# Web Applications and Services 2022 Assignment

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# Web Layer
## Implemented
- Users can
  - View all their previous transactions with timestamps
  - Make direct payments to other registered users
    - Validated to check if the amount is between 0.01 and their account value
  - Request payments from other registered users
  - Conversions hard coded in the transaction service EJB
- Administrators can
  - View all user accounts and their details
  - View all transactions made and their details
  - Register new admins

## Not Implemented
- Notifications regarding payments made to their account
- Notifications regarding requests for payments
- Users can't reject or make a response to request, only make a payment
- No checks are made if the user doesn't have enough to fulfil the request
- Outgoing requests

# Business Layer
## Implemented
- EJBs have been created for different tasks
- AdminService
  - Singleton EJB that uses postConstruct to generate an initial administrator
- RequestService
  - Used to persist requests into the database and update the statuses
- TransactionService
  - Used to read and write transaction data, transactionAttribute REQUIRED annotation is used to ensure integrity
- UserService
  - Accesses user related data such as user transactions, requests, and user details
  - Used to register users and record transactions made by the user

# Persistence Layer
## Implemented
- Several JPA entities have been implemented and using JavaDB as my RDBMS which is installed on the Payara server
- These are accessed using entity managers
- SystemUser
  - Contains user data: username, password, value, currency
- SystemUserGroup
  - Contains what users belong to what group (admins or users)
- UserRequest
  - Contains request data: requester id, recipient id, amount, and the status to check if it's been fulfilled or not
- UserTransaction
  - Contains transaction data: sender id, recipient id, amount, and timestamp

# Security Layer

## Implemented

- Form-based authentication (via j_security and a custom jdbcRealm)
- Logout functionality
- Declarative security to restrict access to web pages to non-authorised users
  - Security constraints are added to the deployment descriptor such that users can only access 'users' pages and admins can only access 'admins' pages

## Not Implemented

- Communication on top of HTTPS for every interaction with users and admins
- Declarative security to restrict access to EJB methods

# Web Services and Thrift

## Implemented

- Thrift service implemented for timestamps
  - Thrift timestamp service deployed on the same server as my system that returns the date and time requested by UserBean
  - The server is implemented as a deployable EJB on a separate thread accepting time-stamping requests at port 10001

## Not Implemented

- REST service

# User Manual

## Initial Page



- User can choose to log in or register a new user

## Log In



- Using incorrect credentials prevents the user from logging in
- However, using correct credentials allows the user to access their user page
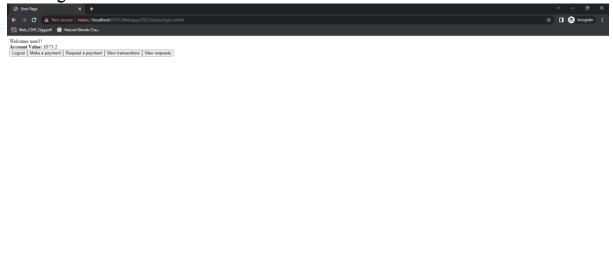
## Registering A New User



- Register a new user by adding a username, password, first name and last name, and choice of currency between GBP, USD, and EUR



- A username that is already in the database prevents the user from registering the user
- If the user is registered, they are taken back to the home page

## User Page



- User can see their account value and the options they can select:
  - Make a payment – direct payments to other registered users on the system
  - Request a payment – request payments from other registered users on the system
  - View transactions – view previously made transactions, outgoing and incoming
  - View requests – view requests received from other registered users on the system

## Make A Payment



- Select a user to pay to



- User can view their details and the recipient details
- User can enter an amount to send with restrictions

- Cannot send an amount smaller than 0.01 or larger than their account value



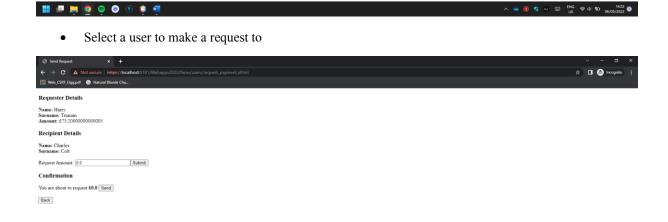- If a valid amount is inputted, then the confirmation message is updated with the amount

- When the user hits the send button, the value is sent, and a timestamp is printed to the user
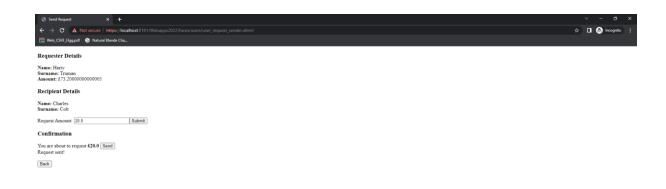
## Make A Request
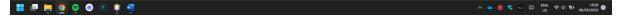
- Similar to make a payment page



- Select a user to make a request to



- Similar to making a payment, the user inputs an amount to request from the recipient
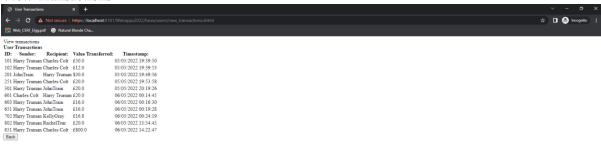
- When sent, a confirmation message 'Request sent!' is printed to the user
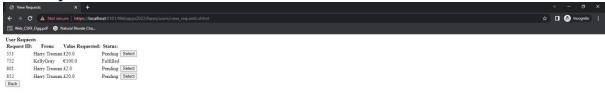


- A new request appears on the recipient's user page

## View Transactions



- User can view incoming and outgoing transactions with the value (with currency) and timestamps
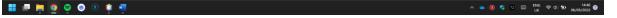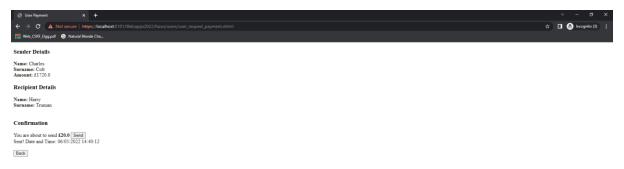
## View Requests



- Requests from other registered users can be viewed, where some may be fulfilled, and some are pending

- Upon clicking a pending request, the user is presented with their details and the recipient's (requester's) details
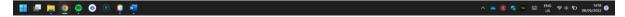


- When clicking the send button, a confirmation message and a timestamp is printed
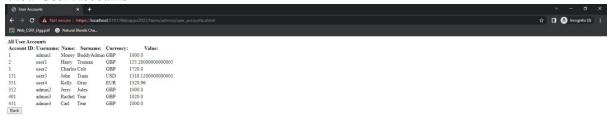
## Administrator Page





- Admins have an 'Administrator Page' button appear for them, where they can access admin level options:
    - View user accounts – view all user accounts and their details on the system
    - View all transactions – view all transactions made by all users
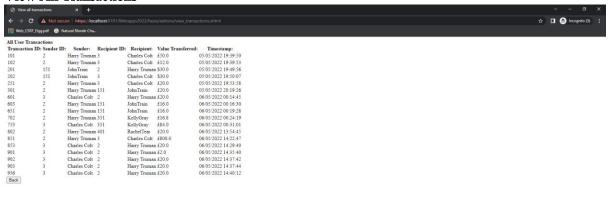    - Register a new admin – register a new admin that can access the same options as above

## View User Accounts



- Admins can view all user accounts with details: account ID, username, name, surname, currency, and account value
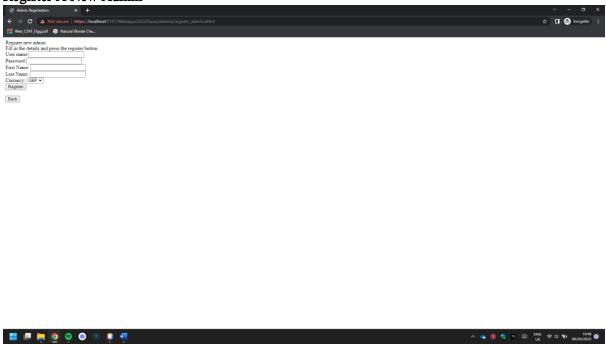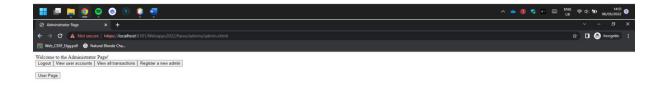
## View All Transactions



- Admins can view all transactions with details: transaction ID, sender ID, sender full name, recipient ID, recipient full name, value transferred (with currency symbol), and timestamp

## Register A New Admin



- Similar to the user registration page, an admin can register a new admin

- Once registering a new admin, the current admin user is returned to their administrator page

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- The new admin ('admin8') is able to log in with the administrator page available to them