Django-Based Payment Service System Documentation

1. Introduction

The WebApps2025 Payment System is a simplified PayPal-like web application built with Django that allows users to send and request money in multiple currencies (GBP, USD, EUR). The system includes user authentication, transaction processing, currency conversion, and administrative functions.

2. System Architecture

- The application is structured following Django's MVC paradigm:
- Presentation Layer: HTML templates with Bootstrap and Crispy Forms
- Business Logic Layer: Views and forms for handling application workflows
- Data Access Layer: Django models and ORM managing data interactions
- Security Layer: Authentication, authorization, CSRF, and other web security features
- Web Services Layer: REST API for currency conversion

2.1 Project Structure:

```
webapps2025/
│   webapps.db
│   manage.py
│   setup.py
│
├──templates/
│   ├──payapp/
│   │   ├──admin_dashboard.html
│   │   ├──dashboard.html
│   │   ├──make_payment.html
│   │   └──request_payment.html
│   └──registration/
│       ├──logged_out.html
│       ├──login.html
│       └──register.html
│
├──register/
```

```
│   │   admin.py
│   │   apps.py
│   │   forms.py
│   │   models.py
│   │   signals.py
│   │   urls.py
│   │   views.py
│   │   __init__.py
│   └──migrations/
│
├──payapp/
│   │   admin.py
│   │   apps.py
│   │   constants.py
│   │   models.py
│   │   signals.py
│   │   urls.py
│   │   views.py
│   │   __init__.py
│   └──migrations/
│
├──converter/
│   │   admin.py
│   │   apps.py
│   │   models.py
│   │   urls.py
│   │   views.py
│   │   __init__.py
│   └──migrations/
│
└──webapps2025/
    │   asgi.py
    │   settings.py
    │   urls.py
    │   wsgi.py
    │   __init__.py
```

3. Presentation Layer (Implemented)

- Implemented HTML templates for all core pages:
    1. Home, Register, Login, Dashboard
    2. Send Payment, Request Payment
    3. Admin Dashboard, User List, Transaction List
- Navigation through Django's URL routing
- Bootstrap 5 and Crispy Forms used for UI and form formatting
- All pages validate inputs and are responsive

4. Business Logic Layer (Implemented)

- Django views handle:
    1. User and admin registration/login/logout
    2. Sending and requesting payments with balance validation
    3. Viewing notifications and transactions
- All transactions are atomic using @transaction.atomic
- Currency conversion during transactions
- Notifications sent to users for every financial action

5. Data Access Layer (Implemented)

- Models:
    1. UserProfile - stores currency, balance, linked to Django User
    2. Transaction - logs all payment and request transactions
    3. Notification - records of user activity logs
- Data stored using SQLite via Django ORM
- Admin interface registered for all models

6. Security Layer (Implemented)

- Authentication and role-based access control via decorators
- CSRF protection on all forms (enabled by default)
- Secure password storage using Django's hashers
- Session-based login, logout, access control

- Default middleware protects from XSS, SQL Injection, and Clickjacking

7. Web Services (Implemented)

- RESTful endpoint: /conversion/<currency1>/<currency2>/<amount>
- Returns JSON response with converted amount
- Uses static exchange rates (can be extended to use live APIs)
- Example:

```
GET http://127.0.0.1:8000/conversion/GBP/USD/100/

Response: {
 "converted_amount": "125.00",
 "rate": "1.250000",
 "from_currency": "GBP",
 "to_currency": "USD",
 "last_updated": "2025-04-10T20:46:32.367525+00:00"
}
```

8. Deployment of AWS (Not Implemented)

9. Setup Instructions

9.1 Installation

1. Create and activate virtual environment:

```
- python -m venv venv
- source venv/bin/activate  # Linux/Mac
- venv\Scripts\activate    # Windows
```

2. Install requirements:

```
- pip install django crispy-bootstrap5 requests
```

3. Run migrations:

```
- python manage.py makemigrations
- python manage.py migrate
```

4. Create initial data:
    - python setup.py

9.2 Running the Application

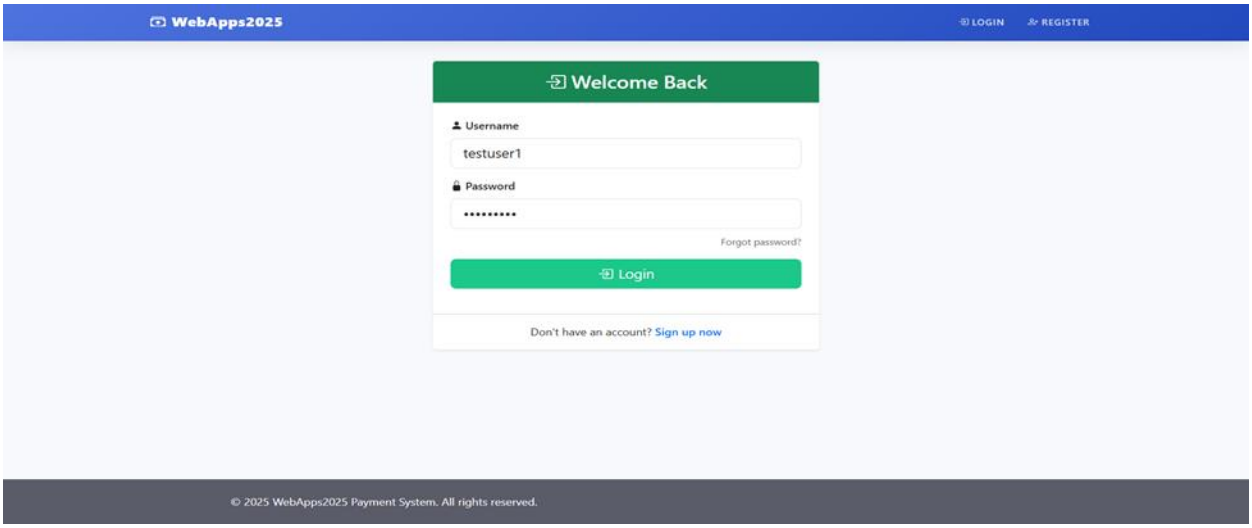
- python manage.py runserver

Access the application at: http://localhost:8000

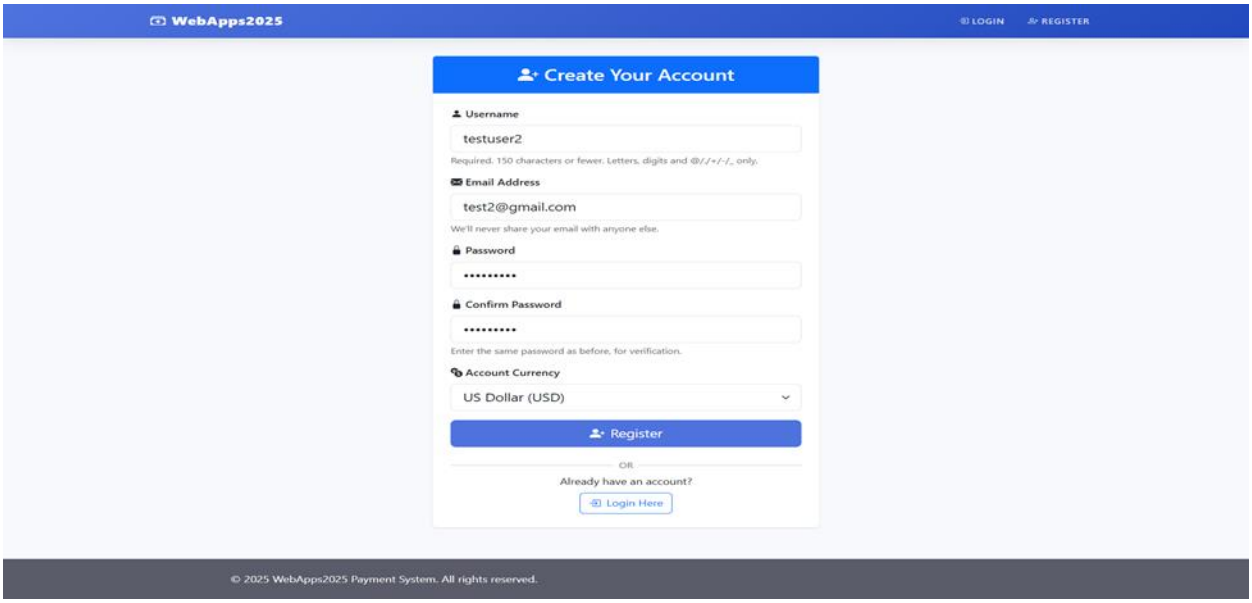
Admin login: admin1

Admin Password: admin1

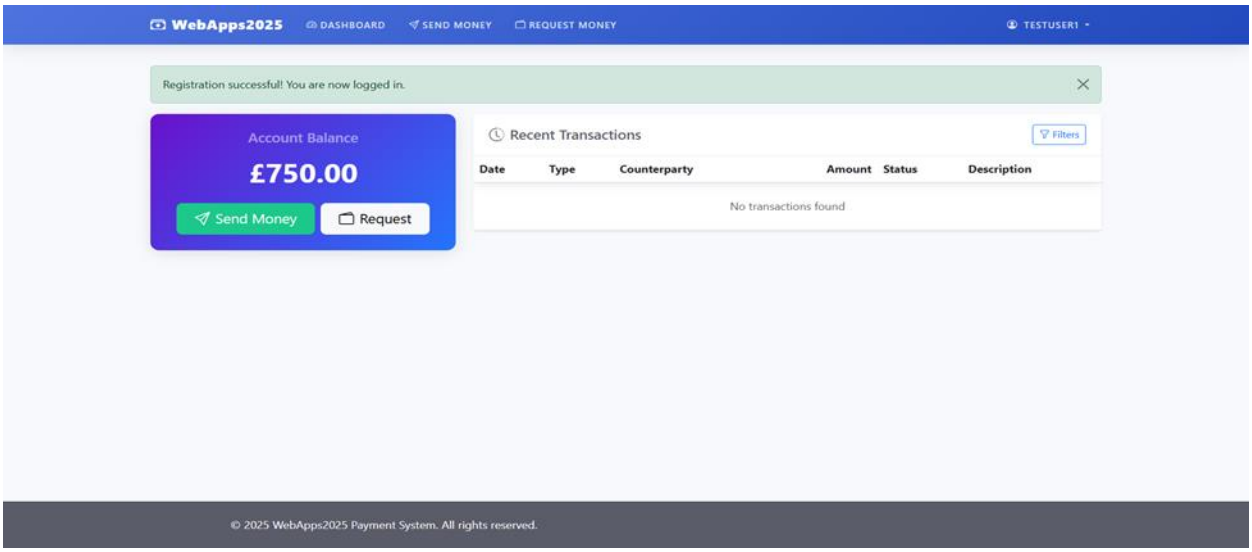
10. Screenshots and Demo



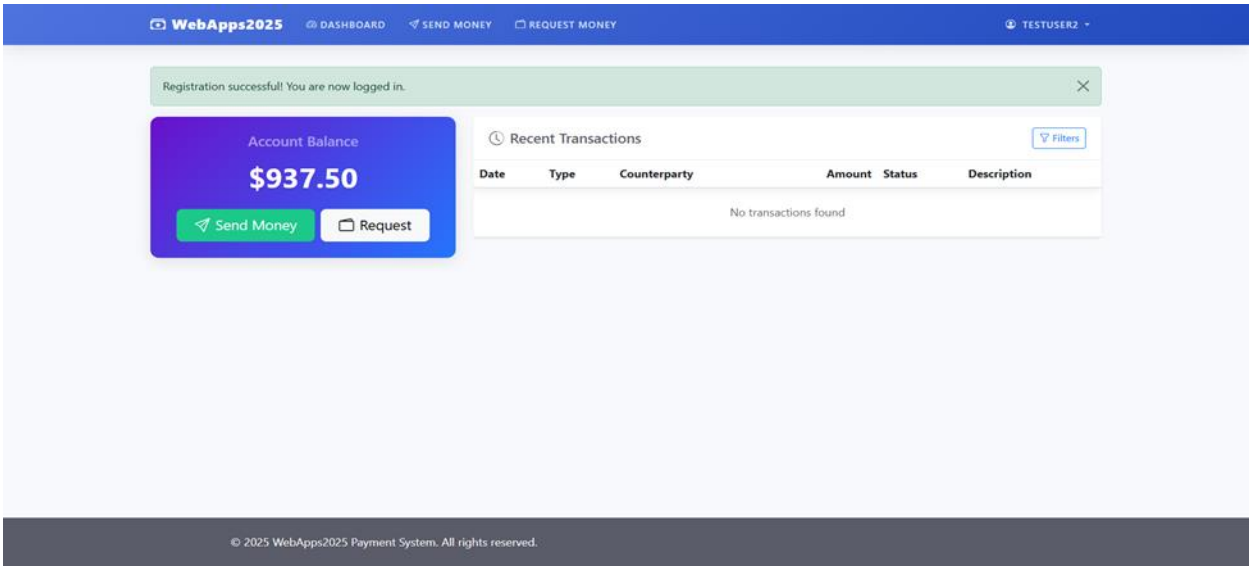
Login Form for User1



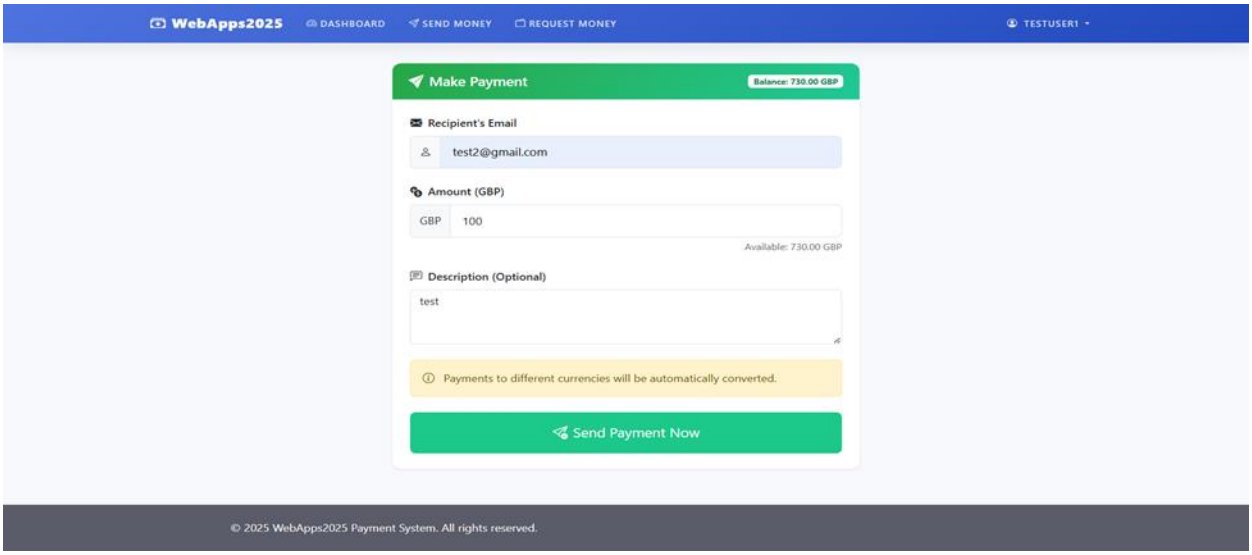
Registeration form for user 2



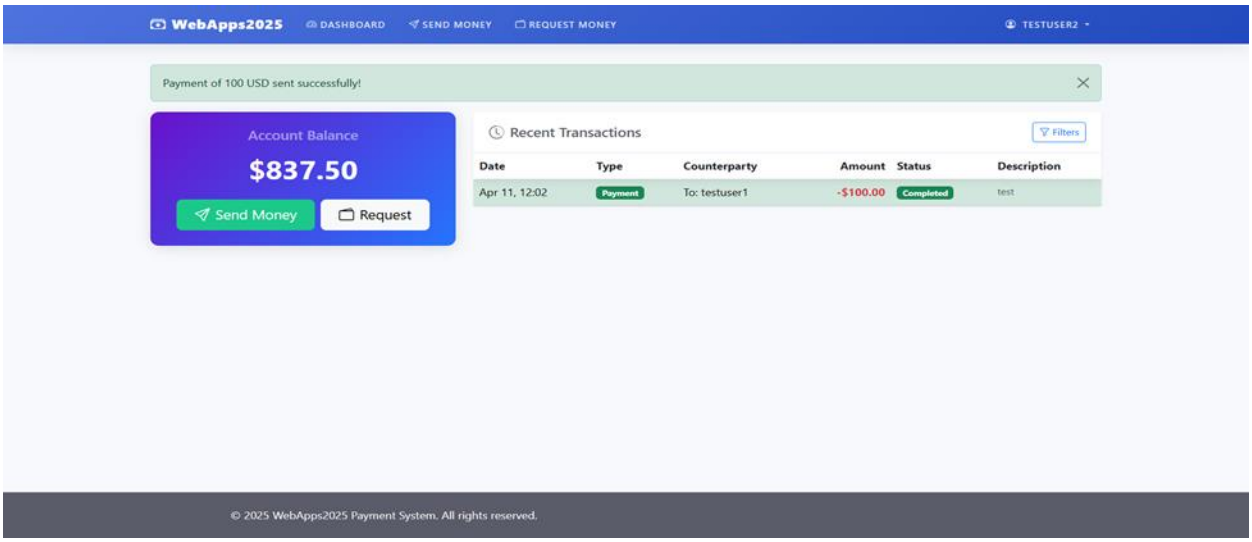
GBP User Dashboard for user1



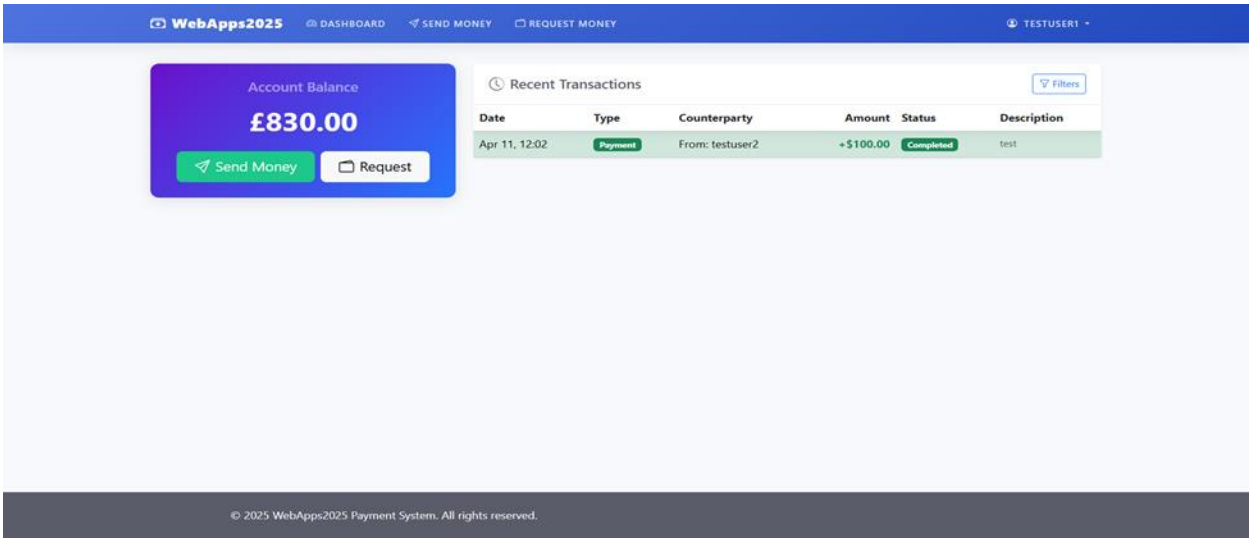
USD user2 Dashboard for user2



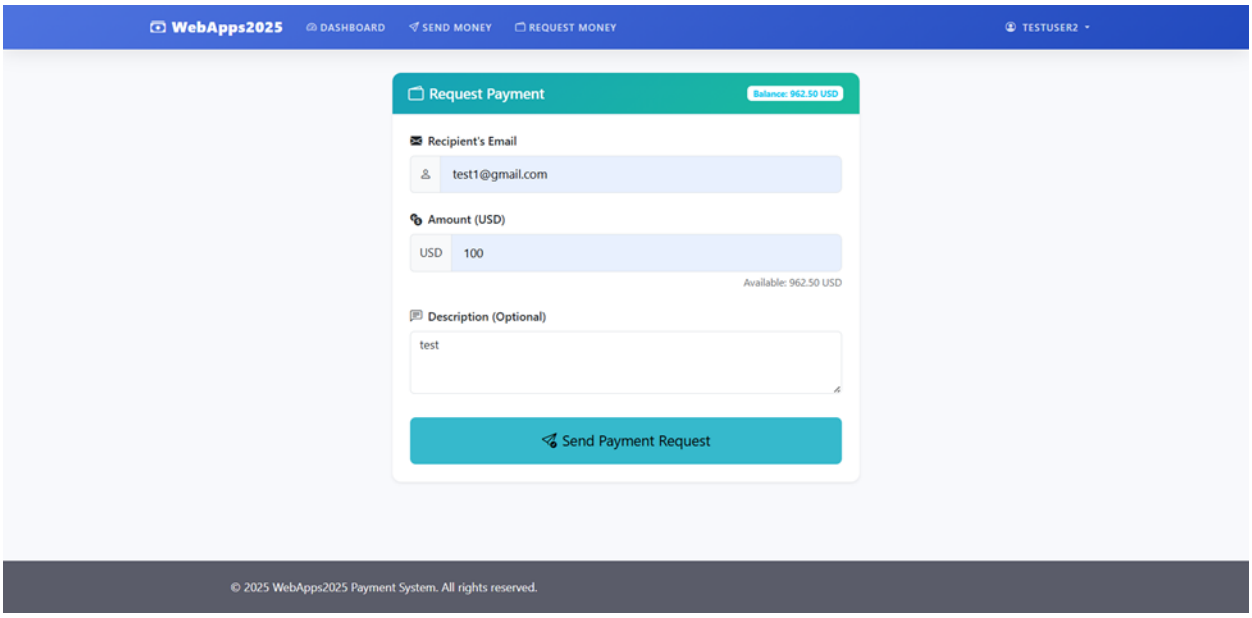
Make payment from user1 to user2



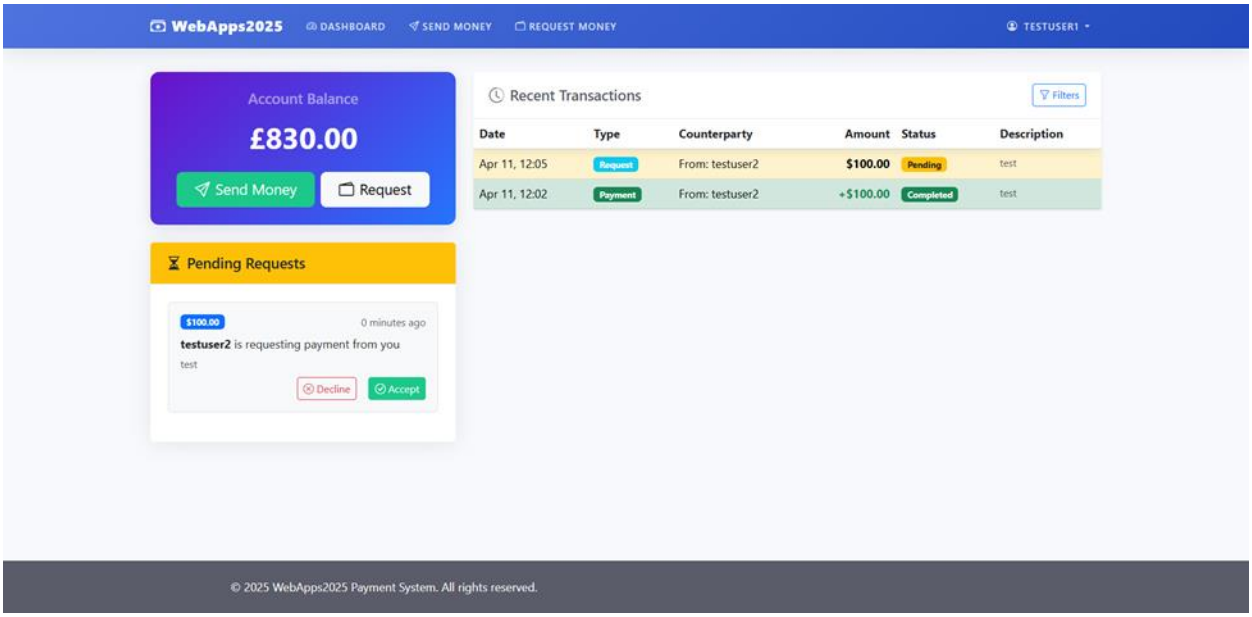
Complete transaction of 100$ Payment from user2 to user1



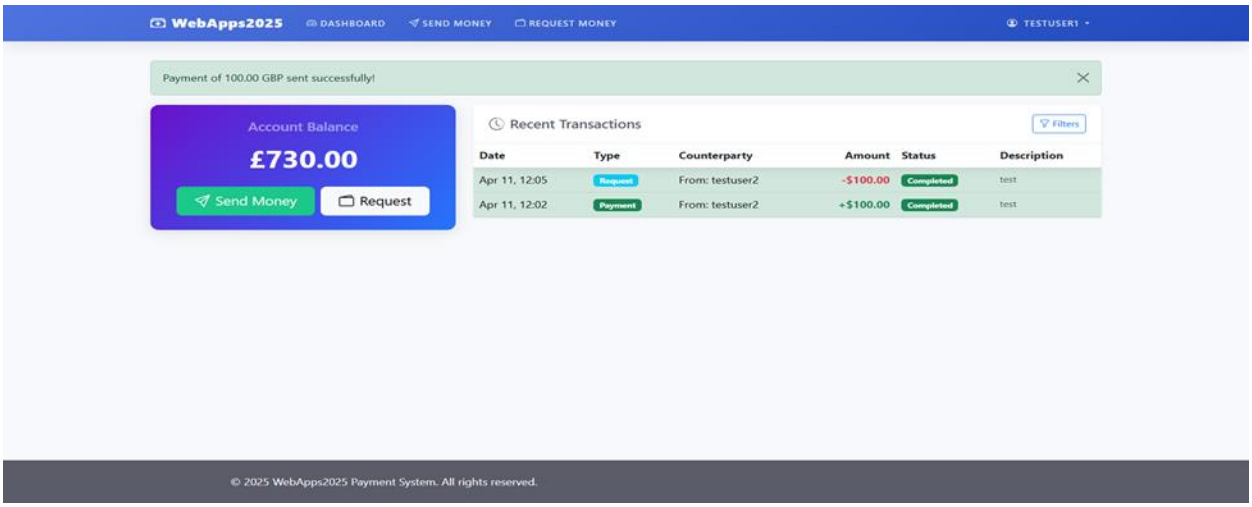
Recived payment from user1 and automatically convert into GBP.



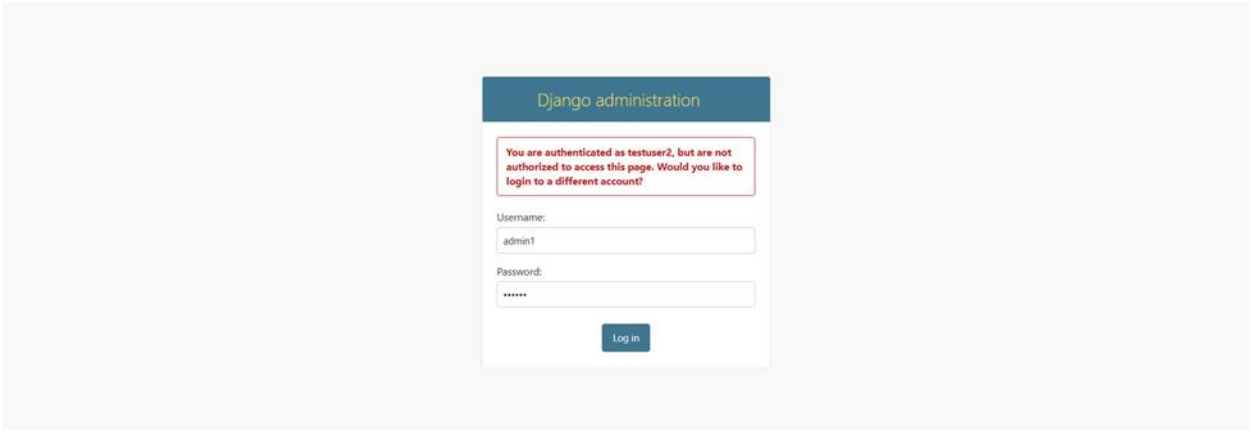
Request payment from user2 to user1



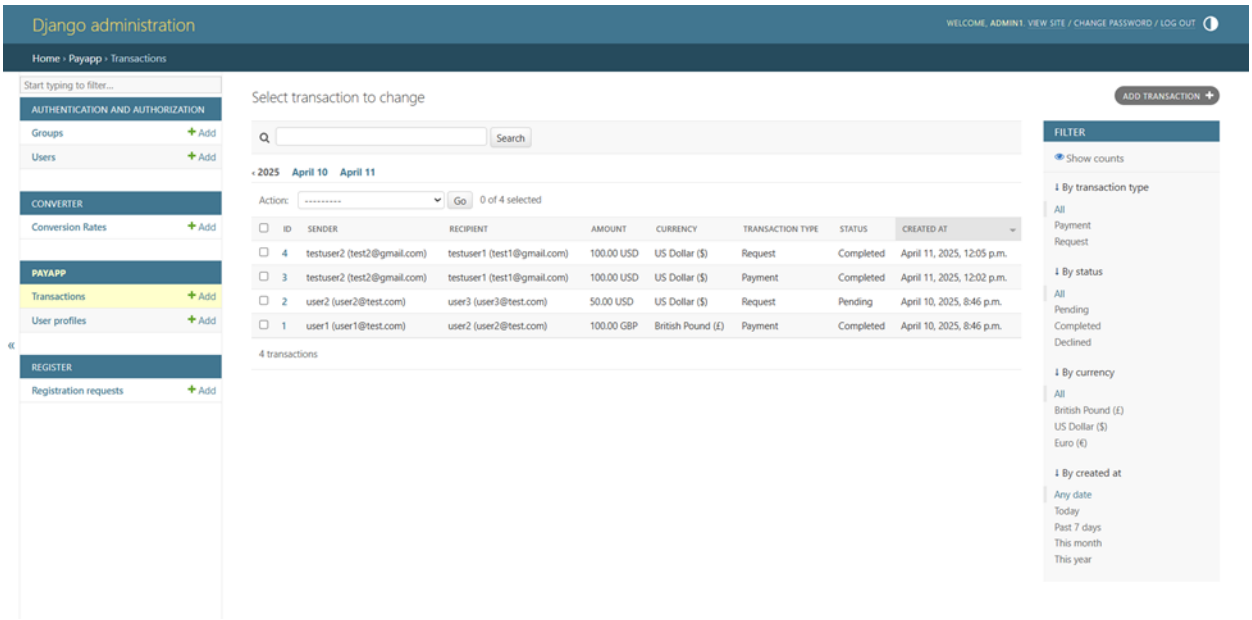
User2 Dashboard as receiving payment request pending from user2



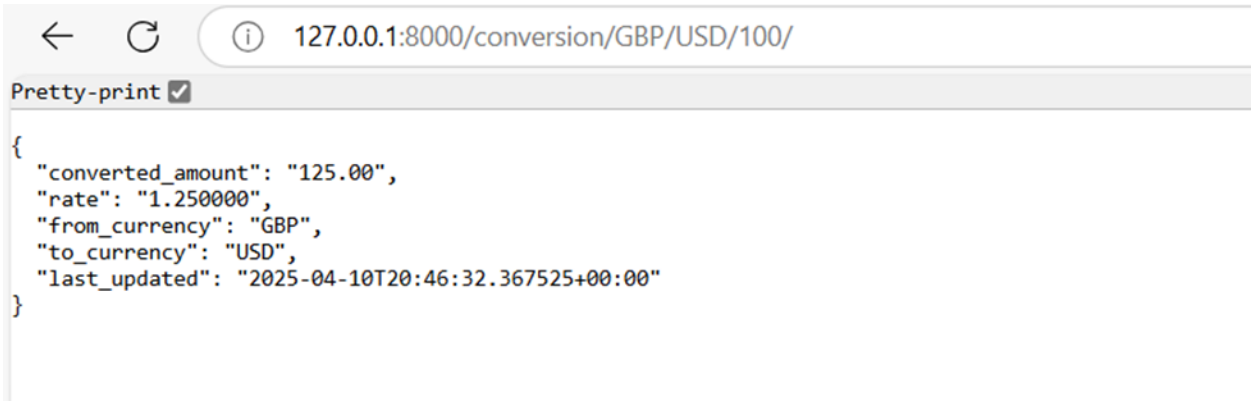
Successful Transaction



Admin Login Form



Complete Transaction Details from the Admin



Example of the REST API Currency Conversion

11. Implementation Summary Table

Section	Status	Comments
Presentation Layer	Fully Implemented	All user/admin templates connected, Bootstrap styling for clean interface.
Business Logic Layer	Fully Implemented	Validations, workflows, atomic transactions
Data Access Layer	Fully Implemented	SQLite models, relationships defined, Data integrity maintained.
Security Layer	Fully Implemented	Login, CSRF/XSS, role-based access, protections
Web Services	Fully Implemented	REST conversion service with static exchange rates
AWS Deployment		