

A Midterm Progress Report

on

Estatery

**Submitted in partial fulfillment of the requirements for the award of
the degree of**

BACHELOR OF TECHNOLOGY

Computer and Science Engineering

SUBMITTED BY :

PRATHAM (2104154)

PRATHAM YADAV (2104156)

DR. AMIT JAIN

(ASSISTANT PROFESSOR)

AT GNDEC, LUDHIANA

(APRIL-2025)



Department of Computer Science and Engineering

GURU NANAK DEV ENGINEERING COLLEGE LUDHIANA

Introduction

In the era of digitization and accessible online services, the demand for an innovative real estate website is more critical than ever. The Estatery platform, developed for the modern property market, is designed to meet this demand. This comprehensive web application caters specifically to property buyers, sellers, and renters, offering features to explore, evaluate, and manage real estate transactions seamlessly.

Project Overview:

Estatery is envisioned as a versatile platform that integrates advanced technology with a user-friendly design. With intuitive features and a strong backend infrastructure, Estatery empowers users to browse listings, schedule property visits, manage documents, and collaborate with Estatery professionals efficiently.

Field of Project:

Estatery resides within the domain of real estate and property technology. It specializes in providing buyers, sellers, and agents with a holistic toolset for property searching, transaction management, and decision-making. By addressing the unique needs of real estate stakeholders, Estatery fills a significant gap in the market as a comprehensive online property solution.

Specialized Terms :

- **MLS (Multiple Listing Service):** A database used by real estate professionals to list and access properties for sale . Homes, apartments, and other properties for living purposes. Properties used for business purposes, such as offices, retail spaces, and warehouses . High-end properties featuring premium amenities and locations.
- **User Interaction:**
 1. **Favorites:** A feature allowing users to save properties they are interested in.
 2. **Inquiry Forms:** Contact forms for connecting with property agents or owners.

3. **Account Dashboard:** A personalized area for users to manage saved searches, listings, and preferences.

- **Filters and Terms:**

1. **Location Filter :** User can filter the properties according to their desired location.
2. **Price Range Filter :** An interactive tool to select minimum and maximum price points. A detailed metric for evaluating property value. A feature that highlights properties falling within a user financial. Reflecting real-time pricing changes in filtered results.
3. **Availability Filter:**
 - ✓ **For Sale** Properties currently listed for purchase.
 - ✓ **For Rent** Properties available for short-term or long-term leasing.

Rationale:

In today's fast-paced world, where real estate transactions play a pivotal role in people's lives, Estatery is indispensable. Serving as a centralized hub, it efficiently streamlines property searches, management, and decision-making. With the increasing complexity of buying, renting, or selling properties and the desire for informed choices, Estatery simplifies the entire process. The platform ensures organized searches, easy access to property details, and seamless transaction management. Its functionality extends to aiding budget planning, fostering communication between stakeholders, and providing valuable market insights to make well-informed decisions.

Objectives

1. To implement Advance Search and Filter Capabilities
2. To provide Responsive Design For Multiple Screen Sizes
3. To make User Authentication Using Tokens through Redux
4. To provide Profile Dashboard, Favorite Listings and Saved Searches

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System Requirements

Software Requirements:

1. Operating System:

The Real Estate Pro platform is compatible with:

- Windows 10 or later
- macOS 10.15 or later

2. Web Browser:

For accessing the web-based version, the platform supports the latest versions of:

- Google Chrome
- Mozilla Firefox
- Safari
- Microsoft Edge

3. Database:

The platform uses MongoDB for storing user data, property listings, and other related information.

4. Development Frameworks and Technologies:

- Frontend: Built with Next.js for a responsive and dynamic user interface.
- Backend: Powered by Node.js and Express.js for robust server-side operations.
- Database Management: Utilizes MongoDB Compass for database visualization and management.
- API Testing: Uses Postman for testing and validating API endpoints during development.

5. Networking:

Access to the internet is required for features such as:

- Fetching property listings.
- Real-time updates and notifications.
- Communication with backend APIs and databases.

6. Server Requirements (for deployment):

- A server capable of running Node.js applications.
- Storage for hosting the MongoDB database.
- Secure HTTPS support for data protection.

Hardware Requirements:

1. Processor:

- For Windows and macOS: Intel Core i5 processor or equivalent.
- For Android devices: ARM Cortex-A53 or higher.

2. RAM:

- Minimum 4GB RAM for desktop/laptop computers.
- Minimum 2GB RAM for mobile devices.

3. Storage:

- Minimum 100MB of free disk space for app installation.
- Additional space for storing offline maps, user preferences, and cached data.

4. Display:

- Minimum screen resolution of 1280x720 pixels for desktop/laptop computers.
- Mobile devices should have a screen resolution suitable for their respective platforms.

5. Internet Connectivity:

- Wi-Fi or cellular data connection for accessing online features.

Software Requirement Analysis

Problem Definition:

➤ **Limited Property Insights:**

Critical information about properties, such as amenities, nearby facilities, and neighborhood trends, is often unavailable or poorly presented.

➤ **Inefficient Communication Channels:**

Buyers and renters struggle to connect with sellers or agents effectively, resulting in delays and miscommunication.

➤ **Inadequate Mobile Optimization:**

Many platforms fail to provide a seamless experience on mobile devices, which is critical given the increasing use of smartphones for property searches.

➤ **Lack of Advanced Filtering Options:**

Many platforms do not provide robust filtering mechanisms for narrowing down property searches by criteria such as price range, location, area size, and availability.

Modules and their Functionalities:

1. Authentication Module

Pages: Login, Signup, OTP, Reset Password

Functionalities:

- Login Page:
 - Secure user login using email/password.
 - Social media login options (e.g., Google, Facebook).
- Signup Page:
 - New user registration with email verification.
 - Validation for required fields (name, email, password).

- OTP Verification:
 - Send one-time password (OTP) to email/phone for authentication.
 - Verify OTP to activate the account.
- Reset Password:
 - Request password reset link via email.
 - Update password after validation.

2. Homepage Module

Pages: Homepage

Functionalities:

- Search Bar:
 - Keyword-based property search (location, type, or price range).
- Property Tabs:
 - Quick navigation for categories like "For Sale," "For Rent," "Luxury Homes," etc.
- Property List by Location:
 - Display popular or featured properties based on the user's location.
- Image Slider:
 - Showcase featured properties or promotional content with high-resolution images.

3. Buy Page Module

Pages: Buy Page

Functionalities:

- Property Listing:
 - Display properties available for purchase with key details (price, size, location).
- Advanced Filters:
 - Location, price range, availability (For Sale/For Rent), area size, and property type.

- Sort Options:
 - Sort properties by price, size, or date added.

4. Detail Page Module

Pages: Property Detail Page

Functionalities:

- Property Information:
 - Display detailed property specifications, including images, price, area, amenities, and descriptions.
- Interactive Features:
 - Virtual property tours, video walkthroughs, and floor plans.
- Contact Form:
 - Allow users to send inquiries directly to the seller or agent.
- Property Location:
 - Integrate Google Maps to show the exact location.
- Share and Save:
 - Social media sharing options and a "Save to Favorites" feature.

5. Feedback Page Module

Pages: Feedback Page

Functionalities:

- User Feedback Form:
 - Allow users to submit their experiences, suggestions, or issues.
- Rating System:
 - Provide a 5-star rating system for overall experience or specific features.

- **Feedback Management:**
 - Admin dashboard to view and respond to feedback.

6. About Page Module

Pages: About Page

Functionalities:

- **Company Information:**
 - Overview of the company's mission, vision, and services.
- **Team Details:**
 - Highlight key team members with profiles and roles.
- **Contact Details:**
 - Include company address, email, and phone number.

7. Profile Dashboard Module

Pages: Profile Dashboard

Functionalities:

- **User Profile Management:**
 - Update personal details like name, email, and phone number.
- **Saved Properties:**
 - View and manage favorited property listings.
- **User Activity:**
 - Track inquiries sent and properties listed.
- **Password Management:**
 - Change password and manage login credentials.

8. Sell Page Module

Pages: Sell Page

Functionalities:

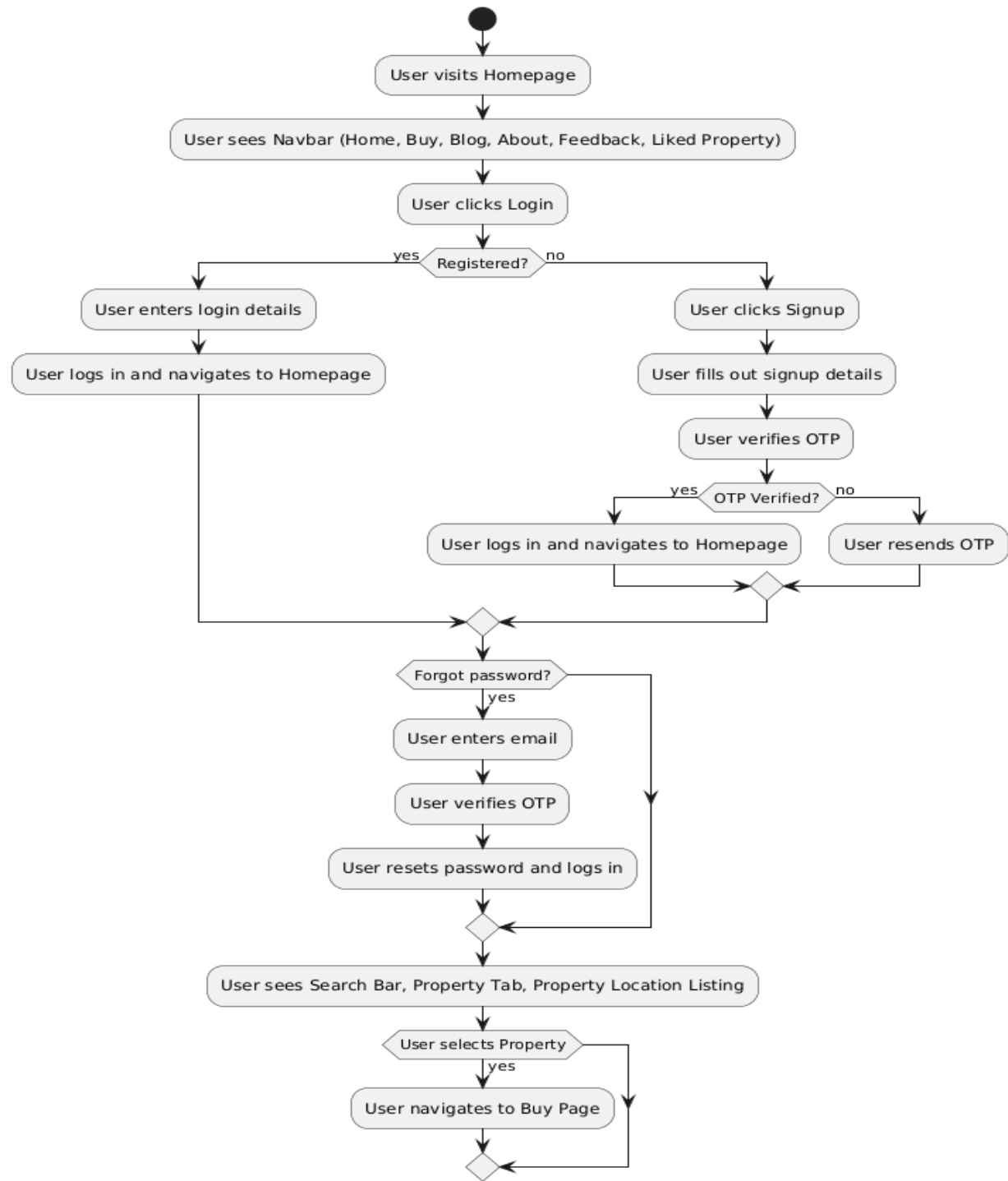
- Property Listing Form:
 - Allow sellers to add new properties with details like title, description, price, images, and availability.
- Image Upload:
 - Support multiple image uploads with size and format validation.
- Property Management:
 - View, edit, or delete listed properties.
- Analytics for Sellers:
 - Provide insights into listing performance (e.g., views, inquiries).

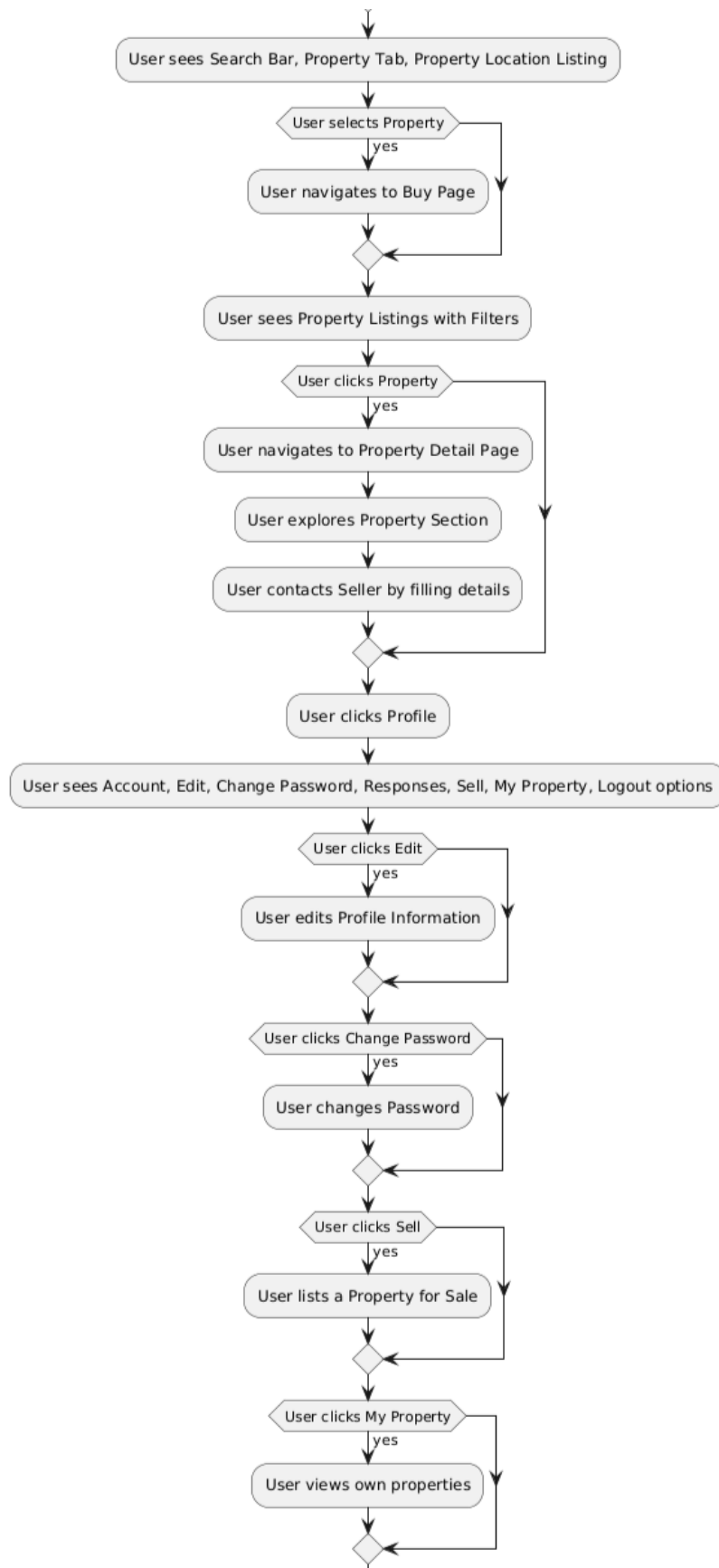
Additional Features Across All Pages

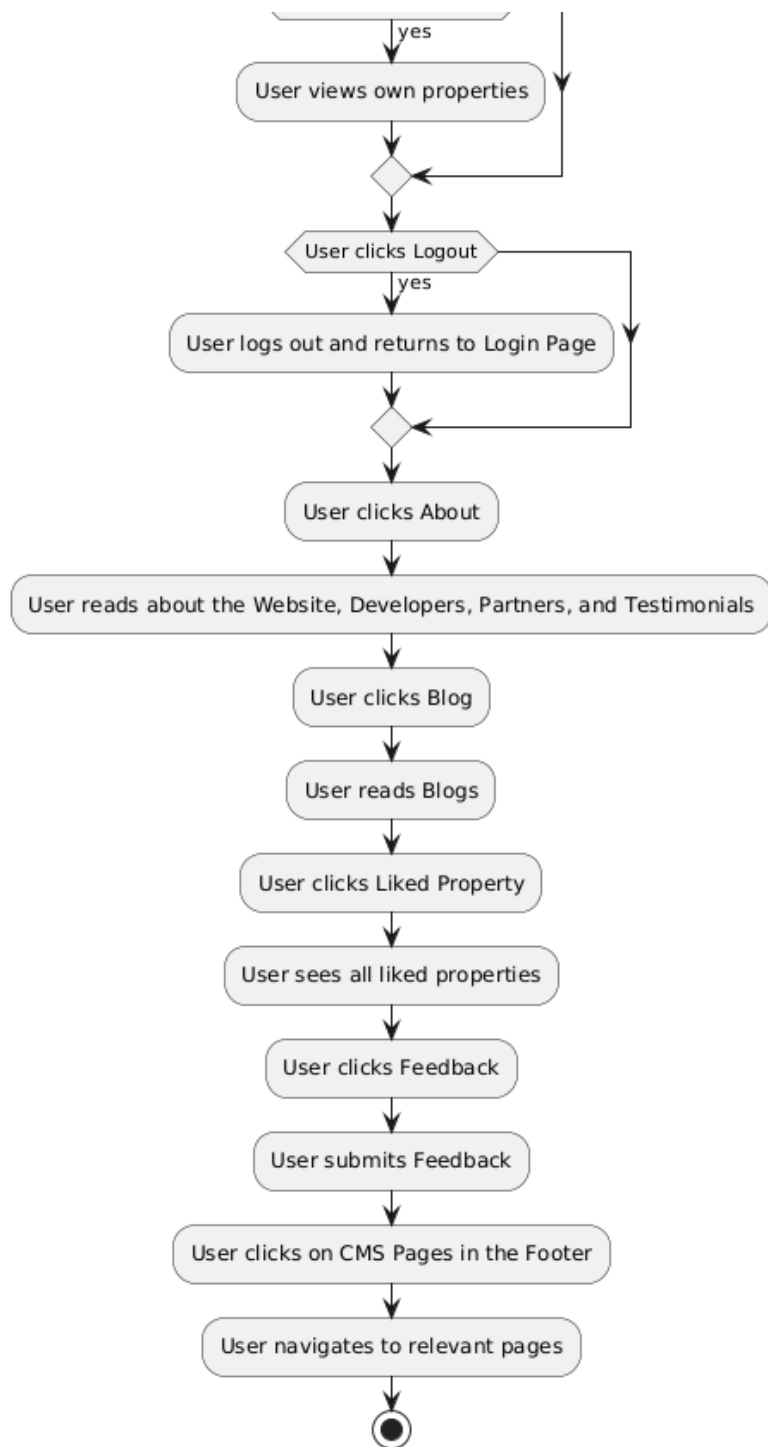
- Responsive Design:
 - Optimized layout for desktop, tablet, and mobile devices.

Software Design

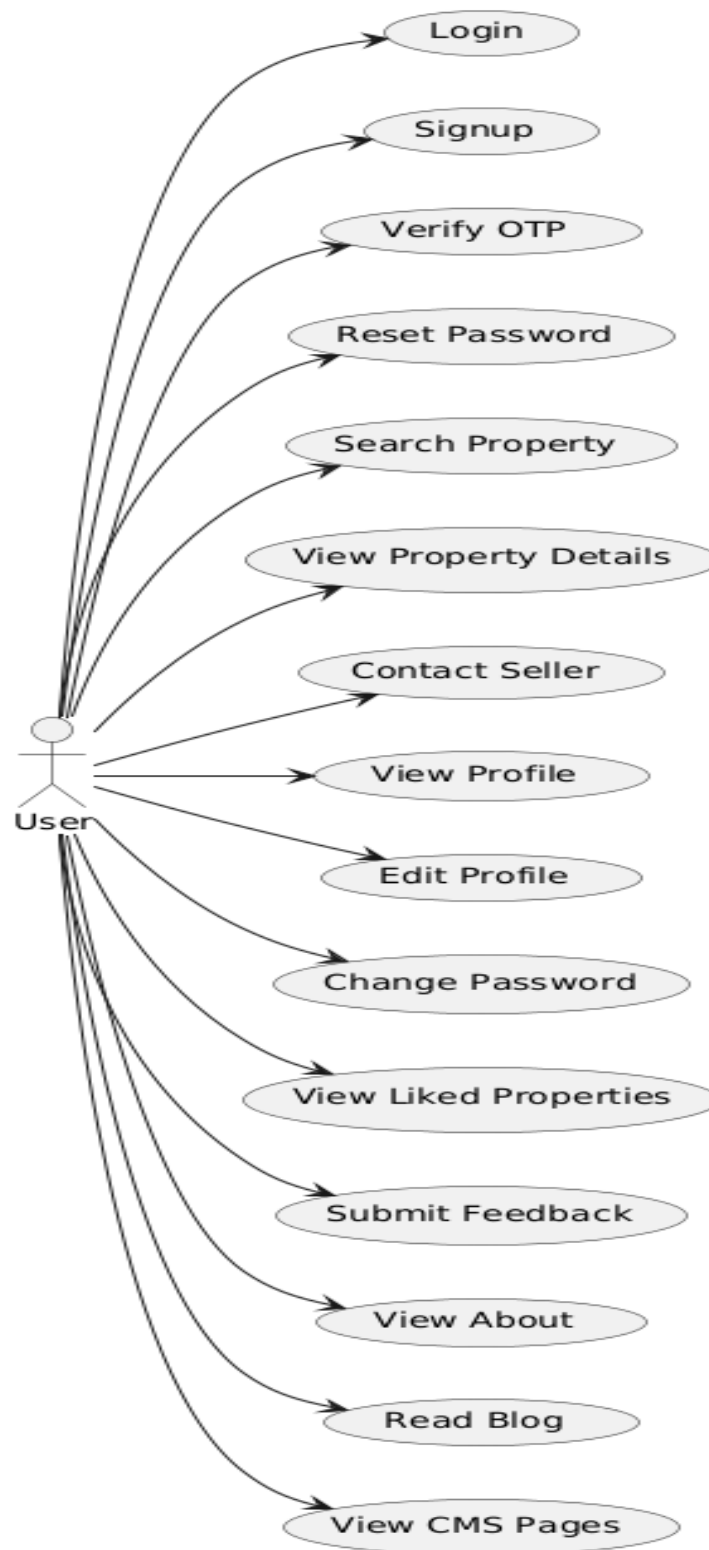
Flow Chart :



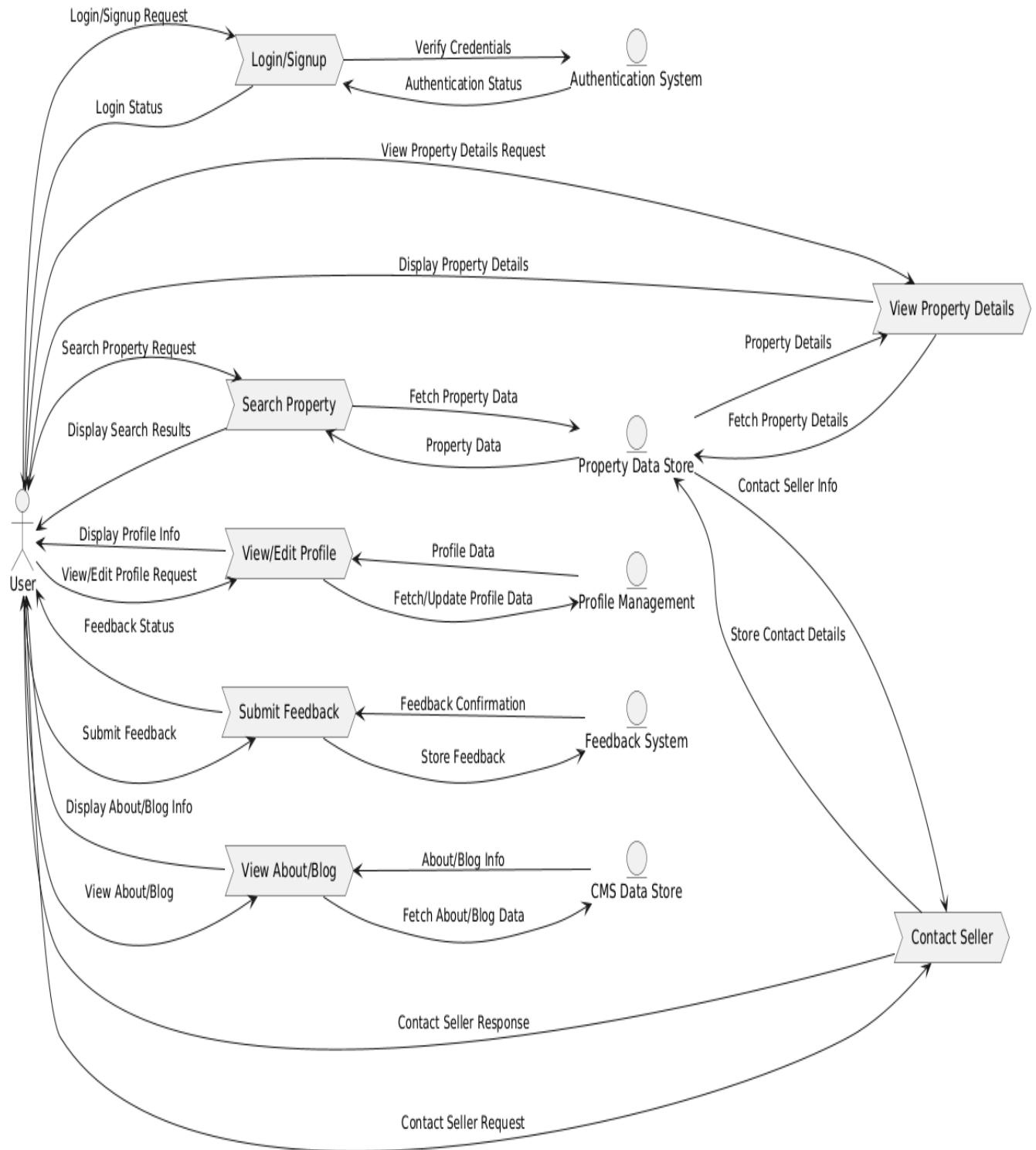




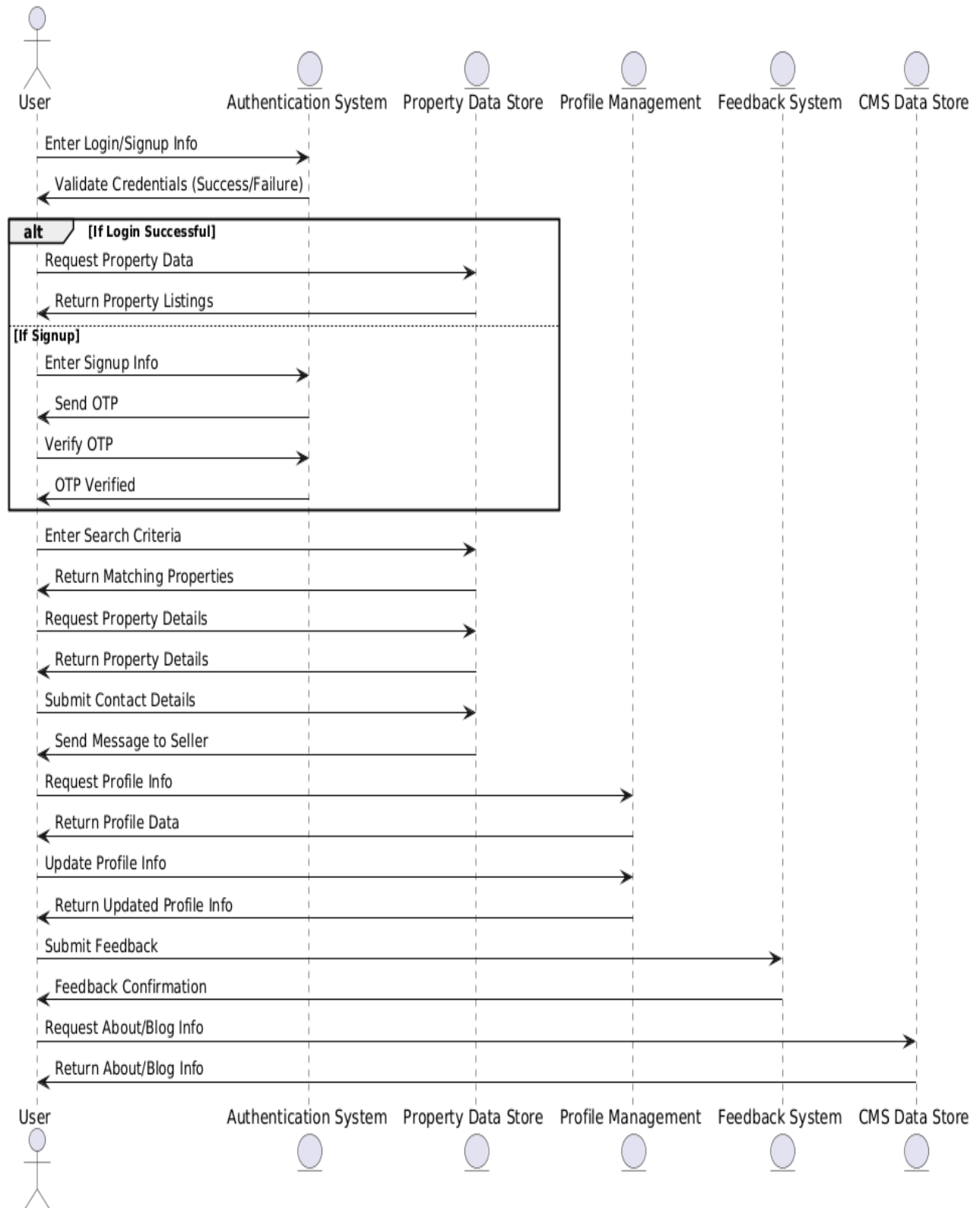
UML Diagram :



DFD:

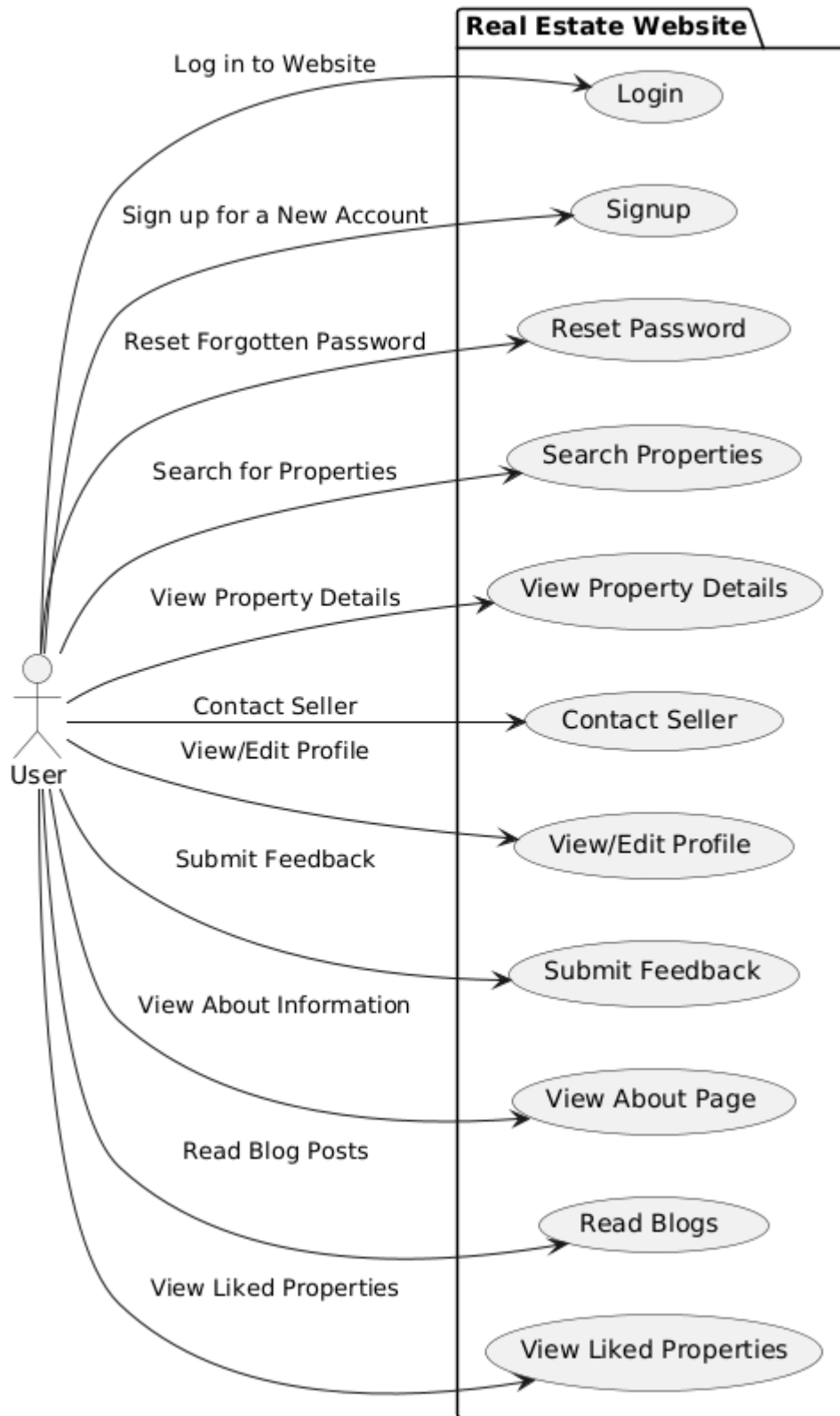


Sequence Diagram:

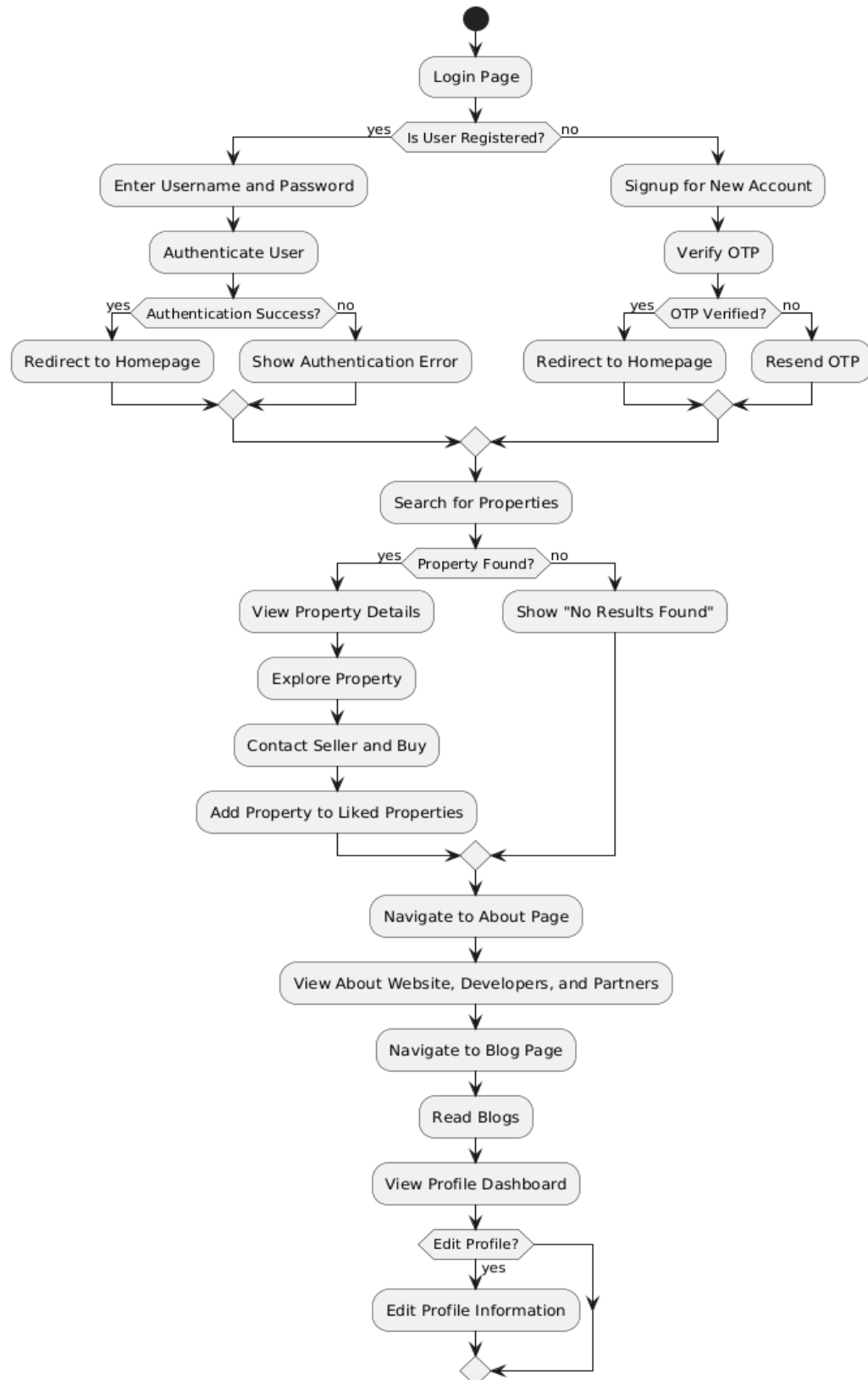


Use Case:

Use Case Diagram



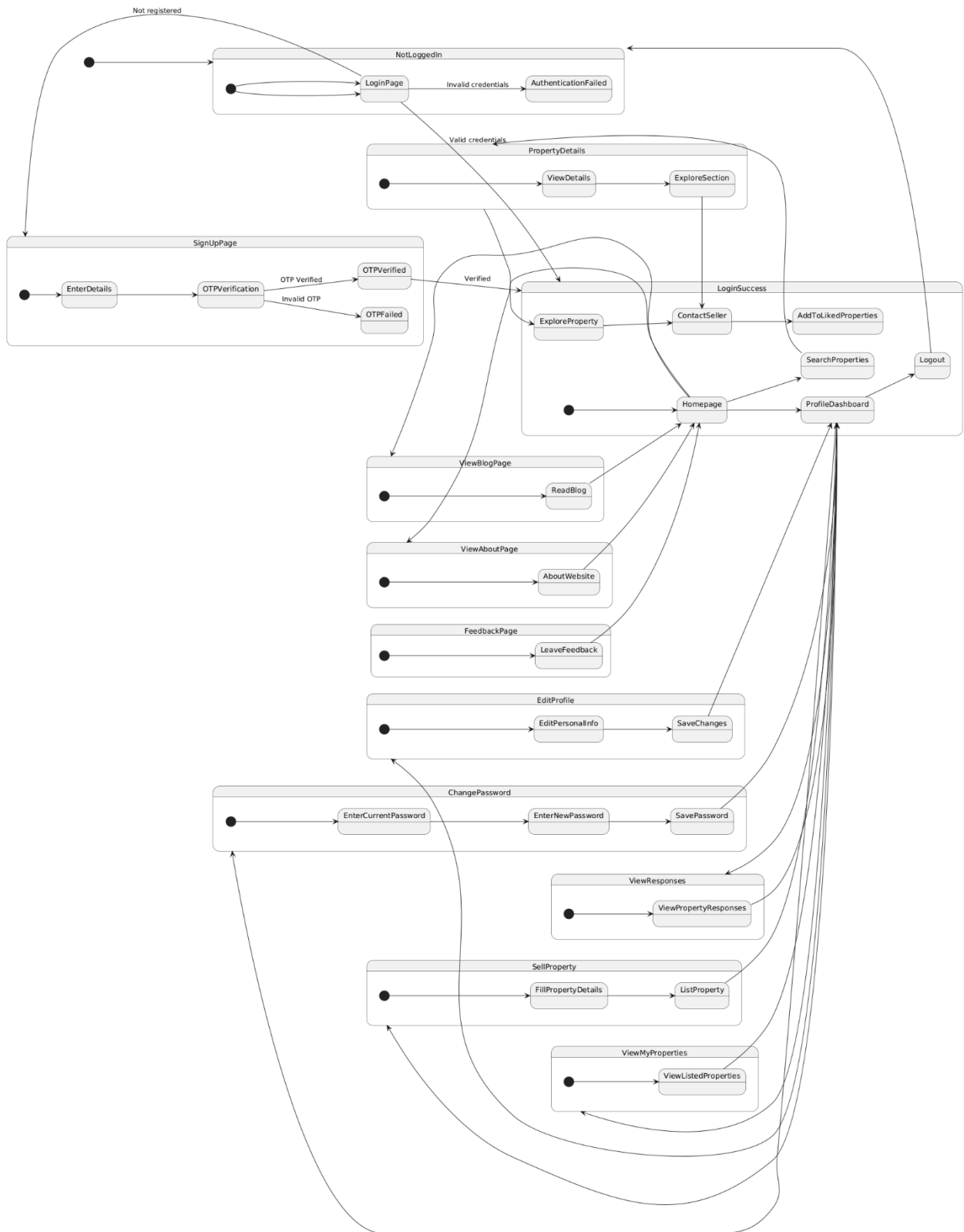
Activity Diagram



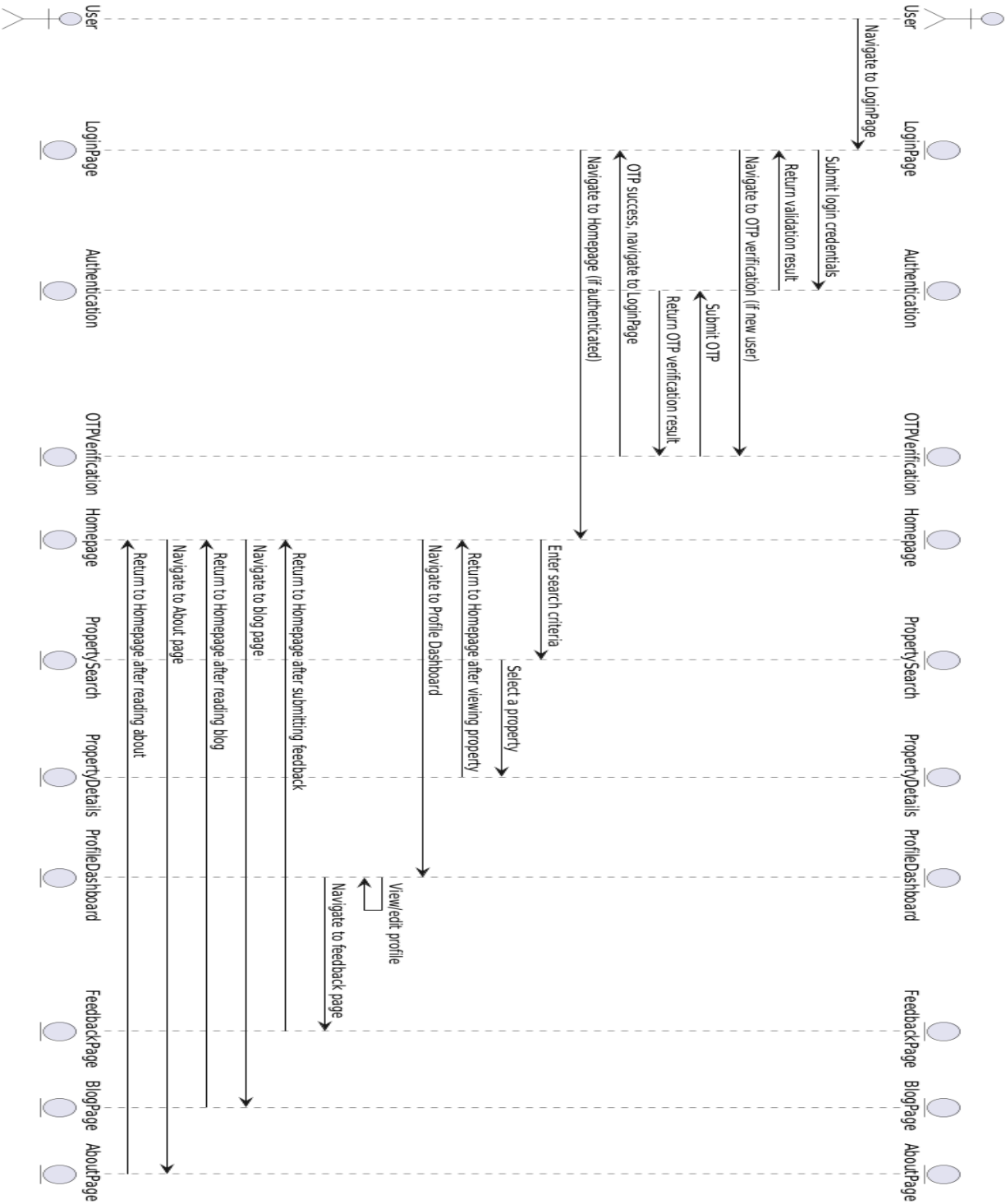


State Diagram:

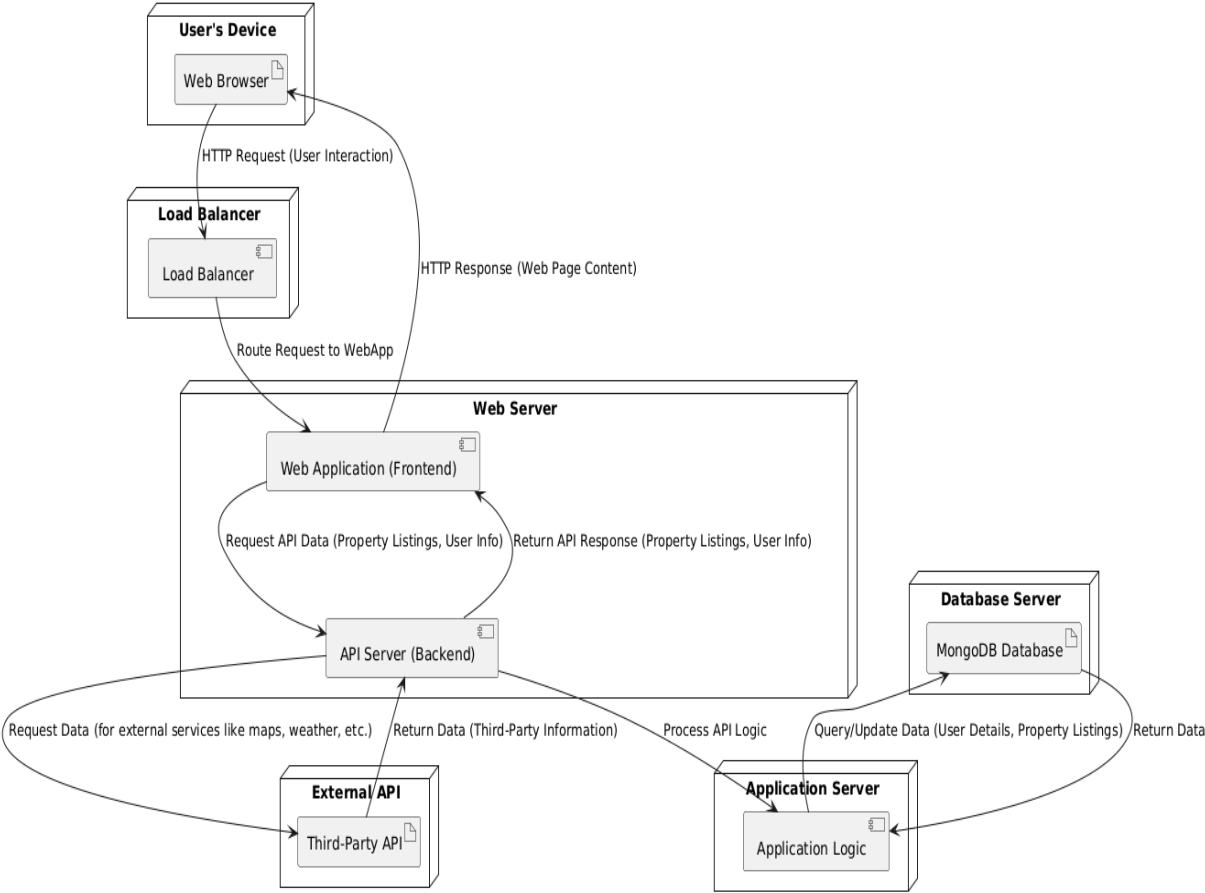
State Diagram



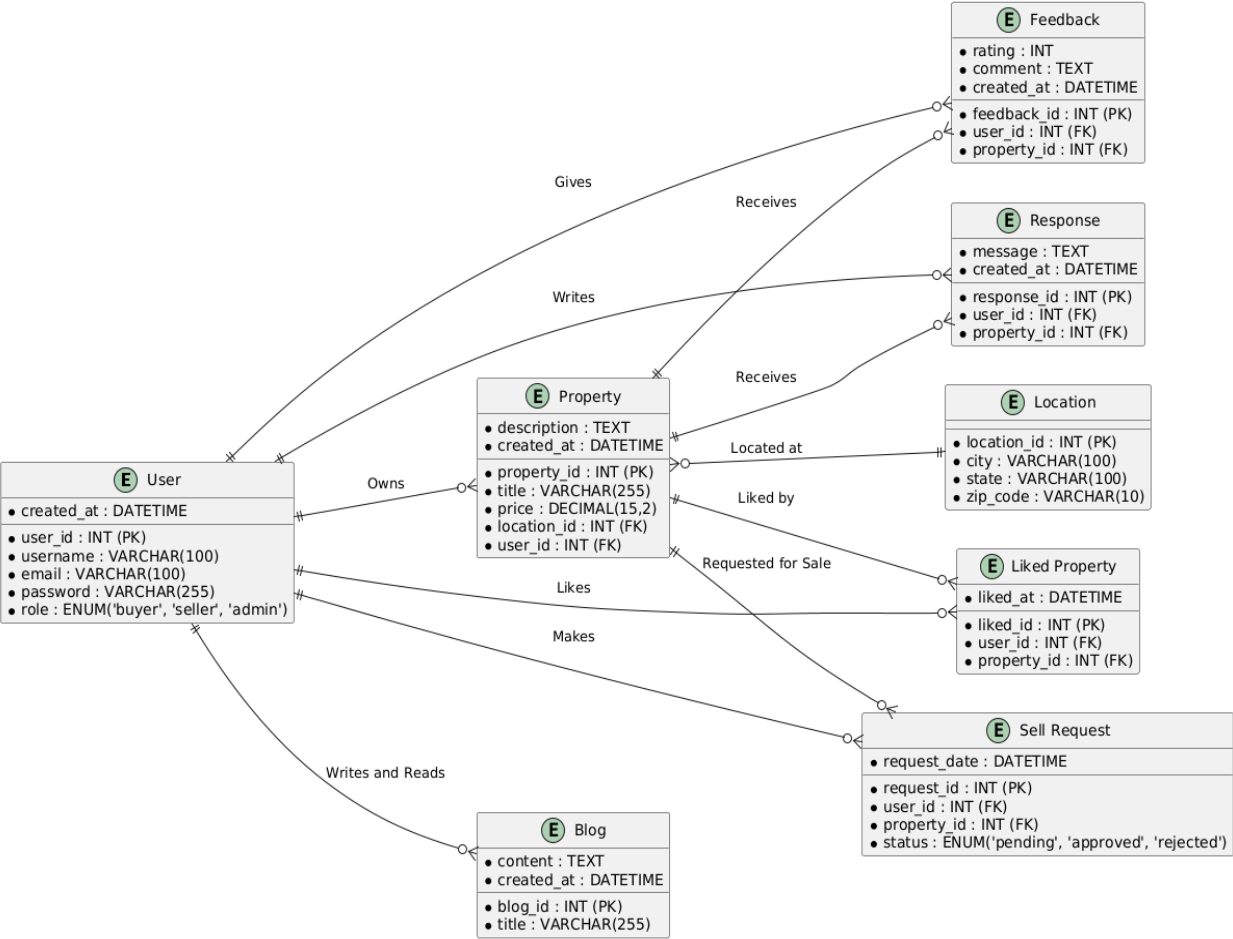
Communication Diagram:



Deployment Diagram:



E-R diagram



Testing Module

1. Functional Testing

This testing ensures that all functionalities of the website work according to the requirements.

Key Areas to Test:

- Authentication System:
 - Verify login, signup, OTP verification, reset password, and logout functionalities.
 - Ensure proper error messages are displayed for invalid inputs.
- Search Bar and Filters:
 - Test the search bar with valid, invalid, and edge-case inputs.
 - Validate filters (location, price range, availability, and size range) on the Buy page.
- Property Listing and Details:
 - Verify accurate property display with correct details.
 - Check the working of the "Contact Seller" form.
- Profile Dashboard:
 - Validate functionalities like Edit Profile, Change Password, Liked Properties, and Responses.
- CMS Pages and Navigation:
 - Ensure all CMS pages (About, Blog, Feedback) are accessible.
 - Test navigation through the navbar and footer links.

2. Usability Testing

This testing evaluates the user-friendliness and intuitiveness of the website.

Key Areas to Test:

- User Interface (UI):
 - Check if pages are visually appealing and align with design standards.

- Verify responsiveness across devices (desktop, tablet, mobile).
- Navigation:
 - Ensure navigation is intuitive, and users can easily find what they need.
 - Validate the breadcrumb trail, if implemented.
- Forms:
 - Test all forms for clarity of input fields, error messages, and button functionality.

3. Performance Testing

This testing ensures the website performs well under expected and peak loads.

Key Areas to Test:

- Load Testing:
 - Test how the website handles concurrent users (e.g., 50, 100, or more).
 - Validate page loading speed and search response times.
- Stress Testing:
 - Test the website under extreme traffic conditions to identify breaking points.
- Database Performance:
 - Evaluate the speed of database queries for property listings, searches, and user actions.

4. Security Testing

This testing ensures that the website is secure from threats and vulnerabilities.

Key Areas to Test:

- Authentication and Authorization:
 - Test for strong password requirements, password encryption, and secure OTP handling.
 - Ensure restricted access for unauthorized users (e.g., accessing the admin panel).

- Data Protection:
 - Validate secure transmission of sensitive data using HTTPS.
 - Check for vulnerabilities like SQL injection, cross-site scripting (XSS), and cross-site request forgery (CSRF).
- Session Management:
 - Verify session timeout and secure storage of session cookies.

5. Compatibility Testing

This testing ensures the website works seamlessly across different platforms, browsers, and devices.

Key Areas to Test:

- Browser Compatibility:
 - Test on major browsers like Google Chrome, Mozilla Firefox, Safari, and Microsoft Edge.
- Device Compatibility:
 - Test on various devices (desktop, tablet, and smartphones) with different resolutions.
- Operating System Compatibility:
 - Verify functionality on Windows, macOS, Android, and iOS.

6. Accessibility Testing

This testing ensures the website is usable for people with disabilities.

Key Areas to Test:

- Screen Readers:
 - Test the website with screen readers like NVDA or JAWS.
- Keyboard Navigation:
 - Verify that users can navigate using the keyboard alone.
- Color Contrast:

- Check the contrast ratio for text and background for readability.

7. Database Testing

This testing ensures data integrity, consistency, and proper CRUD operations.

Key Areas to Test:

- Data Validation:
 - Validate data is correctly inserted, updated, and deleted in the database.
- Foreign Key Constraints:
 - Ensure relationships between tables (e.g., user and property) are maintained.
- Backup and Recovery:
 - Verify proper database backup and restoration processes.

8. Regression Testing

This testing ensures new updates do not break existing functionalities.

Key Areas to Test:

- After Bug Fixes:
 - Test all related functionalities to ensure bugs are fixed without affecting other areas.
- Post Updates:
 - Re-test critical workflows like authentication, property search, and filter functionalities after updates.

9. API Testing

If APIs are used (e.g., for authentication or property data fetching), they need thorough testing.

Key Areas to Test:

- API Response:

- Verify status codes (200, 404, 500) and response times.
- Payload Validation:
 - Ensure APIs handle valid, invalid, and edge-case inputs gracefully

Performance of the Project Developed

1. Page Load Time

- Optimized Target:
 - Homepage: < 3 seconds.
 - Other pages: < 4 seconds.
- Measures Taken:
 - Implemented lazy loading for images and components.
 - Minified CSS, JavaScript, and HTML files.
 - Used caching strategies (e.g., browser caching and server-side caching).
 - Leveraged Content Delivery Network (CDN) for faster delivery of assets.

2. Scalability

- Capacity:
 - Handles concurrent users ranging from 100 to 1,000 with minimal degradation in performance.
- Testing and Results:
 - Stress Testing: Conducted to determine the maximum load the system can handle without crashing.
 - Load Testing: Simulated realistic traffic to ensure smooth functionality under peak load conditions.

3. Database Performance

- Optimized Queries:
 - Indexed frequently queried fields like user_id , property_id, and email.
 - Avoided N+1 query issues by using joins and batch processing.

- Response Times:
 - CRUD operations complete in < 300ms under average load.
- Scalability:
 - Database is horizontally scalable (sharding) to accommodate growing data and traffic.

4. Search and Filters

- Performance:
 - Search results are delivered in under 1 second with applied filters.
- Implementation:
 - Server-side filtering to offload computation from the frontend.
 - Used database optimization techniques, such as full-text search and indexed queries.

5. API Performance

- Latency:
 - API response time is < 200ms under normal conditions.
- Throughput:
 - API supports 1,000 requests per second during peak hours.
- Optimizations:
 - RESTful API endpoints are optimized for faster responses.
 - Implemented rate limiting to prevent abuse.

6. Responsive Design

- Device Compatibility:
 - Tested and optimized for mobile, tablet, and desktop views.

- Performance Metrics:
 - Consistent load times across devices (< 2.5 seconds on average).

7. Resource Utilization

- CPU and Memory:
 - CPU usage remains < 70% under peak load.
 - Memory usage is optimized with garbage collection and resource pooling.
- Server Load:
 - Distributed load across servers using load balancers.

9. User Experience

- Feedback:
 - Users report seamless navigation with minimal waiting times.
- Retention Metrics:
 - High user retention due to a responsive interface and fast search capabilities.

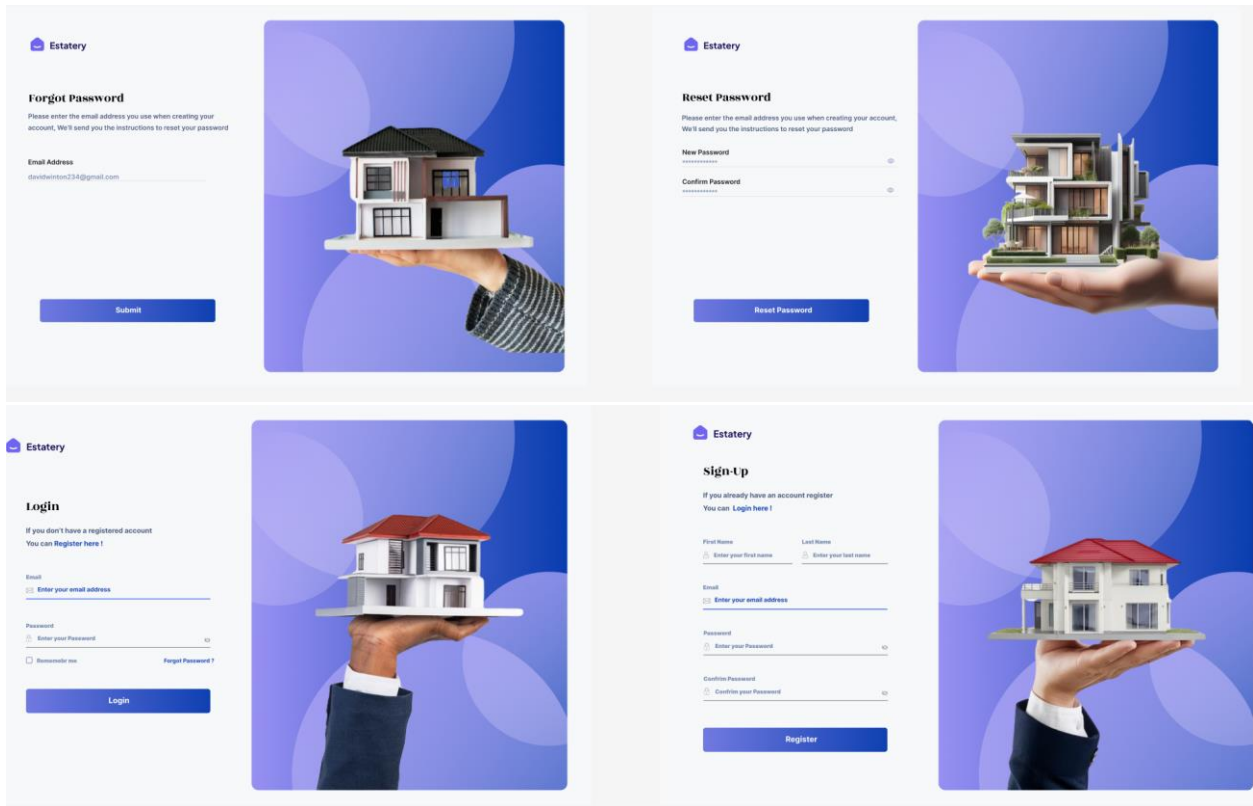
10. Performance Monitoring Tools

- Tools Used:
 - Google Lighthouse: For page performance audits.
 - New Relic: For application monitoring.
 - Apache JMeter: For load and stress testing.
 - Postman: For API testing and monitoring.

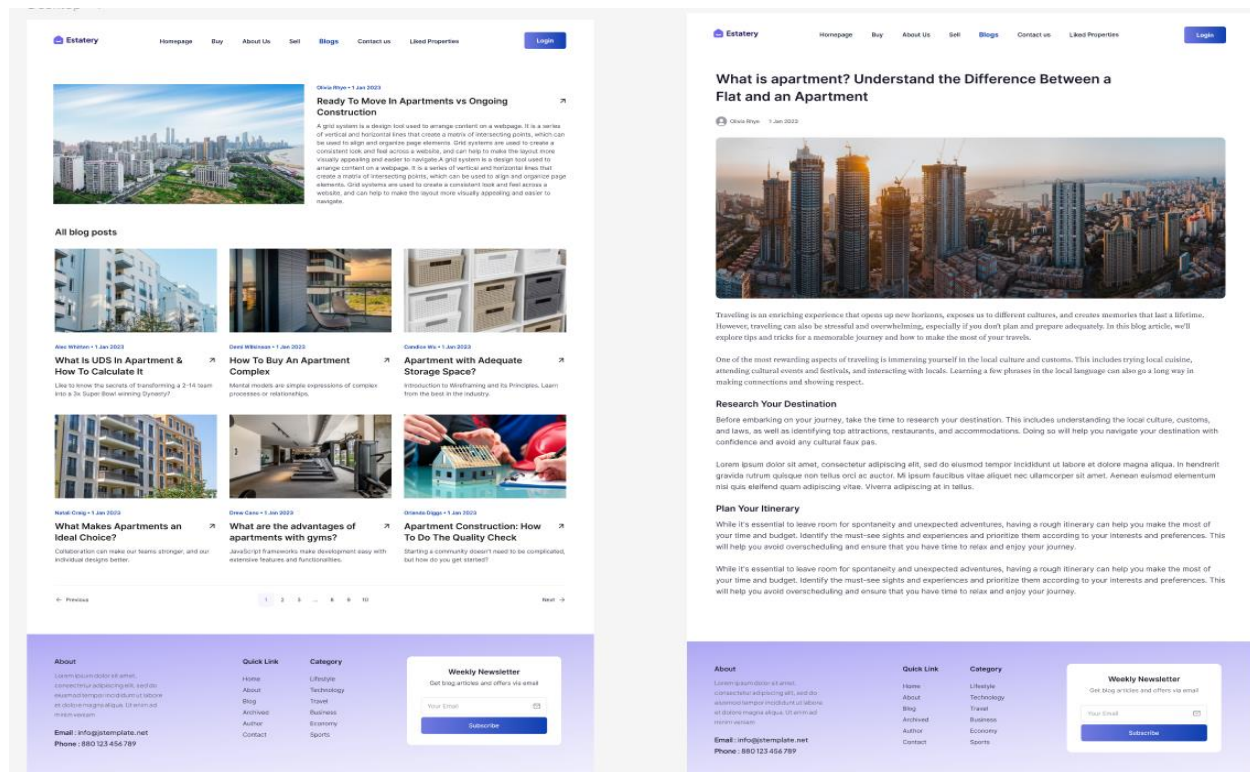
11. Areas of Improvement

- Search Speed:
 - Implement Elasticsearch for advanced search capabilities.
- Database Optimization:
 - Transition to a NoSQL database for unstructured data scalability.
- Further Caching:
 - Use Redis or Memcached for real-time data caching.

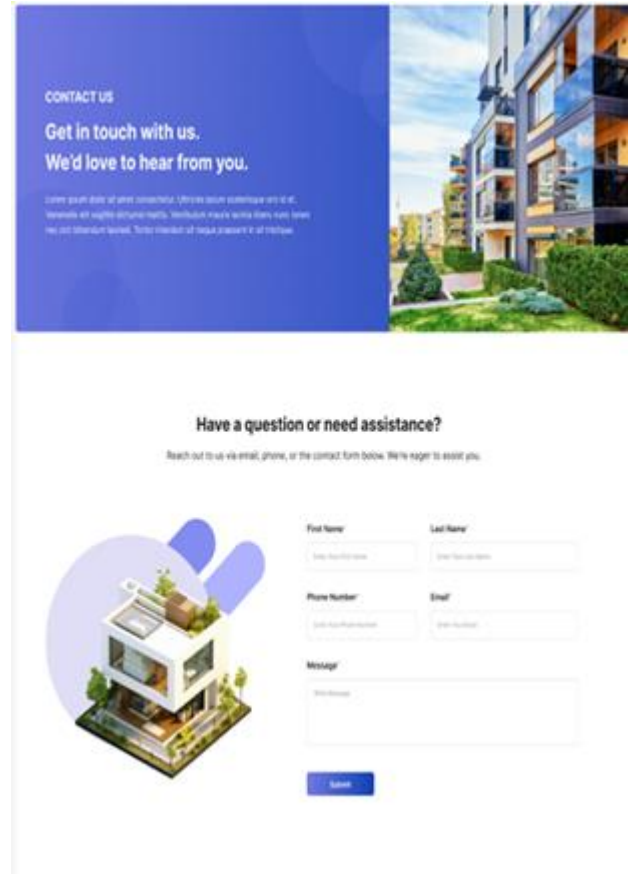
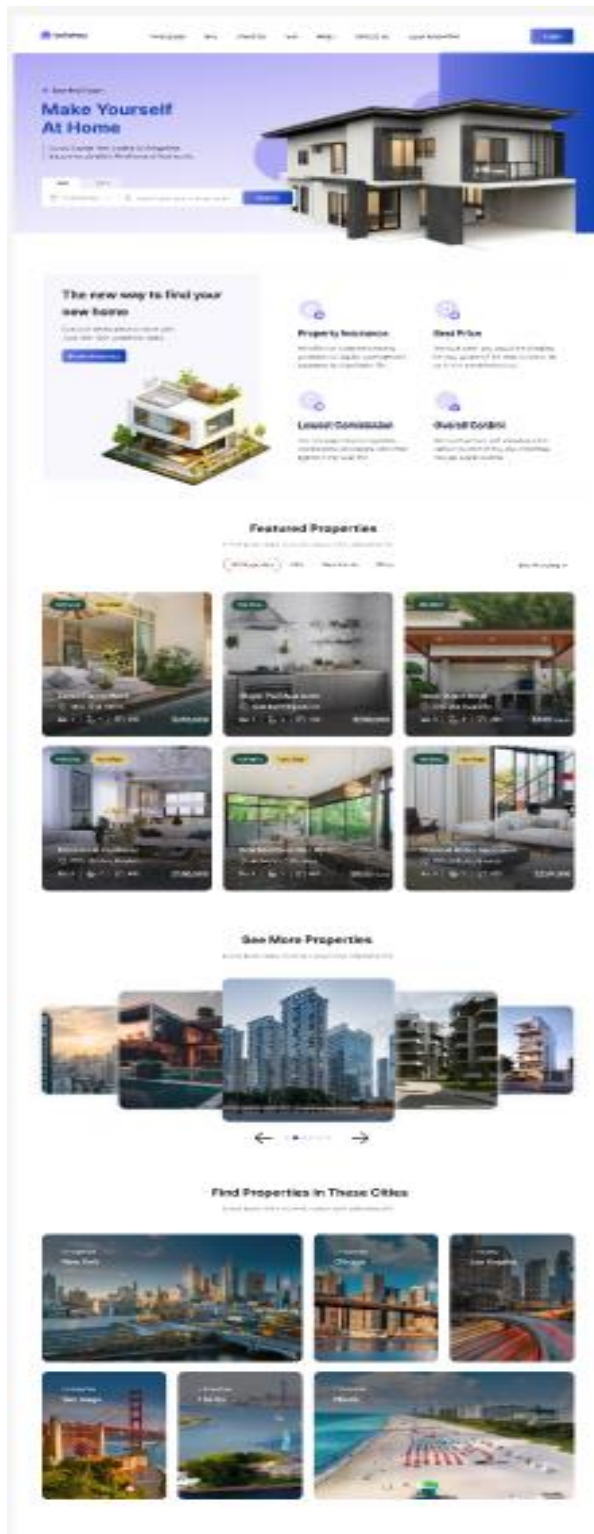
OUTPUT SCREEN



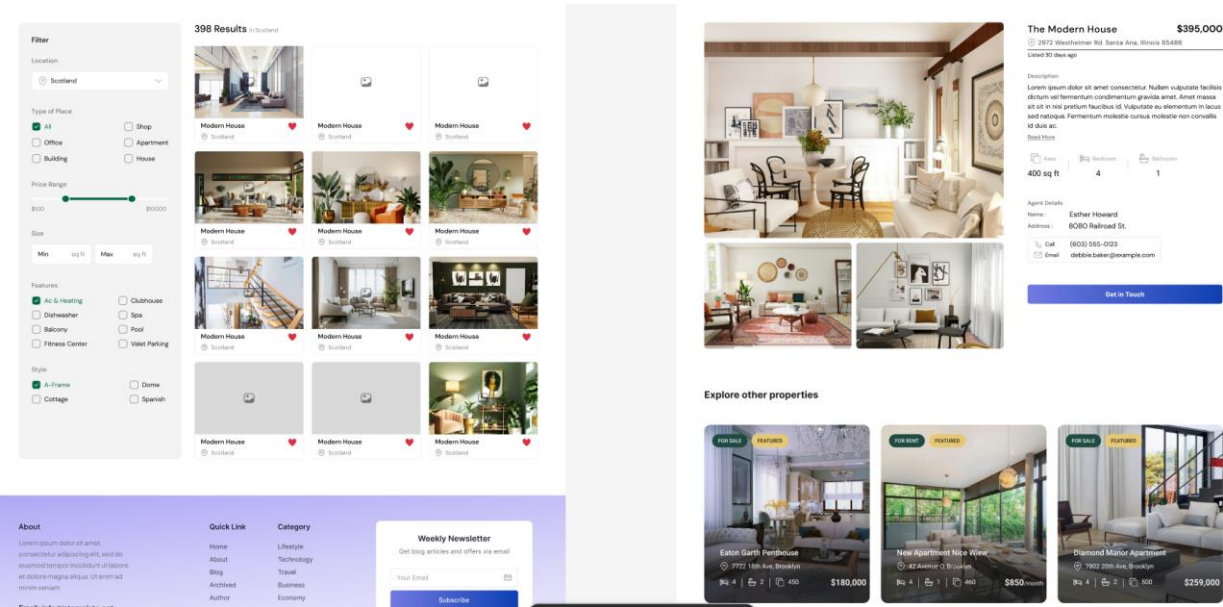
Blogs



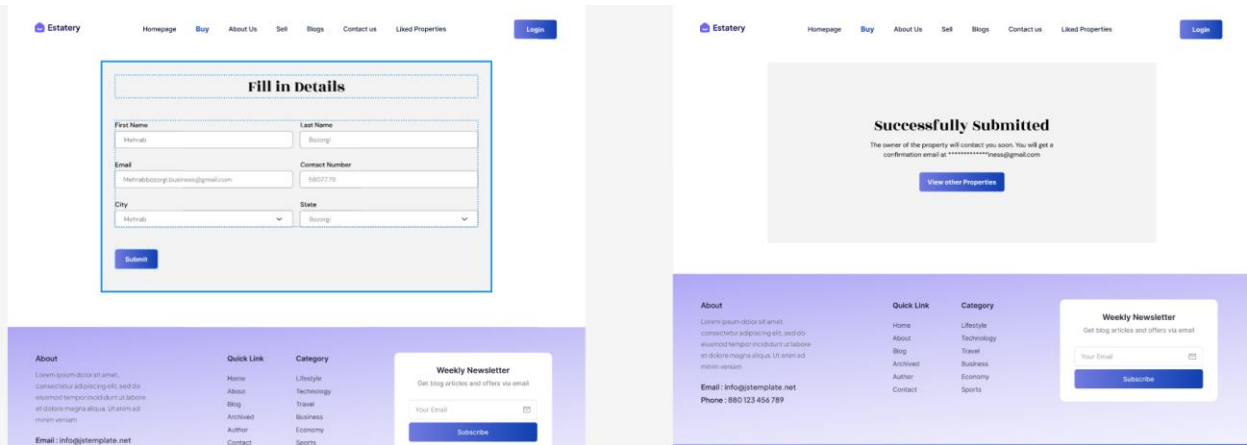
Home and Contact Screen



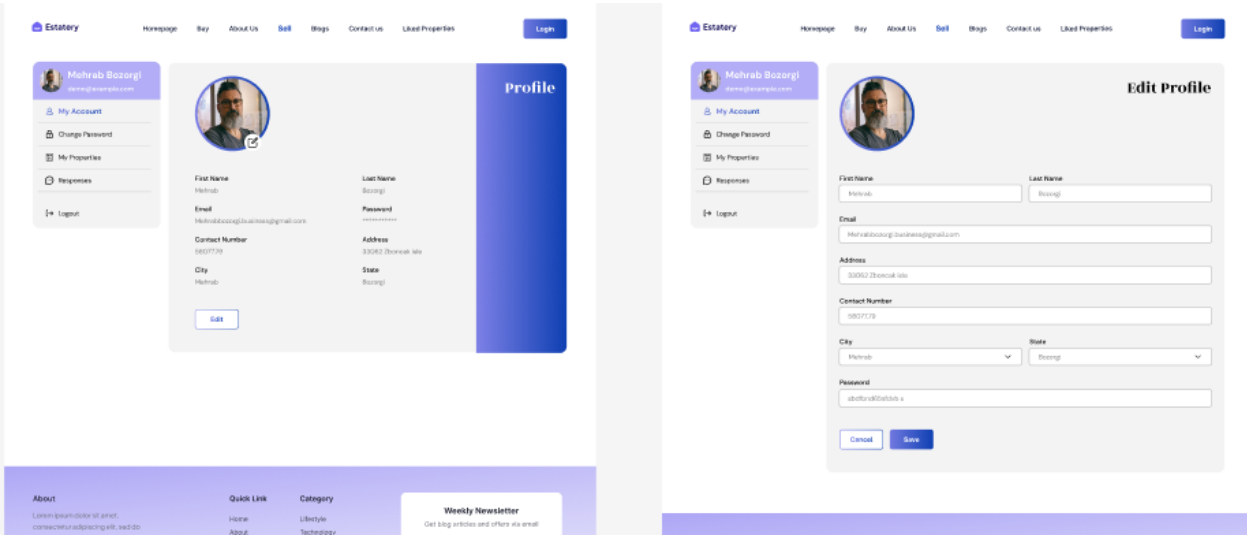
Buy and Detail Screen



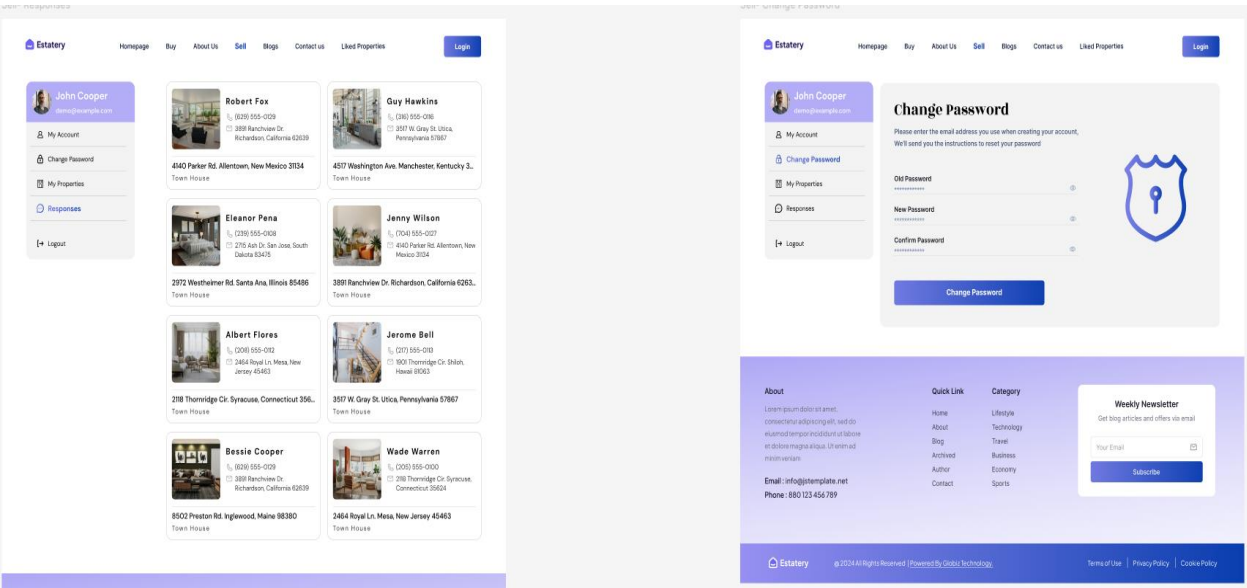
Contact seller




Profile



Response and Change Password Screen



Sell Page And My Property



John Cooper

johncooper@sample.com

My Account


Change Password

My Properties


Responses

Logout


Select Property Types




Modern Villa




Town House



Apartment



Family House



Other

If Other Please Specify

Eg. Room

Property Address

Address here

Area

No. of Bedrooms

No. of Bathrooms

No. of Floors

1

1

1

Description

Write description and amenities

Rent & Deposit

Price

Enter here

Enter here

Role

Availability

Owner

Enter here


Personal Information

Name

Contact Number

Eg. John Cooper

+638 111 1111



John Cooper

johncooper@sample.com

My Account


Change Password

My Properties

Responses


Logout

Recla...




398 Results

Scotland



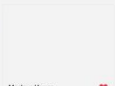
Modern House

Scotland




Modern House

Scotland




Modern House

Scotland




Modern House

Scotland




Modern House

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Modern House

Scotland




Modern House

Scotland




Modern House

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Modern House

Scotland




Modern House

Scotland



Modern House

Scotland



Modern House

Scotland

Next

→

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References

1. MERN Stack

- MongoDB, Express.js, React.js, and Node.js were utilized as the core technologies for building the application.
- Official documentation and guides:
 - MongoDB: <https://www.mongodb.com/docs/>
 - Express.js: <https://expressjs.com/>
 - React.js: <https://reactjs.org/>
 - Node.js: <https://nodejs.org/en/docs/>

2. Postman

- Used for API development, testing, and monitoring.
- Reference: <https://www.postman.com/>

3. MongoDB Compass

- GUI tool for interacting with and managing the MongoDB database.
- Reference: <https://www.mongodb.com/products/compass>

4. Redux

- Implemented for state management in the frontend.
- Reference: <https://redux.js.org/>

5. Validator.js

- Used for data validation on the server and frontend.
- Reference: <https://github.com/validatorjs/validator.js>

6. Mongoose

- An Object Data Modeling (ODM) library for MongoDB and Node.js, used for schema definition and interaction with the database.
- Reference: <https://mongoosejs.com/>

7. Next.js

- Framework for server-side rendering, static site generation, and routing in the React frontend.
- Reference: <https://nextjs.org/>

8. Frontend Design and Functionality

- Official documentation for React and Next.js guided the implementation of user interfaces, routing, and optimization strategies.

9. Community Forums and Tutorials

- Stack Overflow: <https://stackoverflow.com/>
- YouTube tutorials and blog posts on MERN stack and Next.js best practices.

10. Development Tools

- Visual Studio Code: For code editing.
- Reference: <https://code.visualstudio.com/>

