RentALL
TEAM 16
SOFTWARE DESIGN
CSCI-P465/565 (Software Engineering I)

Project Team

Yuhan Ke
Suma Priya Davuluri
Shubham Bhagat
Van Thawng

1. Introduction

The team will work in an agile environment and in the approach of component – oriented design to make sure that all the customer requirements will be met, and website purpose will be fulfilled.

1.1 System Description

The team plans to build a website that will ensure proper platform for communication and helps users to rent products they need and sellers to advertise and rent out their products. Fundamentally, the goal is to build a marketplace where people can rent products from any location for any given time and allow sellers to have an income from the products they plan to rent. To meet these requirements, the team will be working in the objective to provide users and sellers a seamless experience on the website through a responsive and user-friendly user interface. The team is aiming to project major features in the successive sprints over the period of next three months. After discussion within the team in all aspects, the tech stack of the application will primarily be Figma for UI Design, HTML, CSS, JavaScript, Bootstrap Framework, JSP, JSTL for the front end, and Java – JDBC, Servlet for the back end, and MySQL for the database.

1.2 Design Evolution

To ensure no customer is dissatisfied due to poor website experience, and to give them the best rental experience, the team is extremely focused on easing the user management and rental management on the website. If a customer can login, register, add items to listing and rent them without facing any technical difficulties, the goal of this project will primarily be met. The focus on these functionalities has helped the team to divide the project into components and thus enhanced the understanding from the aspect of the users.

1.2.1 Design Issues

Since this project is a user-friendly project, the core requirement is a seamless user interface experience, be it mobile or desktop, so we are using Bootstrap framework in front end. Apart from this, there are components of the project which depend upon the APIs by the Google and other third-party vendors. The team will be implementing the authorization and authentication services offered by Auth0, which also enables people to login through their social media accounts like Google.

1.2.3 Candidate Design Solutions

Auth0: The team will be using authorization services by Auth0 and to enable login through social media accounts, the application will also be registered with social media like Facebook and Google.

Google APIs: Since at some point of time during this project, there will be map components which enable users to navigate through the renter's location, the application will make use of the API offered by Google.

Search and Recommendation System: To give our users a seamless search experience based on their interests, the search and recommendation system will be implemented.

Instant Messaging System: For users to contact sellers, our website will offer them one-one chat messaging system.

1.2.4 Design Solution Rationale

The rationale behind using component-based design is that it helps the developers and the customers to have result-oriented approach. Each sprint during development is then viewed as a release. It also helps the developers to manage and maintain the code quality by re-using the components, which helps in reduction of bugs with every release.

1.3 Design Evolution

1.3.1 Methods

The team will work in an agile environment and will schedule and plan tasks with respect to a sprint. The sprint is set to be two weeks long and at the end of each sprint, there will be a small demo which will be like a release prototype.
The sprint-wise goals have been defined in the project plan document and the plan for the first week is to release user authentication, login, and registration. The team also aims to deliver the feature to enable the owners of the products to add to the renting listing.

1.3.2 Standards

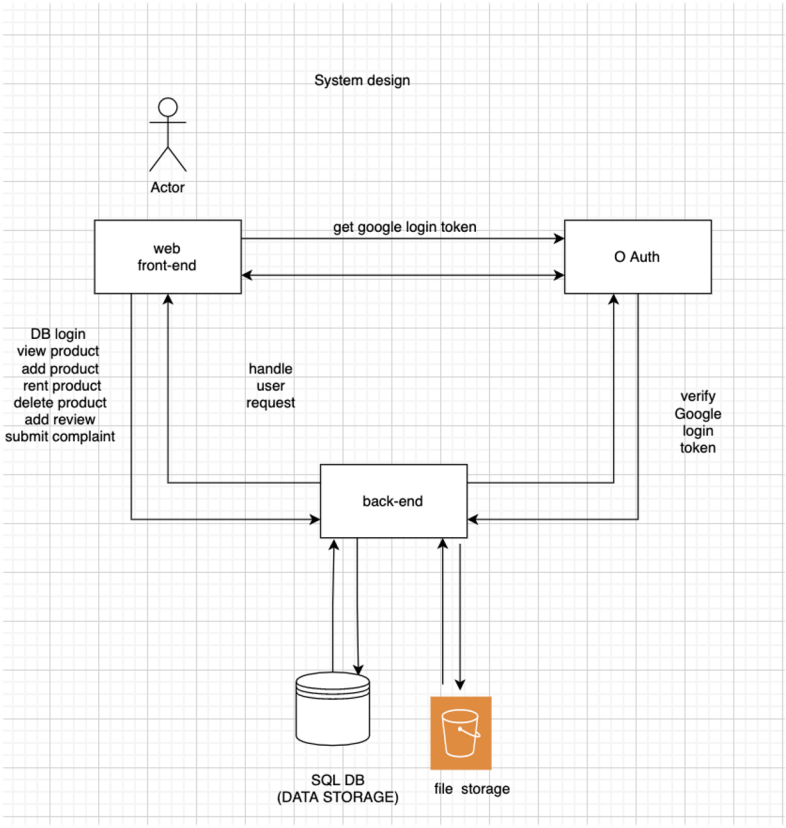
The team is determined to give users the best rental experience, by ensuring a seamless and responsive web layout, which is also user-friendly, and this is accomplished by implementing the front end using Bootstrap Framework.

1.3.3 Tools

UI Design: Figma
Front End: HTML, CSS, JavaScript, Bootstrap Framework, JSP, JSTL
Back End: Java – JDBC, Servlet
Database: MySQL
Authorization: Auth0, Google
Maps: Google Places API and Maps JavaScript API
Amazon Web Service S3 Bucket

2. System Architecture

2.1 System Design



All the users interact with the web application using the front-end built using html, CSS, JavaScript, bootstrap. The front-end is integrated with Google Maps API and web speech API for voice recognition.

Users can login to the website in two ways. First is to create a dedicated user account with the website and second is to login using google auth which is handled by OAuth.

To view the list of products available, users can go to the product section. To view the product details, users can click on any product. To rent any product, add new product, add reviews or submit a complaint , users need to be logged in.

After successful login, all the user interaction with the front end is sent to the backend to handle user requests. Session management will be done using session variables.

2.2 External Interfaces

1) Google Maps API for displaying product location on map
2) Geolocation API for getting list of states and their respective cities
3) 0Auth API for authentication using google account
4) web speech API for voice activated search
5) AWS S3 Bucket for image storage

3.Component Design

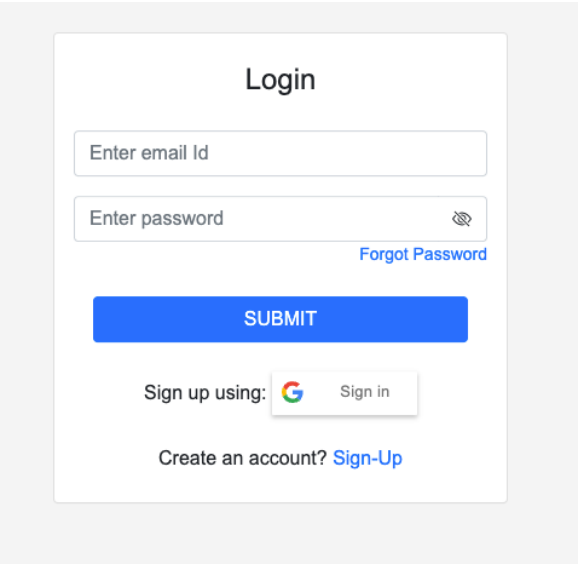
- **Component Name and Description**

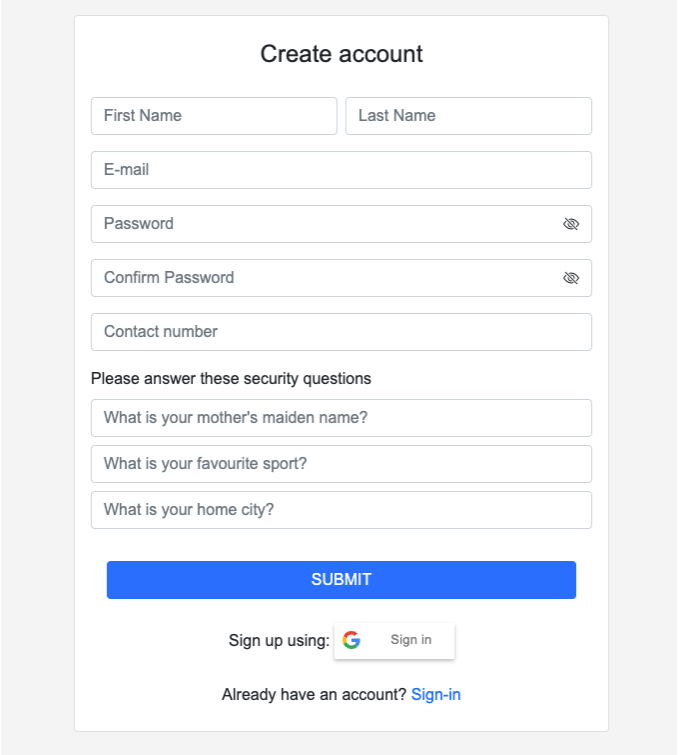
1) **Authentication component (Login and Registration):**
   Component consists of login and registration.
   In login part, first will be **login using OAuth**, the http request is sent to OAuth server and if verified, server responds with an access token which is sent to the backend. On the backend, this access token is used to verify the identity of the user, once the user is verified, they would be successfully logged in.
   Second, is **login using email id and password**. In this user is asked to enter his email id and password. The password is hashed and compared with the hashed password stored in the database. On successful authentication user is logged into the website.

   In sign up - Here the user would be creating the account first time, he is asked to enter details such as his name, contact, email id, password and would be answering 3 security questions. On backend, the password is hashed before storing into the database.

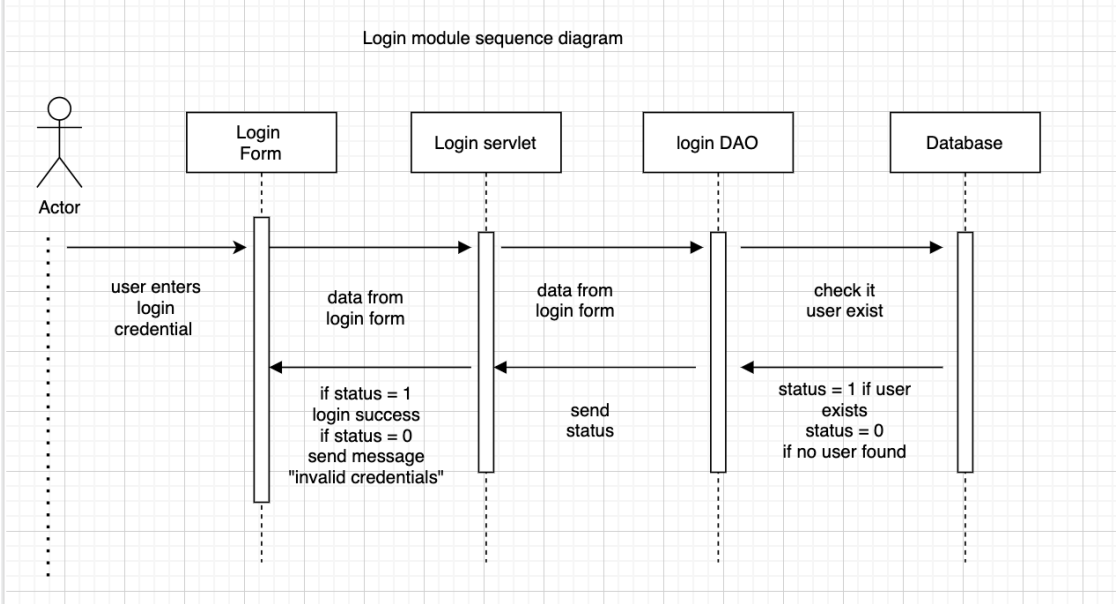
   Forgot password - the user can reset their password, the first step is to enter the users email id and answer 3 security questions which were asked during registration, after validating the user's input, the user will get rest code on their email id. The user will be asked to enter this reset code and type in the new password. If the reset code is verified to be correct, password is updated which will be shown on a prompt.

   Component UI:

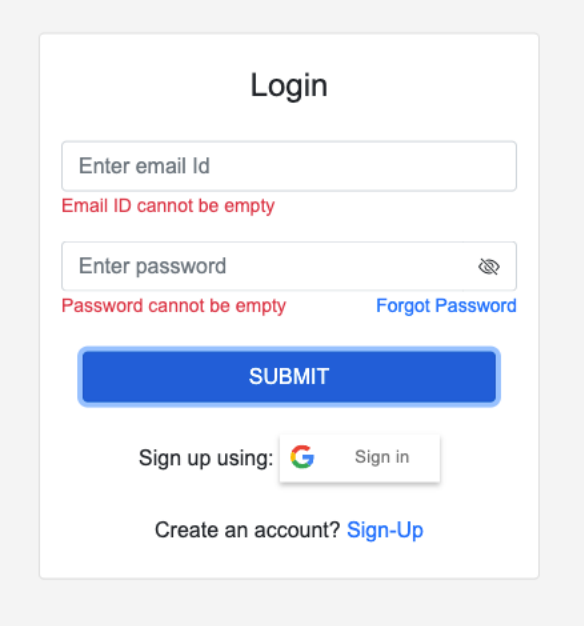


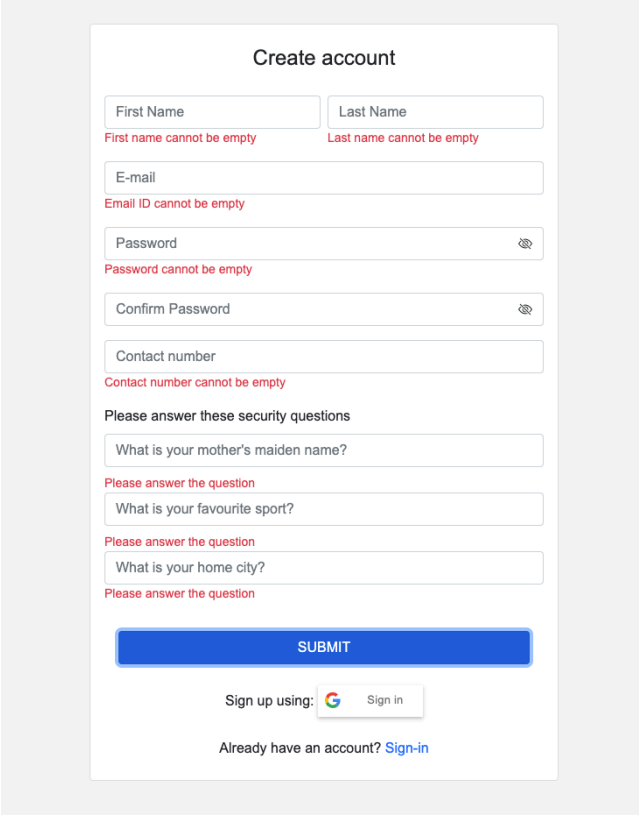


Component Interface:
Communicates with the Auth0 server using HTTP requests.



Component Error Handling:
JavaScript is used to validate the form on client-side. It checks whether user enters correct details in the form. On the server side, if login fails, the user is shown a prompt on front-end stating “Please enter valid login credentials”.





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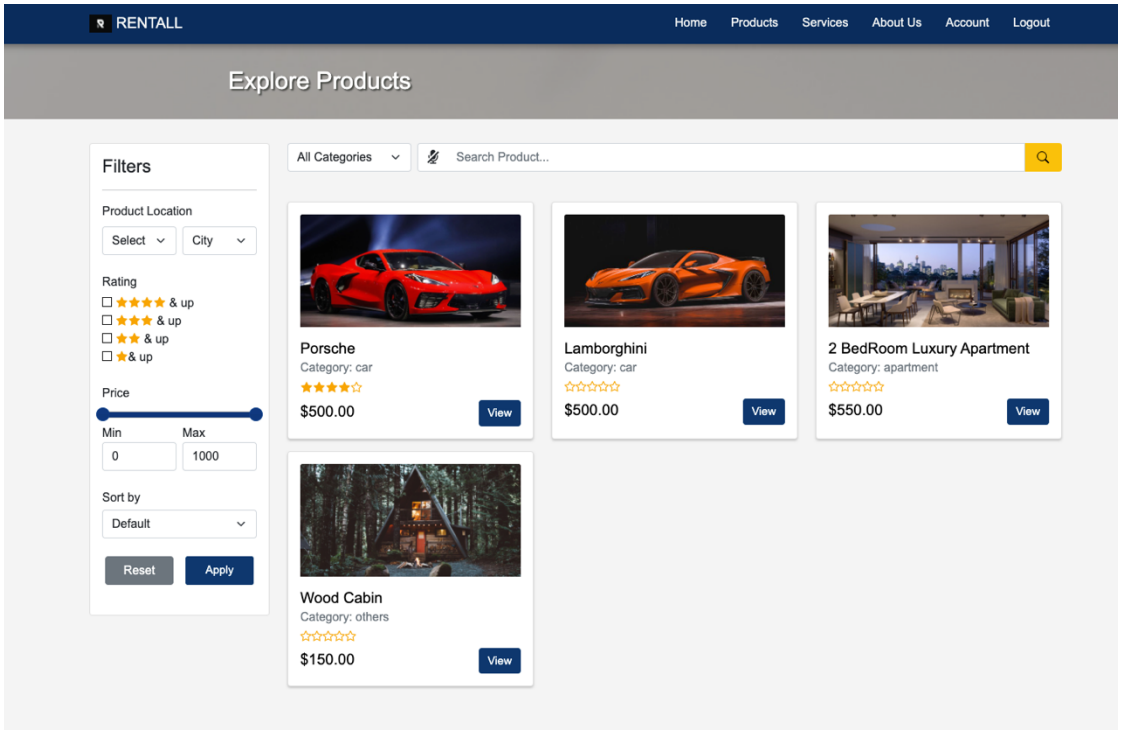
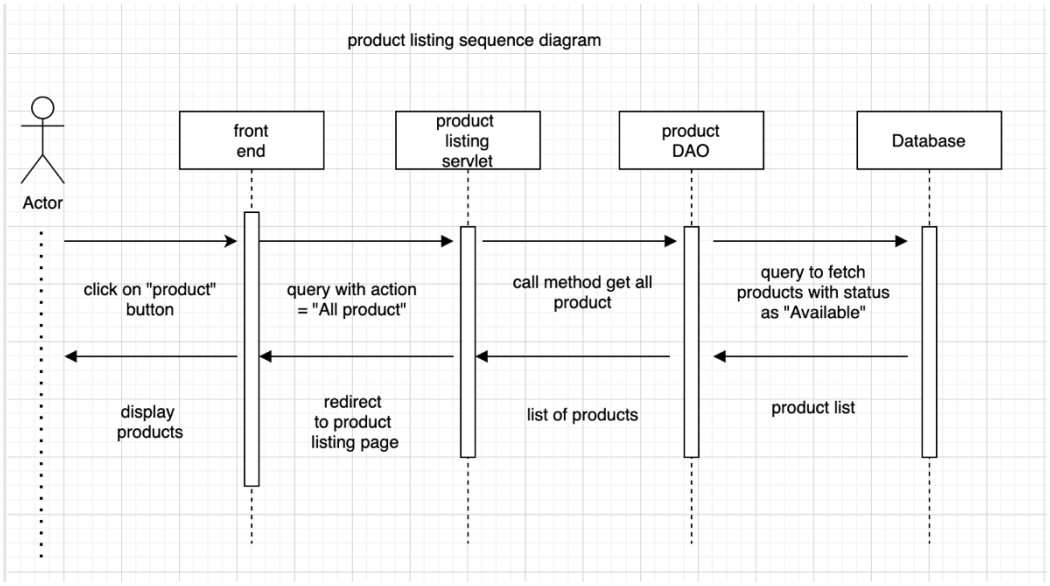
2) Product listing & Filtering:

Products which are approved by the admin are displayed to the user. Products can be **filtered** based on different criteria such as location, rating, and price. Also, if user has logged in. **Product recommendation** on previous rented products is shown.

Component UI:



Component Interface:



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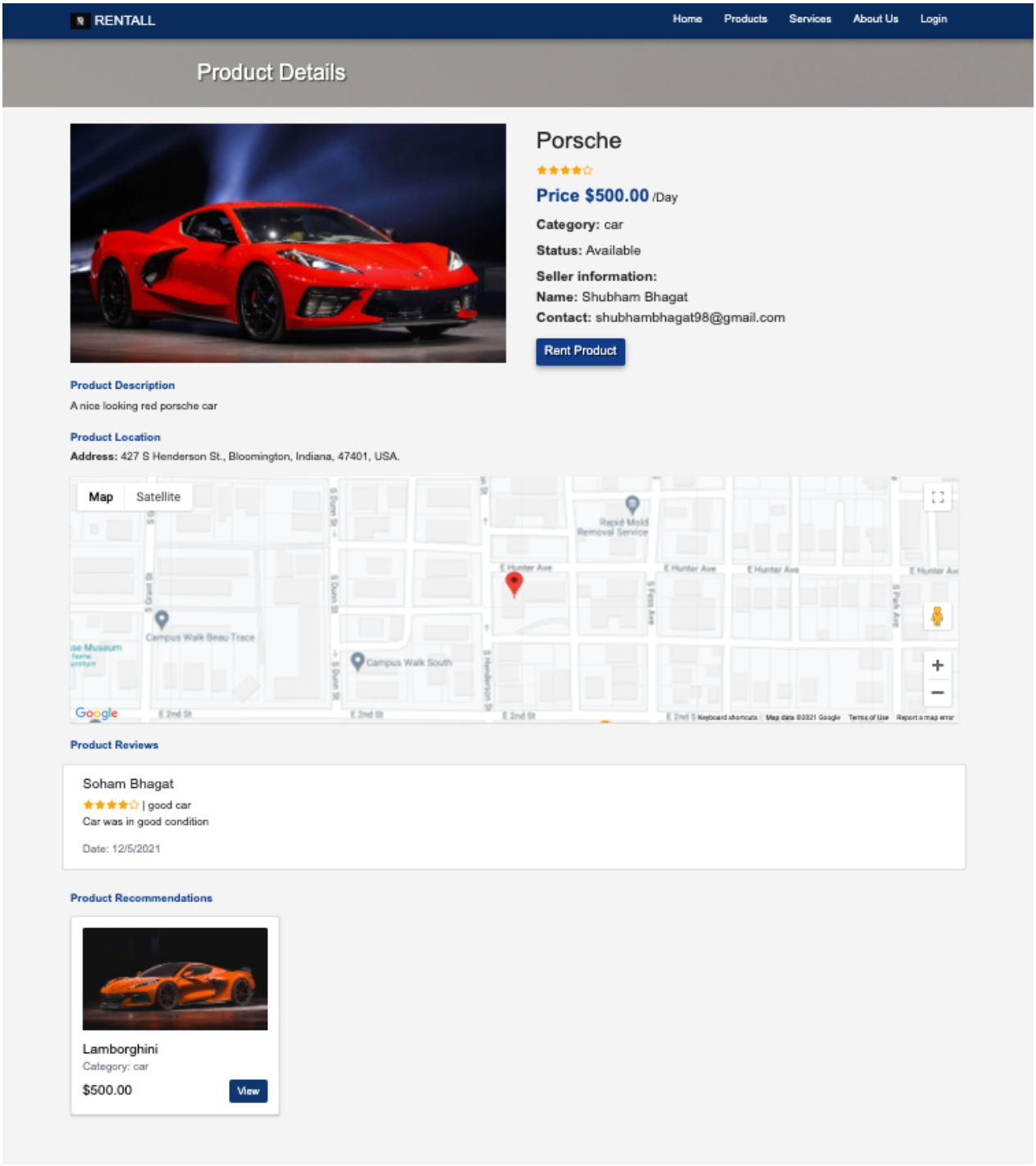
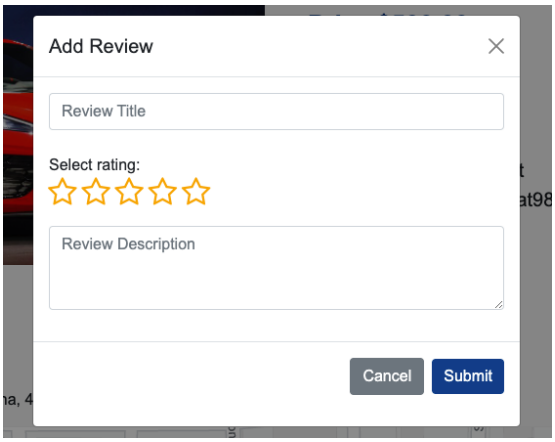
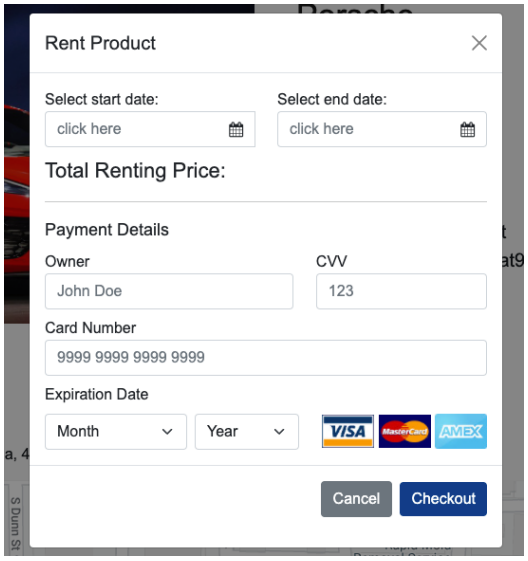
3) Product details:

This component will display all the details of the product such as product image, product title, description, price, seller's information, rating, reviews, location, and recommendation of the similar category products. On this page user can also add reviews, submit complaints, or rent a product.

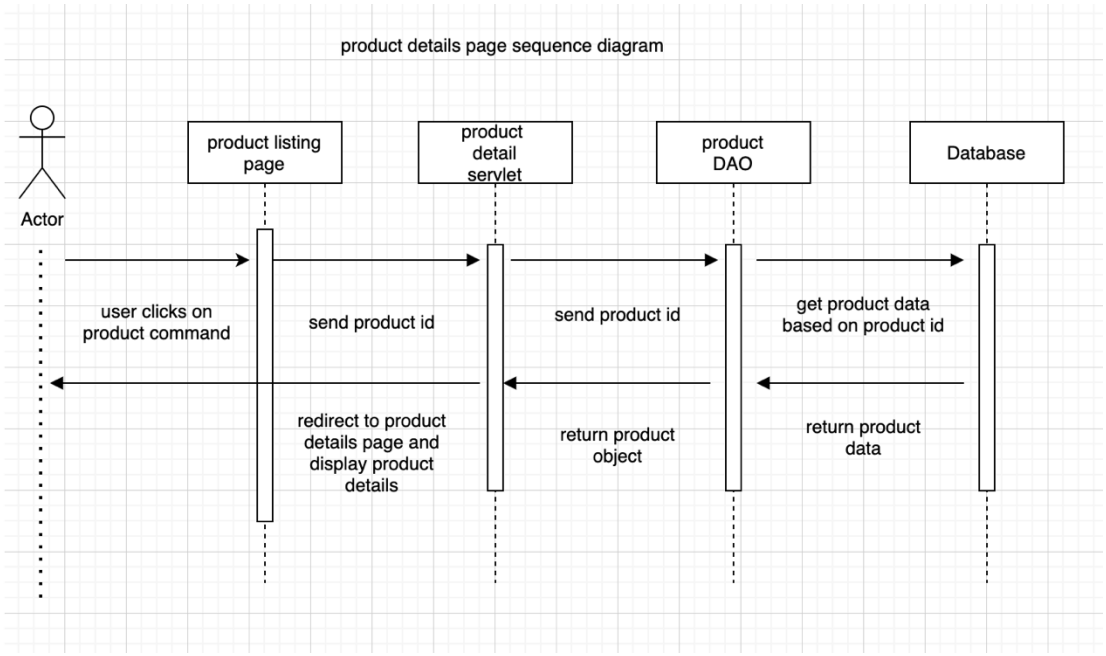
Component UI:







Component Interface:



Component Error Handling:

1) If user tries to rent a product without logging-in, a prompt will be shown with message “Please login first”.
2) If user enters incorrect details in rent form, the input fields are validated by client-side JavaScript code and accordingly an error message is shown.

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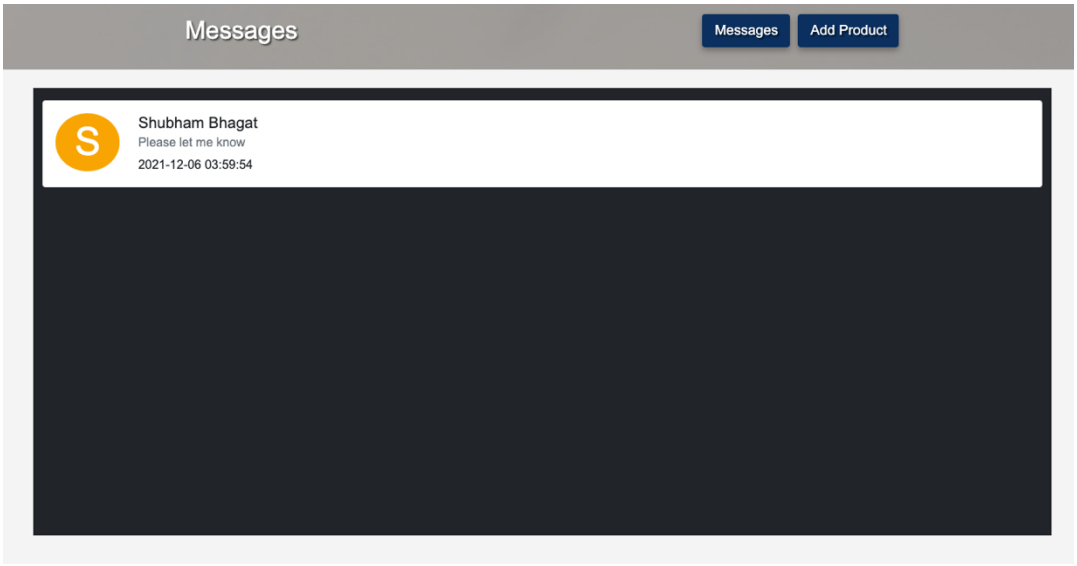
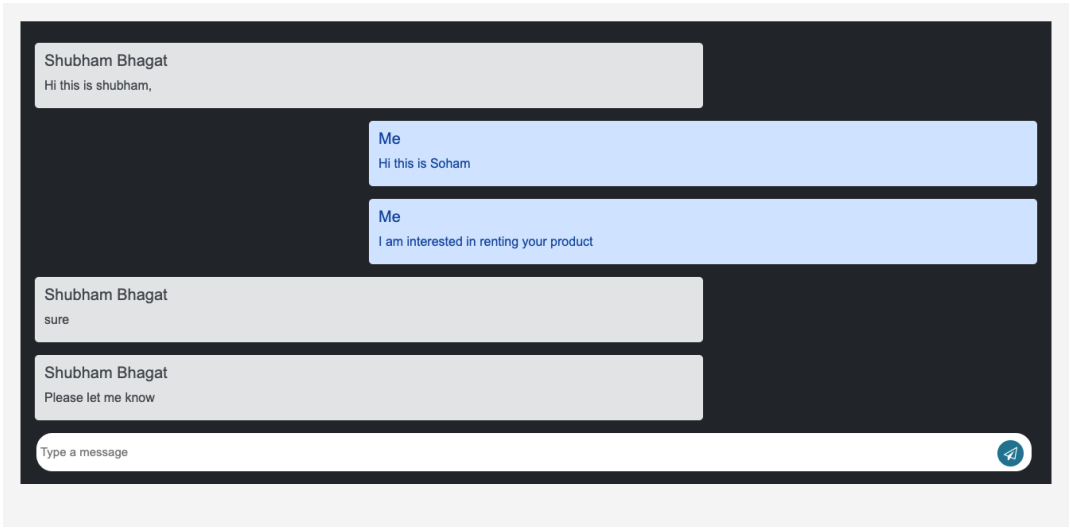
4) Chat messaging:

In this component, users can initiate chat with different sellers.

Component UI:





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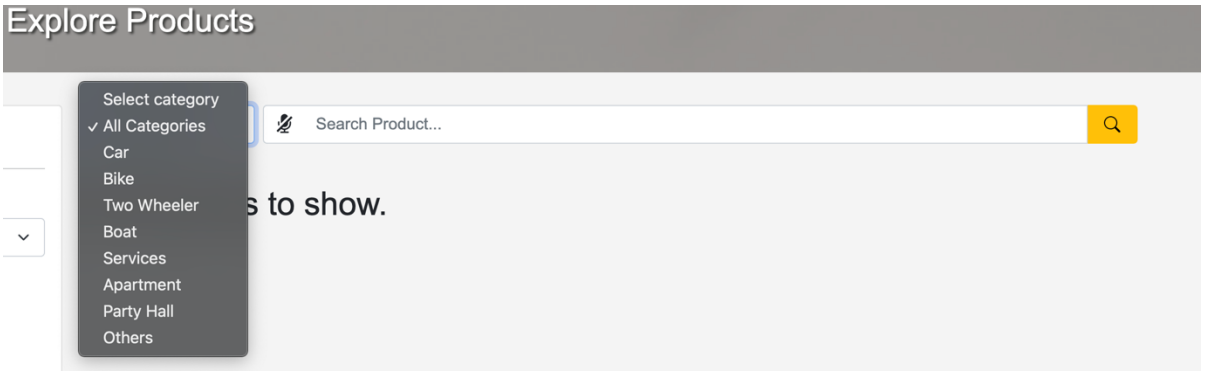
5) Product search:

User can enter the input as a **text** or select category from **drop down** menu or use **voice activated search**. **Voice activated search** is simple and has 3 commands, first is search, reset input, and stop recording.

Component UI:



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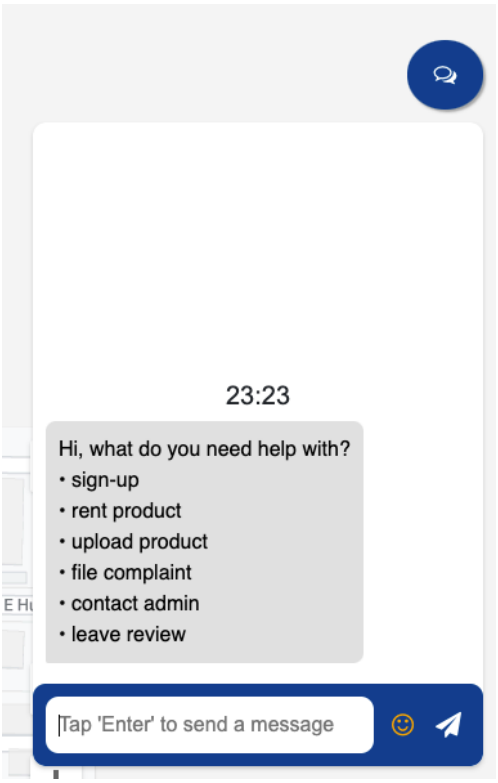
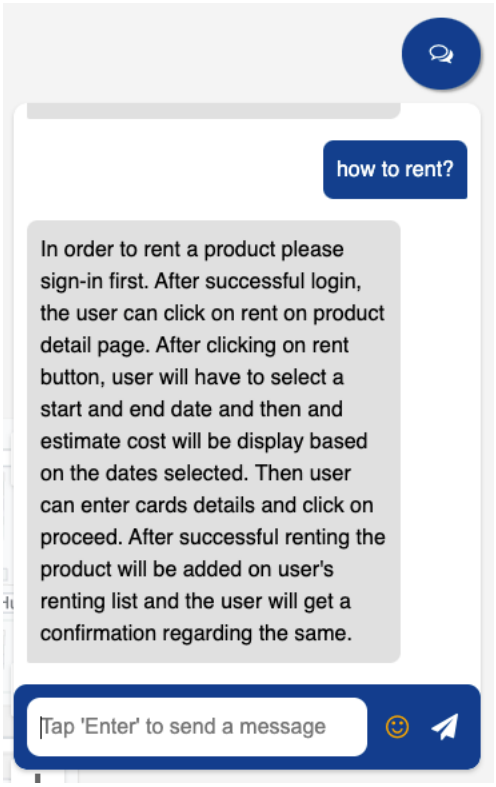
6) Chat bot:

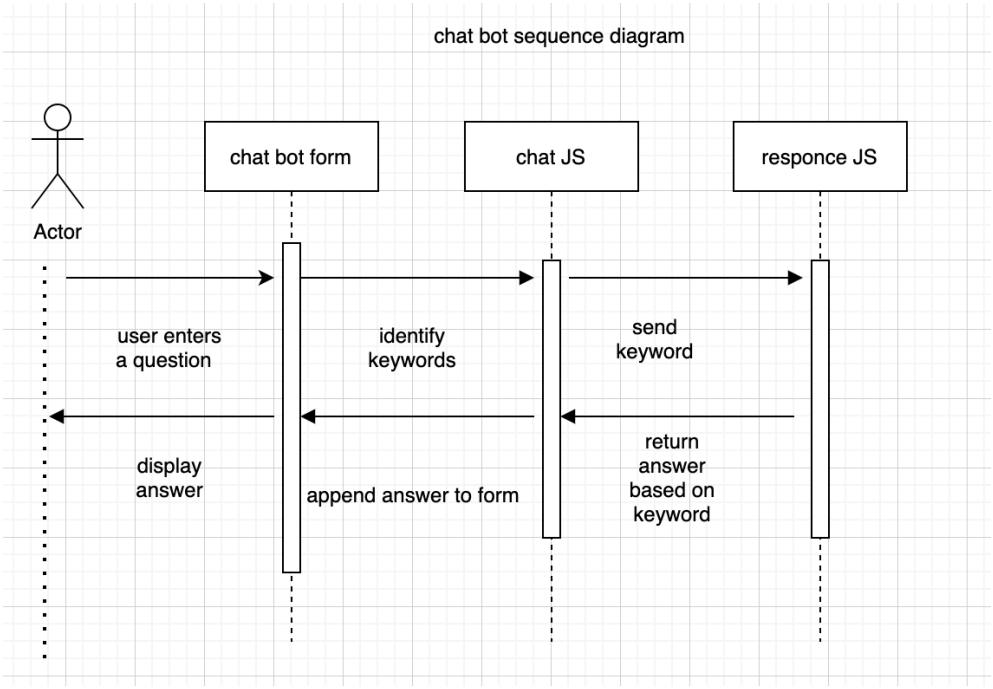
It acts as an assistant to the user for using the website. Users can ask different questions and chatbot can reply with appropriate answers.

Component UI:





Component Interface:



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7) Admin component:

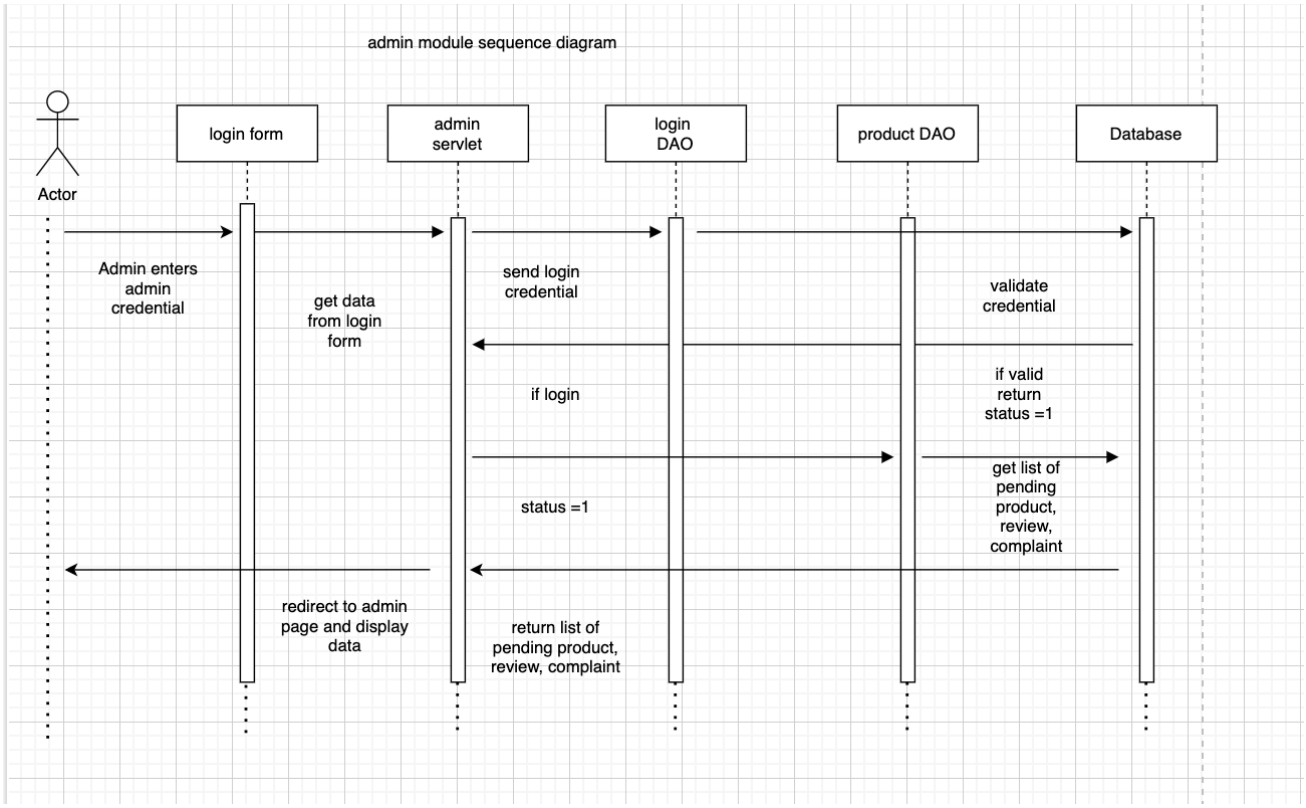
It is divided into 3 sub-components.

1) **Pending products** which displays the list of newly added products by user which are yet to be approved.

2) **Analytics:** It consists of 2 graphs, first graph displays count of rented products based on product categories, second graph displays count of rented products based on product location.

3) **Complaint board:** this displays all the complaints submitted by different users. Each complaint has information such as product image, product title, seller information, complaint description, the name of the user submitting the complaint and date of its submission.

Component Interface:

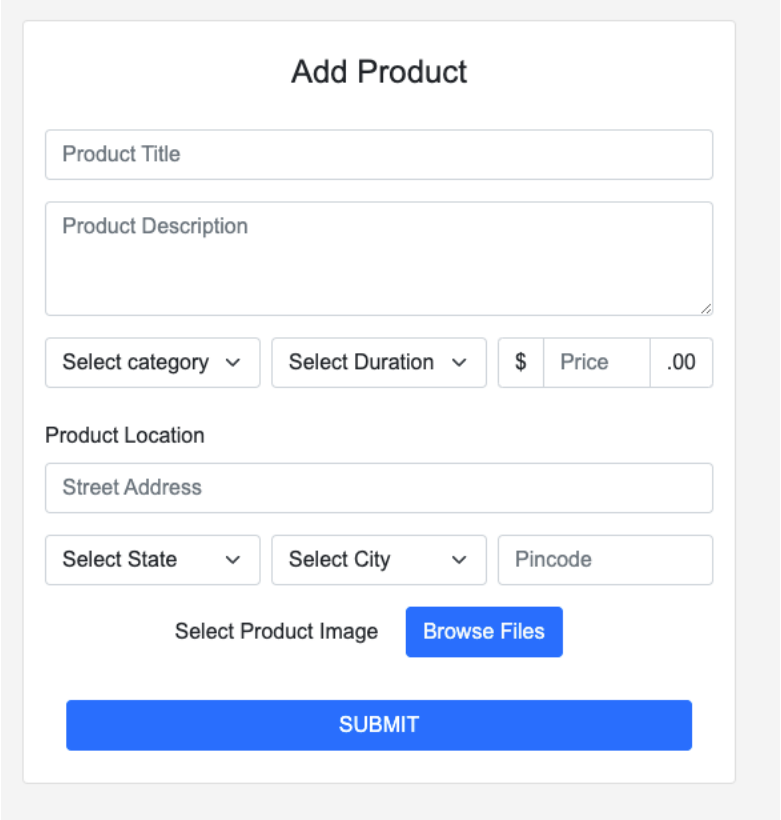


Implemented By: Shubham Bhagat, Yuhan ke, Suma Priya Davuluri

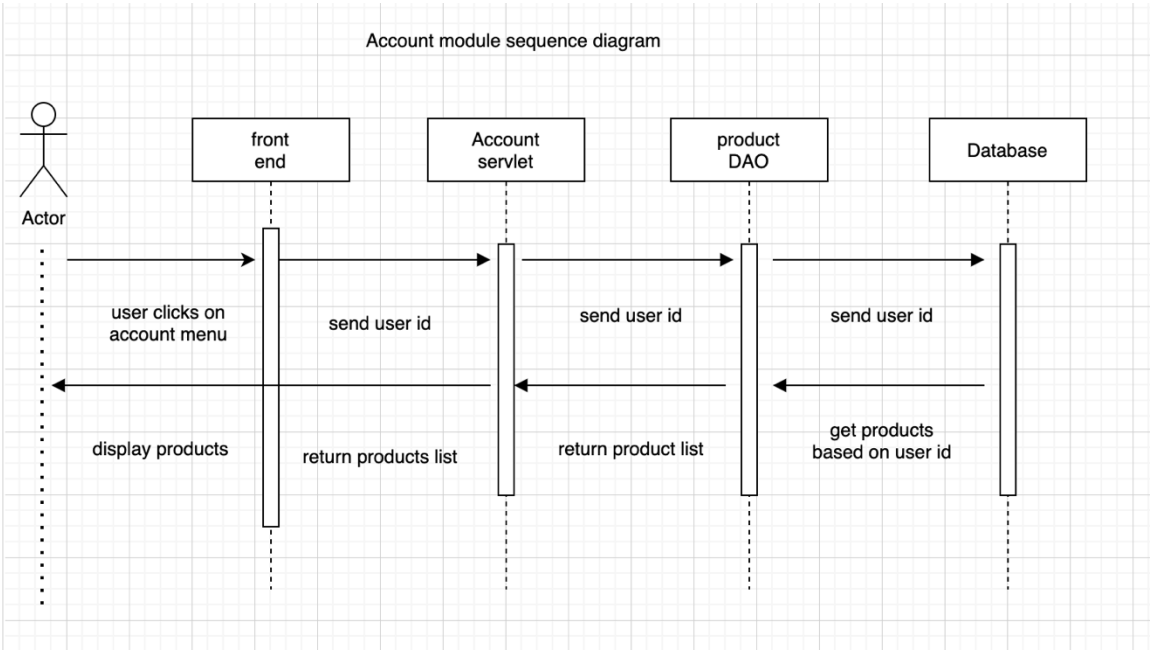
8) **Account component:**

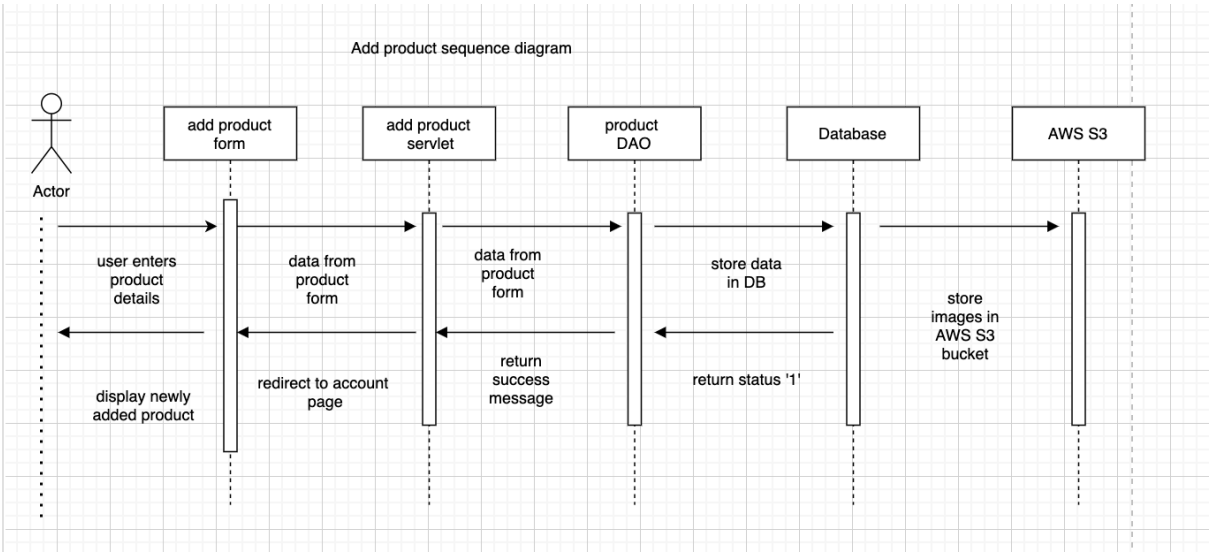
Users can view the list of their own products, list of products rented by them, view their chat history, and add a new product.

Component UI:



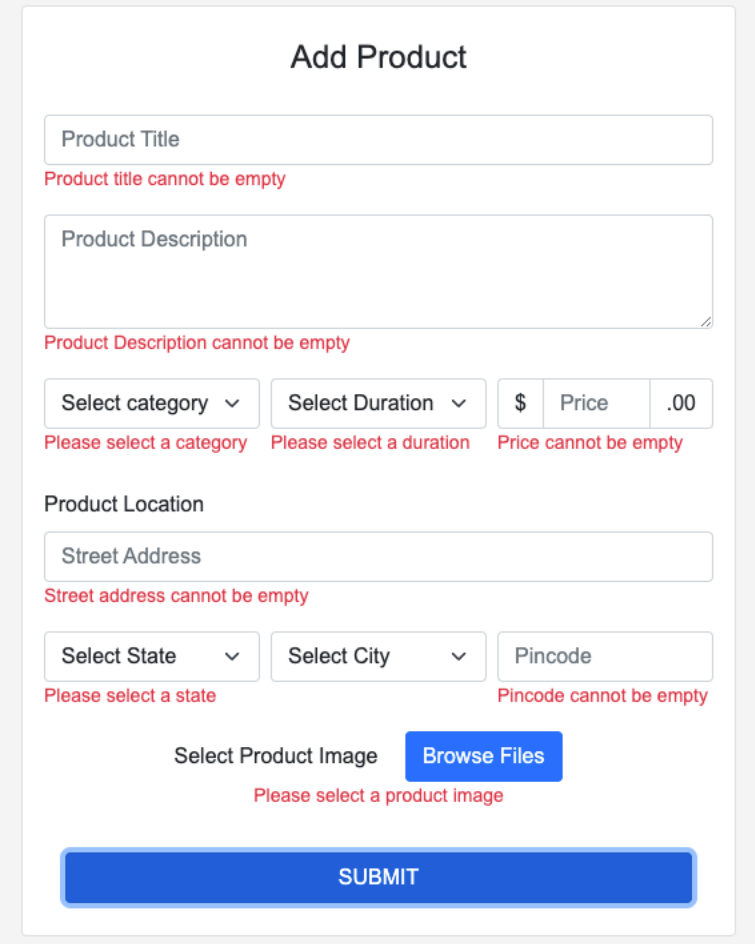
Component Interface:





Component Error Handling:

JavaScript is used to validate the add product form on client-side. It checks whether user enters correct details in the form. If user enters incorrect details, an error message is shown below the corresponding input field.

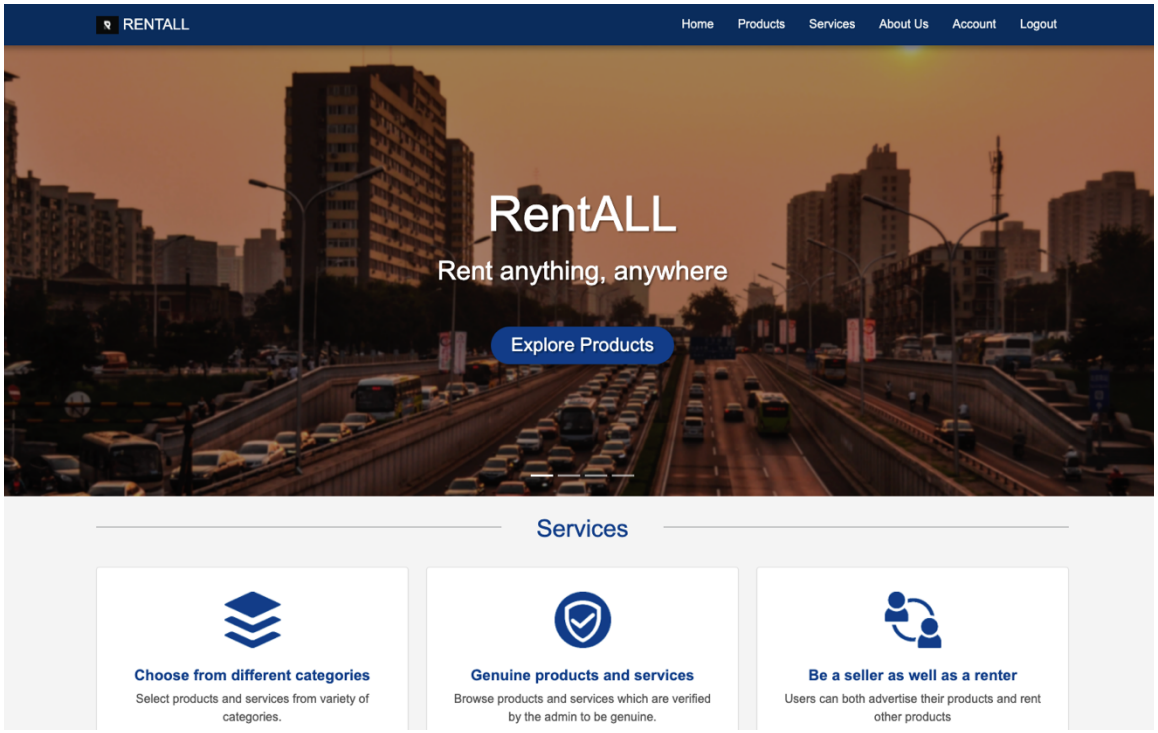


Implemented By: Shubham Bhagat

9) Landing Page:

Provides brief overview of the services we offer to the user. It also tells users about the vision and mission of the entire rental development team.

Component UI:



Implemented By: Shubham Bhagat & Yuhan ke

Revision History

Revision	Date	Change Description
1	3 October ,2021	Created login form using local database connection. Design of the user interface of the website using **online UI prototyping tool – Figma**
2	17 October ,2021	Implemented the functionality of adding, editing, deleting the product information in the database and displaying list of products from the

		database to the webpage. Implemented login form which allows users to sign-in using their google account (used **OAuth API**)
3	31 October ,2021	Implemented marking text address in map (**Geocoding** technique), Storing images along with product details, responsive product listing, UI for login and signup form
4	14 November,2021	Implemented **graph** to see which products are the most rented for the admin view, **chatbot** for user help, **Speech to text** to assist user with their searching experience when looking up for products, **Product details Page** for users to view all the details of an available product, **Account Dashboard** which is personalized for every user.
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Page Author/Creator: Shubham Bhagat, Yuhan Ke, Suma Priya Davuluri, Van Thawng
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