – Enables the use of dynamic content within HTML files through Jinja2 templating.
4. **Enables Code Reusability** – Common UI components, such as headers and footers, can be stored in separate template files and reused across multiple pages using template inheritance.

Project Structure Example:

```
bash
CopyEdit
```

```
/my_flask_app
|— app.py
|— /templates
|   |— index.html
|   |— about.html
|   |— base.html
|— /static
|   |— styles.css
|   |— script.js
```

Here, `index.html` and `about.html` are stored inside the `templates` folder and can be rendered using `render_template()`.

3. What is Jinja2, and how does it integrate with Flask?

Jinja2 is a powerful templating engine used in Flask to generate dynamic HTML content. It allows embedding Python-like expressions inside HTML, making web pages more interactive and adaptable based on user input or backend data.

Integration with Flask:

Flask uses Jinja2 by default when rendering templates through `render_template()`. The syntax includes:

- **Variables** – `{{ variable_name }}`
- **Control Structures** – `{% if condition %} ... {% endif %}`
- **Loops** – `{% for item in list %} ... {% endfor %}`

Example Usage:

Python Code (Flask App)

python

CopyEdit

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

Jinja2 Template (`greet.html`)

html

CopyEdit

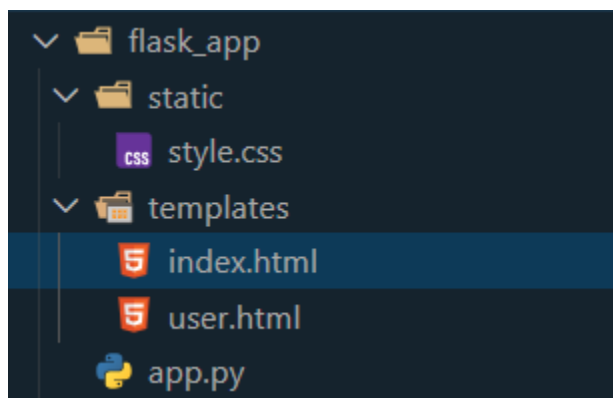
```
<!DOCTYPE html>
<html>
<head>
    <title>Greeting</title>
</head>
<body>
    <h1>Hello, {{ username }}!</h1>
</body>
</html>
```

Features of Jinja2 in Flask:

1. **Template Inheritance** – Allows reusing base layouts using `{% extends "base.html" %}` and `{% block content %} ... {% endblock %}`.
2. **Filters** – Modify data output (e.g., `{{ name.upper() }}` converts text to uppercase).
3. **Control Structures** – Supports conditionals and loops for dynamic content.

Jinja2 enhances the flexibility of Flask applications by enabling dynamic content generation within HTML templates.

OUTPUT:-



app.py

```
from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')

def home():
```

```

    return render_template('index.html')

@app.route('/user/<username>')

def user(username):

    return render_template('user.html', username=username)

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>Flask Template Rendering</title>

    <link rel="stylesheet" href="{{ url_for('static',
filename='style.css') }}">

    <link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.
css">

</head>

<body>

    <div class="container">

        <div class="card">

            <h1>Welcome to My Flask App</h1>

            <p>Explore user pages dynamically!</p>

```

```

        <div class="links">

            <a href="{{ url_for('user', username='Sanket') }}"
class="btn btn-custom">Sanket's Page</a>

            <a href="{{ url_for('user', username='Rohit') }}"
class="btn btn-custom">Rohit's Page</a>

        </div>

    </div>

</div>

</body>

</html>

```

user.html:-

```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>User Page</title>
    <link rel="stylesheet" href="{{ url_for('static',
filename='style.css') }}">
    <link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.
css">
</head>
<body>
    <div class="container">
        <div class="card">
            <h1>Hello, {{ username }}! 🙌</h1>
            <p>Welcome to your personalized space.</p>
            <a href="{{ url_for('home') }}" class="btn btn-custom">Back to
Home</a>
        </div>
    </div>

```

```
</body>
</html>
```

style.css:-

```
body {
    font-family: 'Poppins', sans-serif;
    background-color: #f4f4f4;
    margin: 0;
    padding: 0;
}

.container {
    text-align: center;
    margin-top: 50px;
}

h1 {
    color: #007bff;
}

p {
    font-size: 18px;
    color: #333;
}

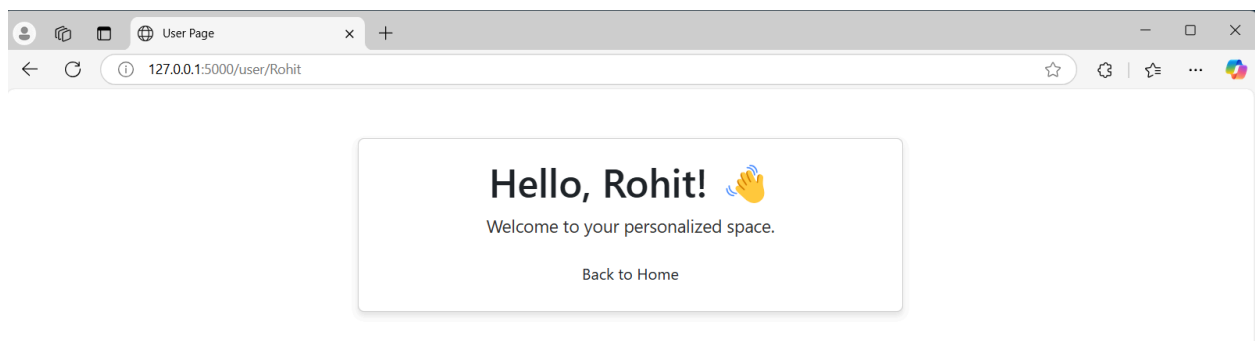
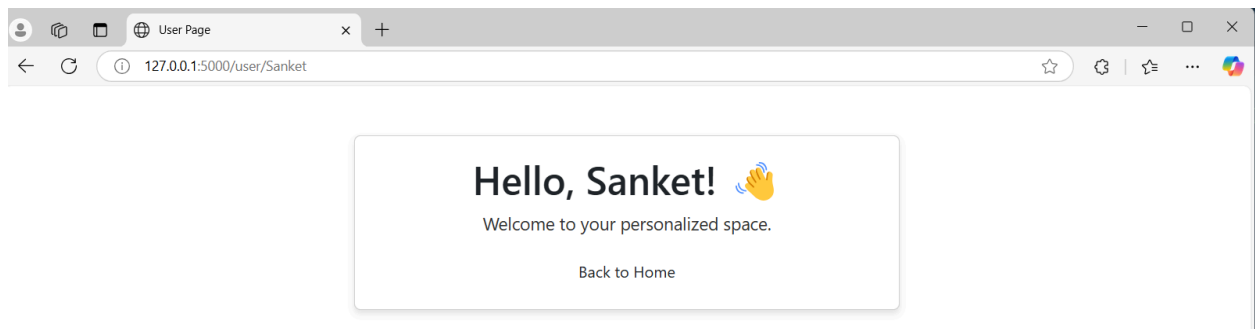
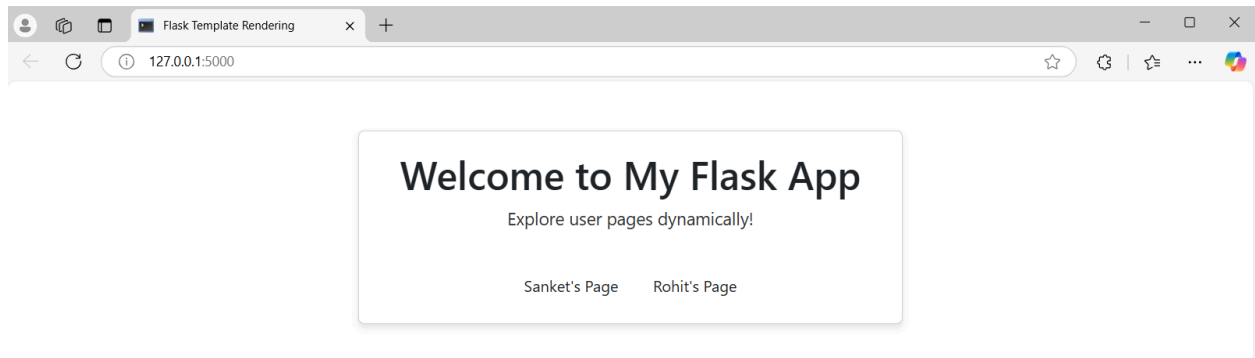
.btn-custom {
    background-color: #007bff;
    color: white;
    padding: 10px 20px;
    text-decoration: none;
    border-radius: 5px;
}

.btn-custom:hover {
    background-color: #0056b3;
}

.card {
    background: white;
    padding: 20px;
```

```
border-radius: 10px;  
box-shadow: 0px 4px 6px rgba(0, 0, 0, 0.1);  
width: 50%;  
margin: 20px auto;  
}  
.links {  
  display: flex;  
  justify-content: center;  
  gap: 10px;  
  margin-top: 20px;  
}
```

Results:




```
PS C:\Users\Sanket More\Desktop\webx> cd flask_app
PS C:\Users\Sanket More\Desktop\webx\flask_app> python app.py
* Serving Flask app 'app'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production 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: 521-799-694
127.0.0.1 - - [26/Feb/2025 08:41:05] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [26/Feb/2025 08:41:05] "GET /static/style.css HTTP/1.1" 304 -
127.0.0.1 - - [26/Feb/2025 08:41:05] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - - [26/Feb/2025 08:41:21] "GET /user/Sanket HTTP/1.1" 200 -
127.0.0.1 - - [26/Feb/2025 08:41:21] "GET /static/style.css HTTP/1.1" 304 -
127.0.0.1 - - [26/Feb/2025 08:41:33] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [26/Feb/2025 08:41:33] "GET /static/style.css HTTP/1.1" 304 -
127.0.0.1 - - [26/Feb/2025 08:41:35] "GET /user/Rohit HTTP/1.1" 200 -
127.0.0.1 - - [26/Feb/2025 08:41:35] "GET /static/style.css HTTP/1.1" 304 -
127.0.0.1 - - [26/Feb/2025 08:41:43] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [26/Feb/2025 08:41:43] "GET /static/style.css HTTP/1.1" 304 -
PS C:\Users\Sanket More\Desktop\webx\flask_app>
```