

**BARI VARA: WEB BASED APPLICATION**

**BY**

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This Report Presented in Partial Fulfillment of the Requirements for the  
Degree of Bachelor of Science in Computer Science and Engineering

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**DAFFODIL INTERNATIONAL UNIVERSITY**

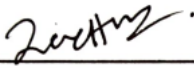
**DHAKA, BANGLADESH**

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## APPROVAL

This Project titled “**BARI VARA: WEB BASED APPLICATION**”, submitted by Md. Samiul Karim Prodhan, ID No: 201-15-3041 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 26.01.2024

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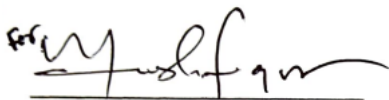
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## DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Ms. Aliza Ahmed Khan**, Senior Lecturer, Department of CSE Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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## **ABSTRACT**

Bari Vara is an online rental and reservation platform for apartments. Improving human labor, making it more precise, and cutting down on the amount of time needed to rent and reserve real estate are the main goals. It lessens the workload for those looking to rent an apartment as well as the owners who must rent out their space. Bari-Vara provides property management services to the general public that needs to rent an apartment. This includes booking, contacting the owners, and helping the owners set up rent by listing their apartment on the internet and providing a rent list. The software can be operated using an easier-to-use version of the User Interface (UI), and advanced User Experience (UX) modules are available for enhanced user experiences. Firebase Server serves as the back-end and React JS as the front-end for the exam management system. People without apartments can now rent apartments with ease, which will cut down on labor-intensive manual labor and pen-and-paper work. It's also a scalable, adaptable, and sturdy system. This product's lifecycle has been properly maintained and followed since the product code's inception. In order to produce the best results in the shortest amount of time, I basically used SCRUM management in the model I built for this project.

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# CHAPTER 1

## INTRODUCTION

### 1.1. Introduction

Bari-Vara is a sophisticated web application that automates the whole home rental management process through streamlining and utilizing React.js. The main goal of this project is to offer a dependable, user-friendly system that lessens the burden of individuals looking for apartments while improving their overall online renting experience. Bari-Vara provides a complete solution that meets the various requirements of owners and renters. Users can easily add, remove, become owners, book, plan visits, and more using the system. Bari-Vara ensures a more seamless rental management process by automating these repetitive tasks, which also saves significant time and reduces human error.

### 1.2. Motivation

Bari-Vara is a Rental Management System (RMS) was created in response to the pressing need to modernize and streamline the complex procedures related to renting out real estate. Traditional rental management methods have many drawbacks, such as laborious physical labor, the possibility of human error, a lack of clear communication, and security flaws. Bari-Vara seeks to free up property managers' and landlords' time so they may concentrate on more important and strategic tasks, which will increase property management's operational effectiveness. Nowadays, in the rental management industry, and conventional approaches frequently cannot keep up with the demands of a fast-paced setting. In order to solve this, Bari-Vara offers a centralized platform with real-time capabilities, guaranteeing that data is updated instantaneously. By facilitating smooth collaboration between managers, tenants, and property owners, communication tools are integrated, which lowers the possibility of miscommunication and promotes a more positive rental management experience.

### 1.3. Objective

To solve the human labor in this real world finding a suitable flat, owners can post a flat for rent, then renters will check that out and booked that for rent. The renters can also see their suitable flat for them by filtering the flats by family, bachelor or sublet.

### 1.4. Description of the system

Bari-Vara is a web application built using ReactJS and Firebase. The solution takes care of the problems with conventional leasing methods, including filter apartment type, apartment booking, make a schedule for the both renters and buyers, maintenance, and communication. Bari-Vara seeks to revolutionize rental management and raise the standard of the rental experience by providing a user-friendly and effective solution. It has listing and filtering properties, booking and leasing, collaboration and communication, reporting and analytics.

Key Components:

**1.4.1. User Interface:** User interface that clean, intuitive, and also responsive allows users to easily navigate and interact with the system. User can see the apartment list. User can also edit profile, upload image.

**1.4.2. Add Owners:** A user can request for owners if he want to leasing his flat. After being granted he/she can be posting a flat with details. An owners can see who are willing to rent his/her flats. Then he will approve them. Then the user can visit his flat. Owners can change profile picture and see his apartment list with details and also can edit profile.

**1.4.3. Add Flat:** An owner can add flat by posting them. He needs to add the details of his flat like total bedrooms, total bathroom, address, total square feet, picture of the apartment, apartment name, id etc.

**1.4.4. Flat List:** User can see the list of flats in to-let section. In the flat list the flats will be shown as flat name, flat address, flat price, the number of bedrooms and bathrooms and the category. The user can also filter the flats according to family, bachelor, sublet. When a user chooses to see a bachelor flats then he will only see the bachelor flat list.

**1.4.5. Flat Details:** The user will select a flat and then he will see the details of the flat. User will see the owner's name, phone no, email address and description of the

owner. Then user will see the overview of the flat like number of bedrooms, bathroom, total square feet, category and price. Then user will see the property address, property info and also user review. If user thinks the flat is suitable for him then user can book the apartment.

**1.4.6. Book Apartment:** User can book the apartment by providing nid card number and user visiting schedule.

**1.4.7. Booking List:** User can see the booking list of his apartment. User can book one or multiple property. A user can delete his booking from booking list. User can also see the pending request and status of the apartment if it is booked or not.

**1.4.8. Rent List:** Owners can see which flats has been on rent and leasing. He also can approve the booking and decline the booking. Owners can set the status of the flats if it is booked or not.

**1.4.9. My Flats:** Owner can see his own flats which he/she wants to lease. Owners can remove the flats from there. Owners can see the details of the flats.

**1.4.10. Edit Profile:** User, owners, admin can edit profile. They can upload profile picture.

**1.4.11. Dashboard:** In dashboard and admin can see the statistics of users, owners, flat type, place etc.

## **1.5. Expected Outcomes:**

**Increased Efficiency:** By making an online rental management system a user can manage his rental process very easily. By making Bari-Vara online the rental management workflow has reduced the time and efforts of people that require to book a flat, provide a to-let banner then show them to the renters who are willing to rent property.

**Reduce Human Cost:** Nowadays, people move from here and there to rent a property. They seek for an apartment in different places in their budget. Sometimes they pay a visit to the apartment but that apartment is not for the bachelor or not for the family vise-versa. This Bari-Vara web app will reduce human cost by removing this type of hassle.

**Enhanced Collaboration:** Bari-Vara web app is an app based on both collaboration of

renters and the owners. Renters can see the apartment which are posted by the owners.

**Improved Accessibility:** The goal of Bari-Vara is to offer a safe environment for rental-related information, guaranteeing data privacy and accessibility, with a strong backend server for secure data storage and appropriate authentication procedures.

**Decision Making:** A user can book multiple apartments at the same time when he surfing on the website. As a result, he can choose his desire apartment. Users of Bari-Vara reporting and analytics module will be able to provide insightful reports on the effectiveness of rental management, supporting data-driven decision-making and ongoing development.

**User Satisfaction:** Renters, owners, users, admin in the renting process should be more satisfied overall with Bari-Vara since it provides an easy-to-use, dependable, and efficient rental management solution.

## **1.6. Report Layout**

### **Chapter 1: Introduction**

This chapter provides the overview of the Bari-Vara project, including its background, purpose, and the context of the rental management system.

### **Chapter 2: Background**

This chapter will describe the pillars and the infrastructure and the related sections as well as observing the related activities, comparing frameworks, related challenges of this project.

### **Chapter 3: Requirement Specification**

In this section different models, Varieties of User Cases, ERD Diagram, Combination of needy requirements, planning, blueprint and necessary requirements will be described here.

### **Chapter 4: Design Specification**

This chapter will describe the front-end and backend-end infrastructure of the whole project. User acquisition will be introduced here.

### **Chapter 5: Implementation and Testing**

The analysis of testing and calculation processes for EMS, including functional and

non-functional testing, performance testing, and user accusation testing to make sure the system gets desired performance standards and achieves the intended objectives.

### **Chapter 6: Conclusion and Future Scope**

A discussion of the challenges encountered during the development of EMS, as well as recommendations for future enhancements and features to further improve the system's performance and capabilities.

## Chapter 2

### BACKGROUND

By creating a complete, user-friendly, and automated solution to handle the rental process in a simple and adaptable manner, the Bari-Vara project seeks to address a number of issues. The goal of the Bari-Vara is to transform the renting process by utilizing cutting-edge technology and creative design to improve accessibility, accuracy, and efficiency.

#### 2.1. Preliminary

The goal of the Bari-Vara (RMS) app project is to create an automated, effective, and user-friendly rental solution that will modernise property rents. Process simplification, increased accuracy, transparency, and a smooth user experience are among the goals. Property listings, tenant administration, financial tracking, maintenance requests, document storage, and a communication hub are all considered essential elements. The anticipated effects include increased communication, operational optimisation, transparency, and flexibility to accommodate emerging market trends. All things considered, the goal of the Bari-Vara app is to completely transform the rental management process for both landlords and tenants. This is built using ReactJS in frontend and firebase in backend. These tools are powerful tools for building up a scalable web app. The ReactJS framework's scalability guarantees that the application can effortlessly adjust to the expanding needs of academic establishments.

#### 2.2. Related Works

Numerous research studies and projects have looked into the idea of automating and optimizing rental management procedures. The following are a few related works that served as the basis for our renting system:

**2.2.1. Airbnb:** One of the industry leaders in short-term rentals, Airbnb provides a platform that links landlords and tenants. It has functions for safe financial transactions, guest reviews, and property listings. [1]

**2.2.2. Zillow Rental Manager:** For property owners, Zillow offers an extensive platform for rental administration. It enables users to manage lease agreements, screen possible renters, list properties, and take online rent payments. [2]

**2.2.3. BProperty:** Starting back in 2016, Bproperty has now become the only real estate solutions provider in Bangladesh and its largest transacting real estate company. Combining an unmatched online and offline presence with our incomparable database of information [3]

**2.2.4. Rentec Direct:** A cloud-based property management tool for associations, landlords, and property managers is called Rentec Direct. It offers functions like online rent payments, financial reporting, and tenant screening. [4]

**2.2.5. Rents:** The PropTech company RENTS Corporation was founded in 2013 and debuted its official website in 2015. It was a pioneer in Bangladesh and the country's first specialist rental platform. We believe that technology is the only thing that can make people's life easier and simpler. [6]

These connected works demonstrate the wide range of options in the rental property management space, each providing special characteristics to meet the requirements of landlords, property managers, and owners.

### **2.3. Scope of the problem:**

The scope of the issue that the rental management system attempts to solve includes a number of facets associated with the rental management of various apartments in various locations. The main goal is to completely automate and optimize the rental management process in order to minimize errors and the need for manual intervention. The following domains are included in the problem's scope:

**2.3.1. Apartment Category Management:** Apartment category is become a huge problem now a days in our country. Many owners don't want to rent his apartment for bachelor. Bari-Vara will overcome this problem by filtering the apartment.

**2.3.2. Multiple Apartment Choose:** User can choose multiple flat from one place. They don't need to visit here and there for finding an apartment.

**2.3.3. User Authentication:** Provide administrators, tenants, and property owners with secure login and registration features.



- 2.3.4. Booking and Rental Agreements:** Provide tenants who are interested in a home with access to an online booking system. Create digital rental agreements with e-signature capabilities, document storage, and terms and conditions.
- 2.3.5. Tenant Management:** Give property owners the tools they need to handle communications, lease details, and tenant profiles. Give renters access to maintenance requests, payment histories, and owner communications.
- 2.3.6. User Dashboards:** Provide tenancy and property owners with customized dashboards that provide important KPIs and pertinent data.
- 2.3.7. Review and Rating System:** Establish a system of reviews and ratings so that tenants and property owners can comment on their renting experiences.
- 2.3.8. Admin Panel:** Provide a platform administrator dashboard so they can handle user accounts, settle disputes, and keep an eye on the system's general performance.
- 2.3.9. Security Measures:** Put strong security measures in place to safeguard sensitive data, user information, and financial activities.
- 2.3.10. Scalability:** Plan the system to be scalable in order to support future feature additions and an expanding user base.

Bari-Vara seeks to change the way apartments are handled in several areas by tackling these areas within the scope of the issue. This will improve efficiency, lower errors, and improve the overall experience for tenants and apartment owners.

## **2.4. Challenges**

There are many obstacles to overcome while developing a flat rental management system, including operational, technical, and legal ones. Here are a few important issues to think about:

- 2.4.1. Database Design:** Database design is an important role for building up a backend server. There was some troubleshooting while creating database in firebase for Bari-Vara app.
- 2.4.2. Designing:** Designing an admin dashboard is also a challenge for making a rental management system. Because here I need to set the component which should be only displayed to the admin.

- 2.4.3. Scalability:** The system needs to be scalable in order to handle more data, traffic, and user interactions as both the user base and the number of listed properties rise, all without sacrificing system performance.
- 2.4.4. User Experience (UX) Design:** Adoption and satisfaction depend heavily on designing a simple and user-friendly interface that satisfies the needs of both landlords and tenants. It's a constant challenge to strike a balance between simplicity and feature depth.
- 2.4.5. Maintenance and Support:** It need ongoing support and maintenance to fix faults, add new features, and adjust to evolving technological standards. Having dependable customer service is essential to ensuring user pleasure.
- 2.4.6. Tenant Verification:** Enforcing privacy rules and regulations while putting in place a dependable tenant verification process that includes credit evaluations and background checks can be difficult.
- 2.4.7. Communication Challenges:** Encouraging easy contact between landlords and tenants while taking privacy issues into account and making sure that critical messages are received and appreciated.
- 2.4.8. Property Listing Accuracy:** Robust verification procedures are necessary to guarantee the accuracy of real estate listings and stop fraudulent actions, such as phony listings or false information.
- 2.4.9. Document Management:** Creating a document management system that works well and guarantees that legal papers are valid and compliant with local regulations while allowing for the safe storage, retrieval, and exchange of such documents.

To effectively tackle these obstacles, one needs a thorough grasp of the real estate sector, strong stakeholder collaboration, a dedication to ongoing enhancement, and adherence to constantly changing legislation.

## CHAPTER 3

### REQUIREMENT SPECIFICATION

The main functional and non-functional requirements that the Bari-Vara system must meet in order to properly automate and optimize exam management procedures in educational institutions are outlined in the requirement specification. Below is a brief explanation of these prerequisites:

#### **3.1. Business Process Modelling:**

A representation of the steps, events, and interactions that make up a business process is called a business process model, or BPM. It offers a thorough and organized picture of how work is done across many entities or inside an organization. A key component of business process management (BPM) is business process modelling, which is used to assess, enhance, and convey processes.

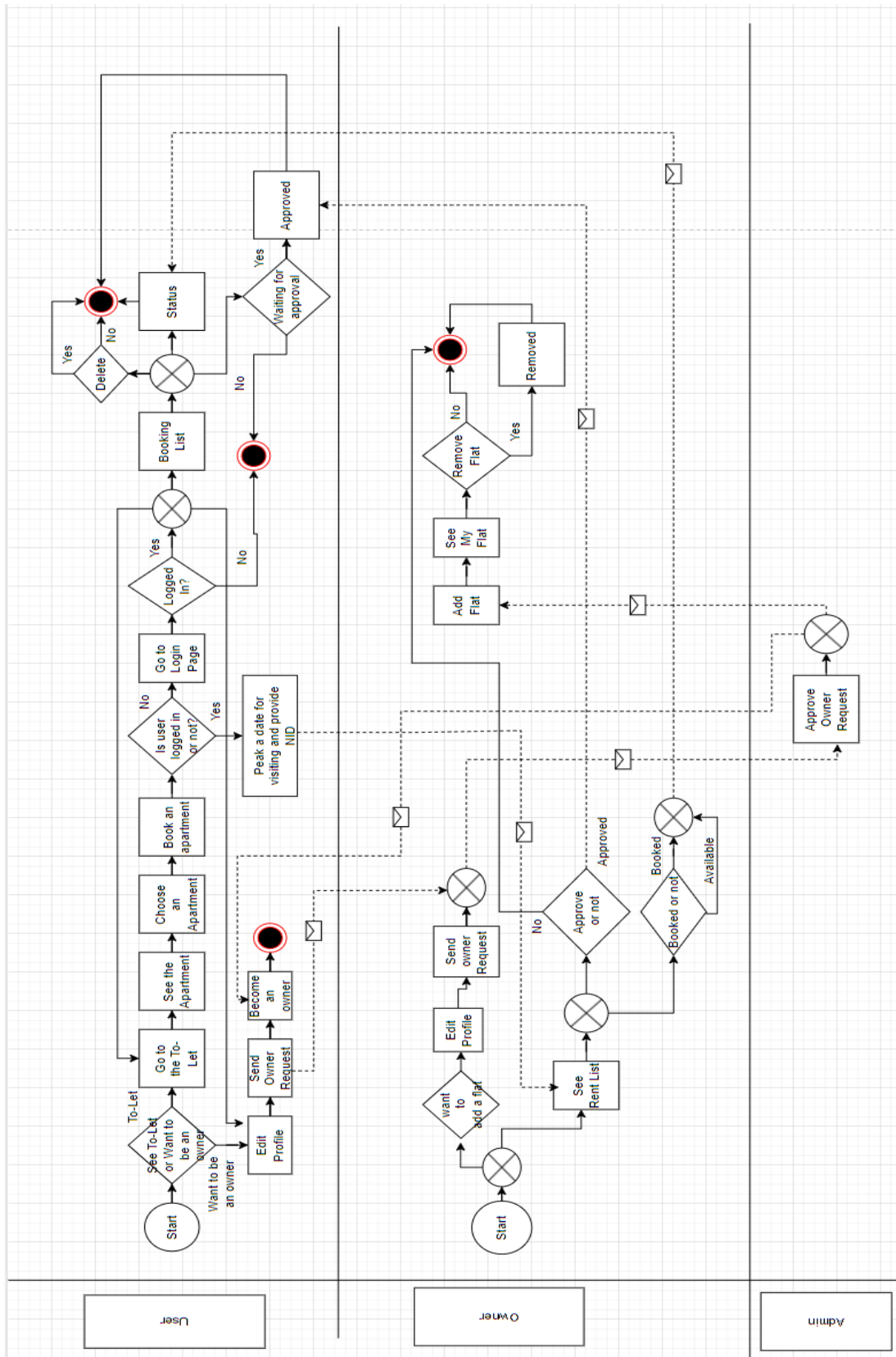


Figure 3.1.1: BPM Diagram of "Bari-Vara"

### **3.2. Requirement Collection and Analysis:**

In software development, gathering and analyzing requirements is an essential step that involves determining the project's goals, stakeholders, and scope. It entails determining the needs of users by techniques including workshops, questionnaires, and interviews. The system's interface may be seen through prototyping, and both functional and non-functional needs are captured in thorough documentation.

#### **Functional Requirement:**

1. User authentication while booking an apartment.
2. Select a flat for a user for one time only.
3. A user cannot select the same flat multiple time.
4. Without admin approval a user cannot be an owner.
5. Same apartment can be booked by multiple users.
6. One's approval should not be approved by others owners.
7. One's approval cannot be mixed with another user approval.

#### **Non-Functional Requirement:**

1. A user can only visit the site.
2. user can only visit the to-let page.
3. A user can book the apartment without getting permission from the owners and admin.

### **3.3. Use Case Modelling and Description:**

Use case modelling is a software engineering technique that entails determining, outlining, and classifying system requirements from the viewpoint of the end user. It is a graphic depiction of how people engage with a system and how that interaction is handled by the system.- In the software development process, use cases also form the basis for further modelling approaches like activity diagrams and sequence diagrams. In Bari-Vara app there are 3 actors: Users, owners and admin respectively. All of them has different works to do. The use case diagram will help to find out proper overview of this app.

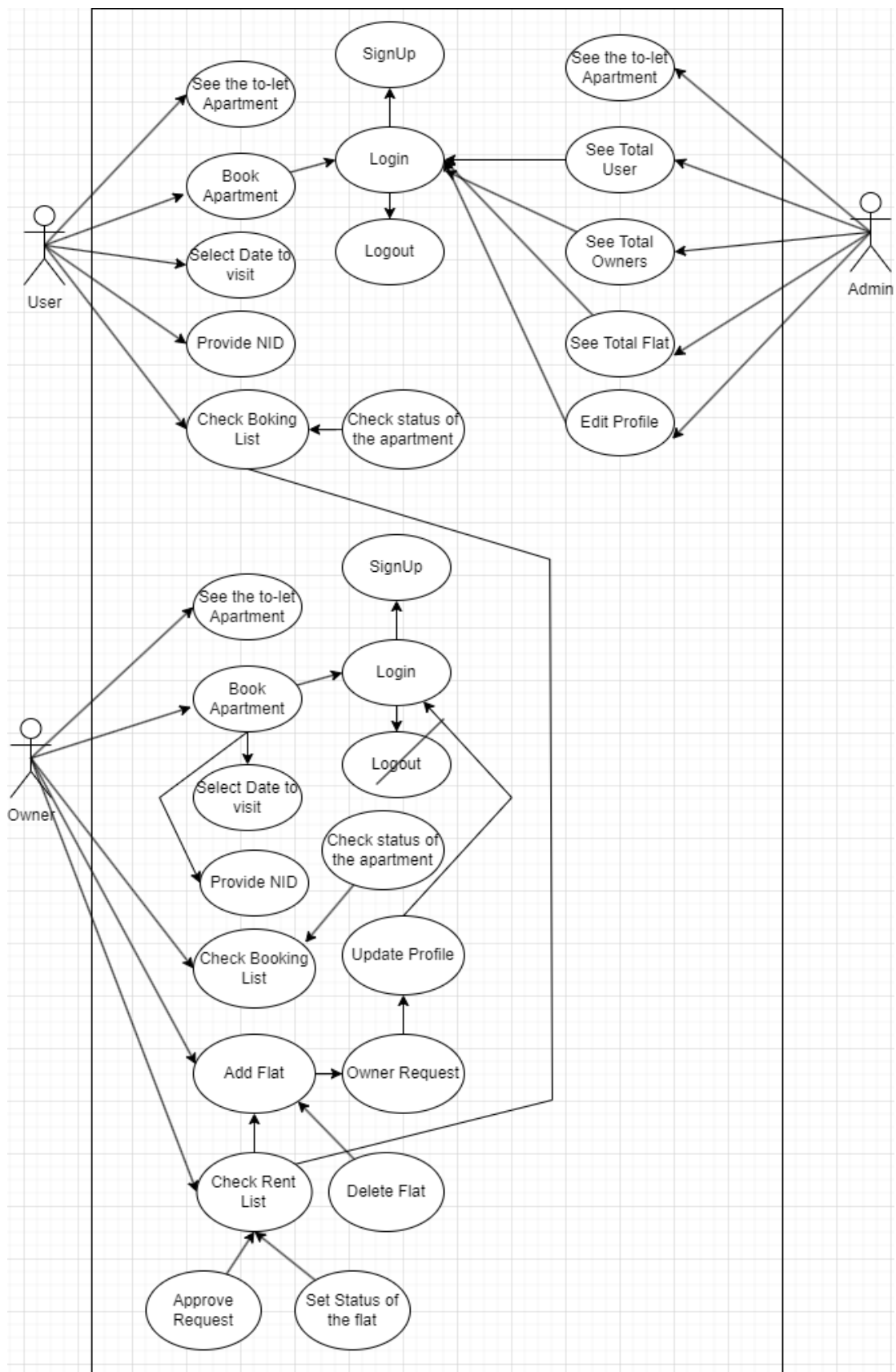


Figure 3.3.1: Use Case Diagram Bari-Vara

Descriptions are listed here:

Table 3.3.2: Description of use case modelling named “DIU-EMS”

Use Case ID	Use Case Description	Actor(s)	Precondition	Postcondition	Alternate Flows
UC0001	User Account Creation and Login	User	User is not registered	User is successfully registered and logged in	User opts for multi-factor authentication during registration
UC0002	Property Booking	User	User is logged in	User views property details, filters, and shortlists properties	User requests a virtual tour of a property
UC0003	Property Booking	User	User has selected a property	Booking is confirmed, and confirmation details are sent to the user	User extends the booking duration
UC0004	Property Booking	User	User has updated his profile	Booking is confirmed, and confirmation details are sent to the user	User extends the booking duration
UC0005	Tenant Application Review	Owner	Owner has received tenant applications	Tenant is accepted/rejected, and notification is sent	Owner interviews shortlisted tenants via video call
UC0006	Document Upload and Verification	User, Admin	User uploads documents	Admin verifies and approves documents, and user receives a confirmation	Document verification fails multiple times; user receives assistance from customer support

UC0007	Communication	User, Owner, Admin	Users need to communicate	Messages are exchanged, and notifications are sent for important updates	Admin sends broadcast message to all users about system maintenance
UC0008	Review and Rating	User	Rental period concludes	User provides review and rating, and feedback is stored for reference	User receives a discount on the next booking for leaving a positive review
UC0009	User Account Management	Admin, User	User needs to update information	User account is updated, and changes are reflected in the system	Admin deactivates an account upon user request
UC0010	Property Inspection Scheduling	Owner	Owner wants to schedule property inspections	Inspection is scheduled, and the tenant is notified	Tenant requests rescheduling of the inspection
UC0011	Property Listing Analytics	Admin	Admin wants to analyse property listing performance	Analytics report on property views, inquiries, and bookings is generated	Admin identifies underperforming listings for improvement
UC0012	Property Cancellation	User	User requests to cancel a booking	Cancellation is processed, and refund or charges are applied	User provides reasons for cancellation, impacting future booking decisions
UC0013	Owner Cancellation	Admin	Admin can cancel an owner permission	Cancellation done by admin	Owner can decline his cancellation request.



### 3.4. Logical Data Model:

An abstract or visual depiction of the relationships, data structures, and rules that specify the logical arrangement of data in a system or database is called a logical data model, or LDM. It offers a conceptual representation of the data, unaffected by the particular database management system or technical aspects of the implementation. Capturing the fundamental business principles and specifications for data storage and retrieval is the aim of a logical data model. In Bari-Vara web app we can represent this logical data model by using ERD. In ERD we can identify how this Bari-Vara web app stores its data in firebase. It will give a visual representation that illustrate the relationships between entities in a database. Before making this app I made a draft of the database to get a database design of a clear, concise, and graphical representation of the data model. Entity Relationship Diagrams (ERDs) are used to show a database's logical structure and facilitate comprehension of the relationships between various entities.

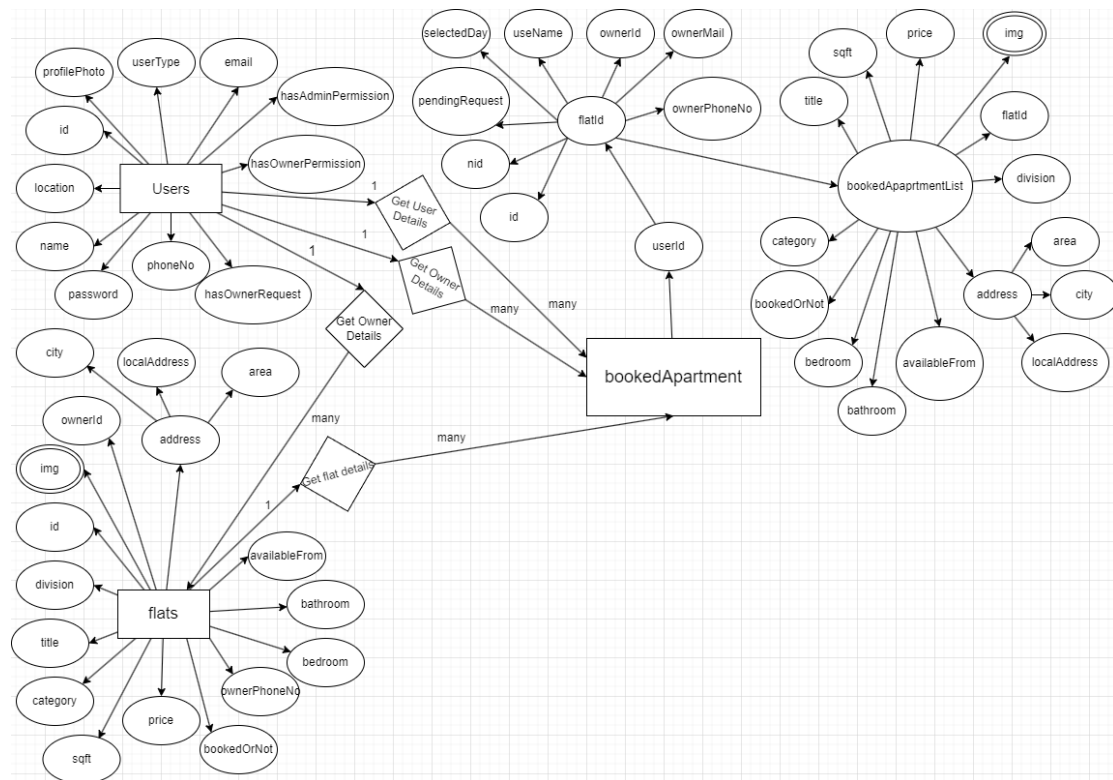


Figure 3.4.1: ER Diagram of "Bari-Vara"

The relationship table for the "Bari-Vara" ER diagram is provided below: -

<b>Users</b>
id
location
name
password
phoneNo
hasOwnerRequest
hasOwnerPermission
hasAdminPermission
email
userType
profilePhoto

<b>flats</b>
id
division
title
category
sqft
price
ownerPhoneNo
bookedOrNot
bedroom
bathroom
availableFrom
address
ownerId
img

<b>address</b>
area city localAddress

<b>bookedApartment</b>
userId

<b>flatId</b>
id nid pendingRequest selectedDay username ownerId ownerMail ownerPhoneNo bookedApartmentList

<b>bookedApartmentList</b>
title sqft price img flatId division address availableFrom bathroom bedroom bookedOrNot category

### **3.5. Design Requirement**

Creating a rental management web app, I do some research on design requirement. First of all, which database type should I use was a concern of my webapp. Bari-Vara use no-sql database. This database is hosted by Firebase.

#### **3.5.1. User Authentication and Authorization:**

It should be possible for users to safely register, log in, and authenticate. Certain user roles (such as administrators, landlords, and tenants) ought to have particular access levels and permissions.

#### **3.5.2. Property Listing and Search:**

Owners of real estate should be allowed to list their homes with information like address, cost, features, and photos. In order to identify properties based on particular criteria, users ought to have access to advanced search filters.

#### **3.5.3. Booking and Reservation System:**

Customers ought to be able to reserve homes and indicate the terms and length of the rental. Booking requests should be sent to property owners, who should be able to accept or reject them.

#### **3.5.4. Lease Agreement Management:**

Digital lease agreements should be easy to create, sign, and store with the help of the system. Online lease reviews and signing should be possible for users.

#### **3.5.5. Communication Platform:**

Establish a message platform so that administrators, landlords, and tenants may communicate with one another. Set up alerts for critical information, such confirmations of reservations or status updates on maintenance.

## CHAPTER 4

### DESIGN SPECIFICATION

A Bari-Vara app's design specs list the functional and technical requirements needed to construct it. By providing guidance during the design and implementation phases, these specs guarantee that the application satisfies the intended needs. Key design criteria for a Bari-Vara app are listed below:

#### **4.1. Front-End Design:**

There are a lot of tools that's has been used in front-end development of Bari-Vara app. As this is a website so we need a markup language like HTML. To design that we need CSS. But not only just HTML and CSS alone can complete the website. We need front-end library like ReactJS and CSS framework tailwind CSS. Designing User Interfaces (UI to depict the layout, composition, and essential interface components of the app, create wireframes and mockups. Unify your font, iconography, and color scheme to create a coherent design language. Make sure the app is responsively constructed so that it can easily adjust to various screen sizes and devices (desktops, tablets, smartphones).

##### **4.1.1. HTML: Hypertext Markup Language:**

The Hypertext Transfer Protocol, or HTTP, serves as the backbone for data transfer on the Internet. It works on a client-server architecture, in which requests are sent to a server by a client (such as a web browser), and the server responds. Because HTTP is stateless and connectionless, every request is made independently. It executes activities using methods like GET, POST, PUT, and DELETE. Uniform Resource Identifiers (URIs), which are frequently URLs, are used to identify resources. HTTP answers provide status codes that indicate the result, while HTTP messages include headers for metadata. There are various versions of HTTPS, and HTTPS offers an encrypted, safe connection. Caching techniques aid in the optimization of resource retrieval, and cookies allow clients to cache little bits of data. The foundation of web communication is HTTP, which allows the retrieval of web pages, images, and other resources. [12]

#### **4.1.2. CSS:**

The web page's palette and paintbrush are provided by CSS. It turns HTML's basic structure into aesthetically pleasing and intuitive user experiences. It gives websites alive by giving you complete control over layouts, animations, colors, fonts, and more. A website wouldn't have its personality without the magic of CSS, just as a picture wouldn't be the same without its colors. [12]

#### **4.1.3. TailwindCSS:**

Tailwind CSS is a utility-first CSS framework that offers a collection of pre-made utility classes to simplify web development. Developers can quickly and consistently style content by applying these classes directly in the HTML markup, as opposed to utilizing conventional CSS stylesheets. Tailwind CSS encourages a scalable and modular approach to web application styling, making it simple for developers to create user interfaces that are both visually appealing and responsive. It offers an extensive collection of utility classes for stylistic components, including padding, margins, fonts, colors, and more. Because Tailwind CSS is flexible, developers can set up the framework to meet the unique design specifications of their projects. Its ease of use, adaptability, and capacity to expedite the development process have contributed to its growing popularity. [7] [8]

#### **4.1.4. DaisyUI:**

DaisyUI is a set of components for the well-known Tailwind CSS framework. By offering an assortment of ready-made user interface components that are simple to include into online applications, it expands the functionalities of Tailwind CSS. DaisyUI makes it easy for developers to construct complicated user interfaces without coding unique CSS by providing pre-made components with expressive syntax. This streamlines the development process. By adding components that can be readily customised and styled using Tailwind's utility classes, such as modals, date pickers, toggles, and more, it expands the capabilities of Tailwind CSS. DaisyUI's seamless integration with the Tailwind CSS ecosystem makes it possible for developers to work more quickly and effectively. [5]

#### **4.1.5. JavaScript:**

High-level, interpreted programming languages like JavaScript are mostly employed to create dynamic, interactive content for websites. It is typically run by web browsers and embedded within HTML documents. JavaScript gives developers the ability to alter a web page's behaviors, structure, and content in real time, improving user experience. Modern online applications require it to handle both procedural and object-oriented programming paradigms. JavaScript may now be utilized for server-side programming thanks to innovations like Node.js, allowing for full-stack web development using just one language. [12]

#### **4.1.6. ReactJS:**

A JavaScript package called ReactJS is used to create user interfaces, especially for single-page applications. React, created by Facebook, introduces a component-based design that makes UI creation easier by enabling developers to create modular. Because of its declarative style, describing the intended UI state is made simpler. React renders content efficiently by updating only the relevant portions of the real DOM using a virtual DOM. JSX, a syntax extension that allows JavaScript to include HTML-like code, and a unidirectional data flow that guarantees predictable state changes are two of its key characteristics. Props allow React components to receive data and maintain local state. Lifecycle methods for class components let developers run code at particular stages of the component's lifecycle. With the introduction of hooks in React 16.8, functional components may now manage state and side effects, often doing away with the need for class components. In React apps, handling navigation is typically handled using React Router. State sharing across components is made easier by the Context API without requiring explicit prop passing. [14]

#### **4.1.7. Axios:**

Axios is a JavaScript library that web applications use to send HTTP requests. With support for many HTTP methods including GET, POST, PUT, and DELETE, it offers a reliable and user-friendly interface for managing asynchronous requests. Because Axios is promise-based, developers may manage asynchronous code by using the `async/await` or `then()` syntax. Request configurations, including headers, parameters,

and authentication, can be customized by developers, and it enables request and response interceptors for worldwide request/response handling. In addition, Axios provides support for concurrent requests, strong error handling, and the option to terminate requests using cancellation tokens. [11]

#### **4.1.8. React-router:**

A JavaScript package called react-router-dom is used to manage routing in React applications. It offers a collection of tools and parts that let programmers control the application's URL and specify navigation. React-router-dom allows developers to define routes and associate them with particular components to construct dynamic and navigable user interfaces. This makes it possible to render various components according to the URL and create single-page applications with unique views. The library contains elements that make it easier to create a navigation structure, like BrowserRouter, Route, Link, and Switch. The Route component allows developers to design routes, while the Link component allows them to create links that allow users to switch between different views. The application is wrapped by the BrowserRouter component, which makes it possible to navigate using the browser history. [15]

#### **4.1.9. React-icons:**

React libraries like as react-icons offer a selection of well-known icon sets as React components. By providing a large range of icon possibilities from various icon libraries, it makes the process of adding icons in React apps simpler. In their React apps, developers can effortlessly incorporate and modify icons without requiring extra image files or intricate style. Popular icon sets like Font Awesome, Material Icons, and others are supported by the library. React-icons components are a convenient way to add eye-catching icons to React apps since they are simple to utilize in JSX. [16]

#### **4.1.10. Recharts:**

A charting package called Recharts was created specifically for React applications, making it easier to create dynamic and eye-catching graphs and charts. It offers a collection of reusable and configurable React components for creating a range of chart formats, such as pie charts, line charts, bar charts, area charts, and more. Built on top



of D3.js, Recharts provides a higher-level abstraction and facilitates the integration of data visualizations into apps for React developers. Because of the library's support for flexible design, charts can adjust to fit various screen sizes. Developers can quickly visualize and visually appealingly present data in their React applications with Recharts. [9]

#### **4.1.11. uuid:**

A JavaScript package called `uuid` is used to create universally unique identifiers, or UUIDs. It offers a quick and easy approach to generate unique IDs, which are commonly employed in situations requiring a unique reference. The `uuid` library generates UUIDs that are intended to remain unique in both space and time, which makes them appropriate for a variety of uses, such as distributed systems, database records, and data indexing. The library is compatible with multiple UUID versions, including UUIDv1 and UUIDv4, each having a unique generating process. To guarantee that identifiers are unique, `uuid` is frequently used in server-side applications and web development. [10]

### **4.2. Back-End Design:**

The structural and architectural planning of the server-side features and components that drive a software programmer is referred to as backend design. In order to manage data processing, business logic, and communication with the frontend (client-side) components, it entails creating the server, databases, and application logic. Building a reliable, scalable, and effective server-side infrastructure is the aim of backend design, which underpins the software application's overall operation. To design the back-end of Bari-Vara app I initially choose to use Firebase authentication as an authentication process of Bari-Vara website. Then Firebase real-time database has been used to store the data. Here CRUD operation has been used to get, post, update and delete data.

#### **4.2.1. Firebase:**

Google created Firebase, a feature-rich platform for creating mobile and online applications. It provides a range of tools and services including real-time databases, cloud storage, hosting, authentication, and other areas of app development. Firebase

gives developers access to an easily controllable and scalable backend infrastructure, which streamlines the development process. Cross-platform programming is made possible by its compatibility for both the iOS and Android operating systems. Features for analytics, testing, and performance monitoring are also included in Firebase, giving it an all-in-one, flexible option for creating contemporary apps. [13]

#### **4.2.2. Firebase Authentication:**

Google's Firebase platform offers a tool called Firebase Authentication that makes user authentication in online and mobile applications easier. Without requiring a complex backend infrastructure, it enables developers to quickly and simply integrate secure sign-up, sign-in, and account management functions into their apps. Numerous authentication techniques are supported by Firebase Authentication, including phone number authentication, social identity providers (including Google, Facebook, and Twitter), email and password authentication, and more. Developers can improve the security of their apps and give users on all platforms a safe and easy way to authenticate by integrating Firebase Authentication. [13]

#### **4.2.3. Firebase Real-time Database:**

Google's Firebase platform offers a cloud-hosted NoSQL database called Firebase Realtime Database. Developers can use it to store and synchronize data in real time between many clients, including mobile and web applications. Because of the database's JSON tree structure, developers may efficiently organize and retrieve data. Any modifications made to the database are instantaneously propagated to all connected clients thanks to its real-time synchronization features, resulting in a fluid and responsive user experience. Building interactive and collaborative apps where data synchronization and real-time updates are essential is a common use for Firebase Realtime Database. [13]

### **4.3. Interaction Design and UX**

Bari-Vara is a ReactJS web application designed to give owners and renters an easy-to-use interface while automating and optimizing the flat arranging process. With careful interaction design, the system aims to improve the user experience (UX) by making it

simple for users to add flats, owners, users, delete flats, and obtain owner approval. An integrated dashboard makes it easier for owners and tenants to collaborate in real time and make the necessary adjustments. Through the process of digitization and automation, the application lessens the workload for both renters and owners, resulting in enhanced productivity and efficiency. It has wonderful ux like:

1. Determine and comprehend the main user personas, such as administrators, tenants, and property owners. Make sure the design is customized to each user group's unique requirements and tastes.
2. Provide a comprehensive search feature with filters so that tenants may locate homes according to location, budget, number of bedrooms, features, and other factors. Offer an interactive map so that users may explore properties visually.
3. Add top-notch photos, thorough descriptions, and important features like rental cost, availability, and contact information to your property listings. For simple scanning, use a card-based, responsive layout.
4. Give users the option to create profiles so that renters may manage their communication settings, store their favorite properties, and manage their rental history. Property owners can maintain their listings.
5. Provide a safe and easy-to-use booking system so that potential tenants may check on the status of the property, set up appointments and start the renting procedure. Send out emails and alerts of confirmation.
6. Give user data security and privacy first priority, especially sensitive data pertaining to rental agreements and personal information.

#### **4.4. Implementation Requirements**

For implementation we need google account to use Firebase, Firebase authentication, Firebase real-time database. We need an api key from firebase to authenticate the api call. We need a text editor like VSCode to write code, postman to see and check the api request. We use rechart to see the analytics of my website. Create a scalable application design so that it can accommodate an increase in the number of users, properties, and transactions. Integrate with other services like identity verification services, mapping

APIs for property location, and compliance and legal databases. Notify and warn of impending lease expirations, property queries, and application status updates, among other significant occurrences. Put security measures in place to safeguard sensitive data and user information. Secure sockets layer (SSL), encryption, and frequent security audits are examples of this. Improve the web application's performance by making sure that resource caching, quick database queries, and quick loading times all happen. Include a calendar system to keep track of lease dates, viewing times, and property availability. Make sure the calendars of the property owners may be updated and synchronized.

# CHAPTER 5

## IMPLEMENTATION AND TESTING

### 5.1. Implementation of Database:

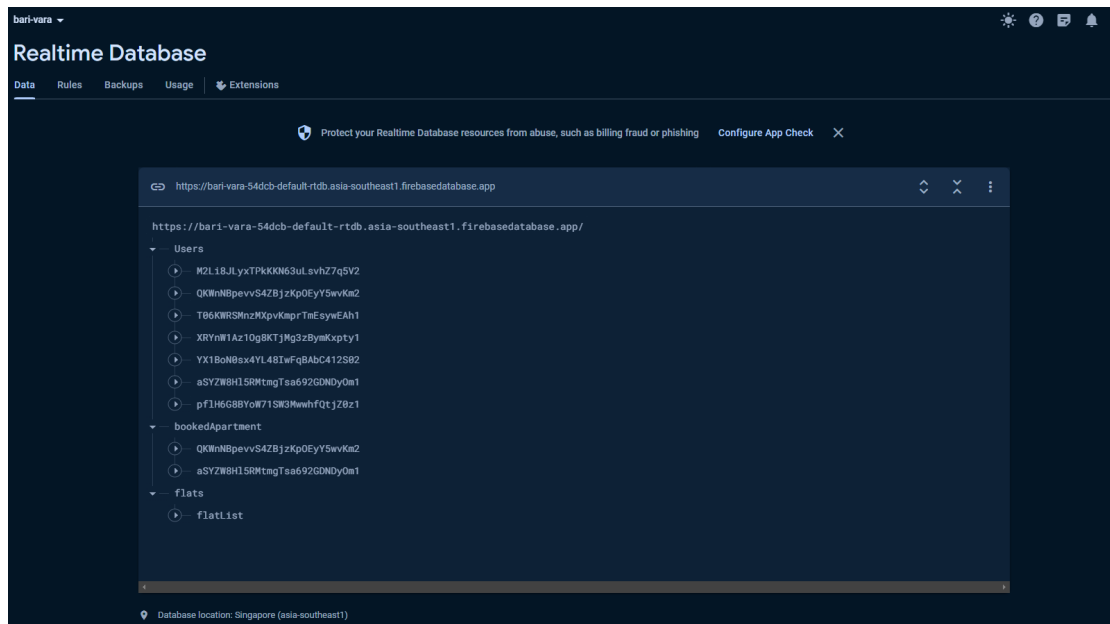


Figure 5.1.1: Database Design of “Bari-Vara”

While implementing database of “Bari-Vara”, Firebase real-time database was chosen. Firebase Realtime Database is a cloud-hosted NoSQL database provided by Google's Firebase platform. It can be used by developers to store and synchronize data in real time among numerous clients, such as online and mobile applications. The JSON tree structure of the database allows developers to effectively arrange and retrieve data. Its real-time synchronization features ensure that any changes made to the database are instantly transmitted to all connected clients, providing a responsive and seamless user experience.

## 5.2. Implementation of Front-End Design:

Front-end design of “Bari-Vara” web app has built up with ReactJS, TailwindCSS, DaisyUI, Rechart, React Router Dom, uuid, React Toast. ReactJS is a powerful tool for making a single page rendering website. It has no-reload feature. This checks the changes with virtual dom then match with current dom. If any changes happened then it re-renders the component which only has changes. React Router Dom used to navigate from one page to another without reload. React Toast is used to give a toast alert.

### 5.2.1. Front Page:

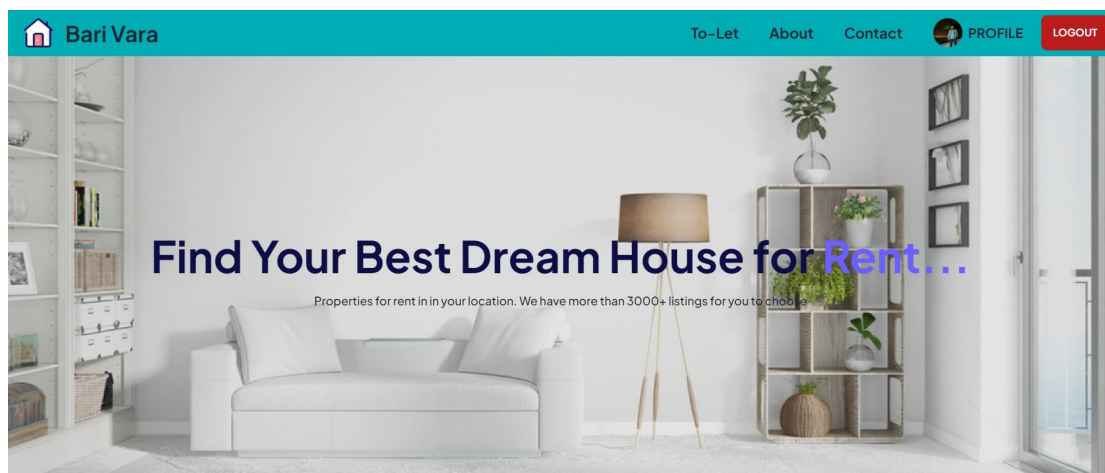


Figure 5.2.1.1: Home Page of “Bari-Vara”

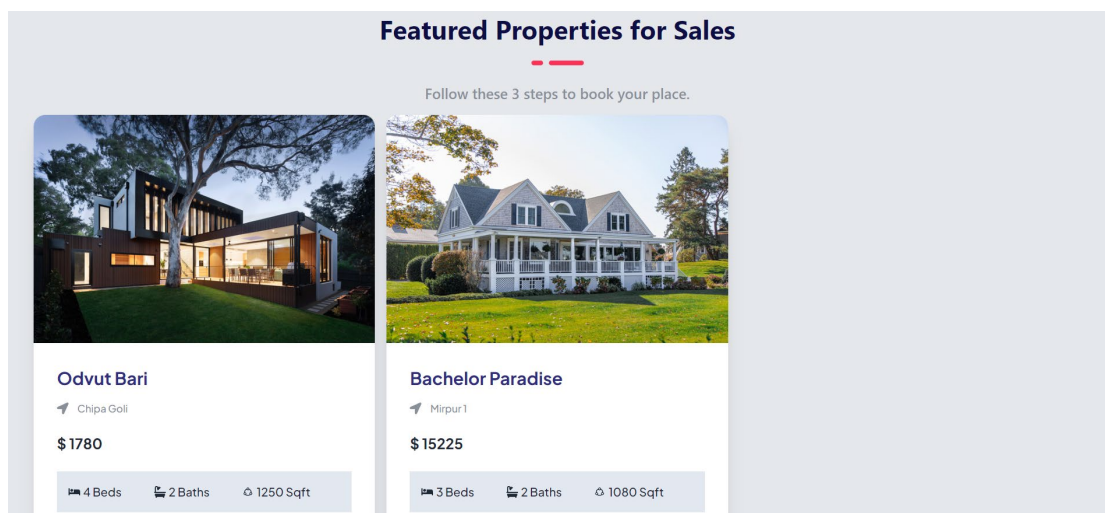


Figure 5.2.1.2: Home Page of “Bari-Vara”

### 5.2.2. Authentication Page:

Authentication is done with firebase real-time database and firebase authentication to track the user. In authentication if user sign-up then he needs to provide name, mail and phone password.

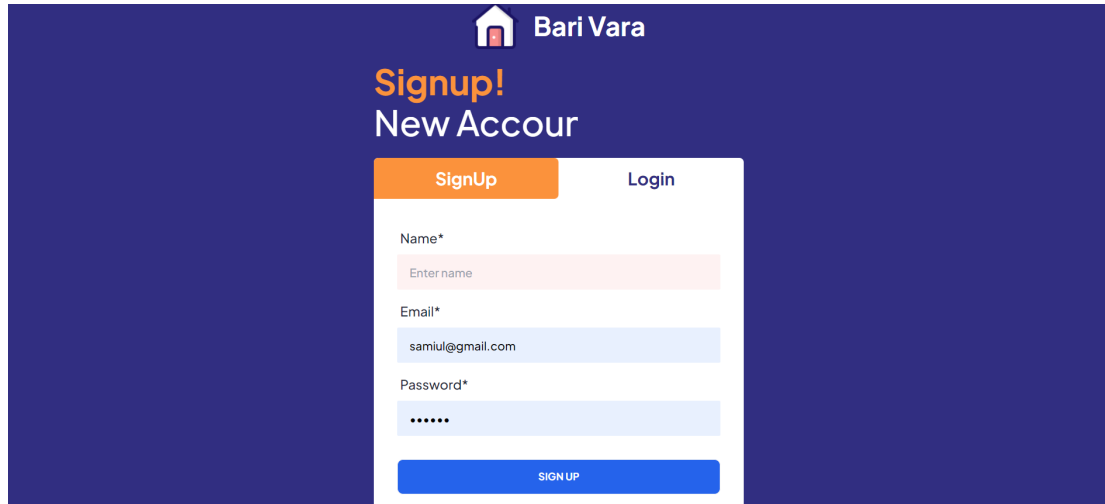


Figure 5.2.2.1: Authentication Page of “Bari-Vara”

### 5.2.3. To-Let page:

Here user can filter the place and the apartment category. In their filtering term, the results will be shown. The apartment is shown as card with details of title, price, place, bedroom, bathroom, total area and category.

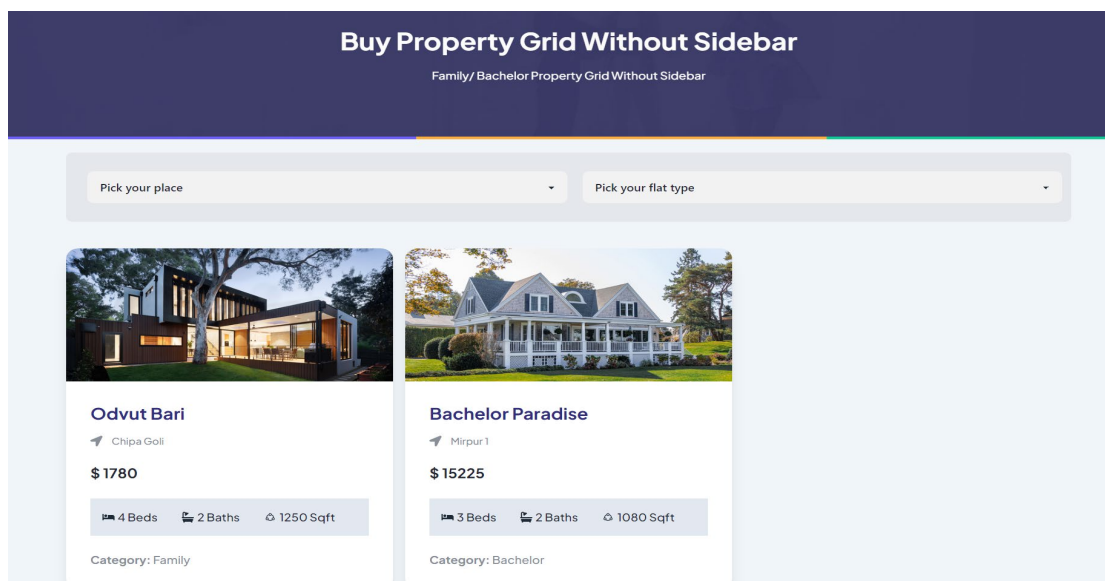


Figure 5.2.3.1: To-Let Page of “Bari-Vara”

### 5.2.4. Property Details Page:

In property details page user can see the apartment picture, owner details with name, email, phone no and email. User can also see the property overview of how many bedrooms, bathroom it has with price tag and the apartment category. Under that they can see the property detail address with area, city, division and country. User can also see the property info. User can see the amenities of the property. At last, they can see the what others are thinking about this property and write something about the property. The main functionality of this page is they can book the property by providing NID and visiting date.

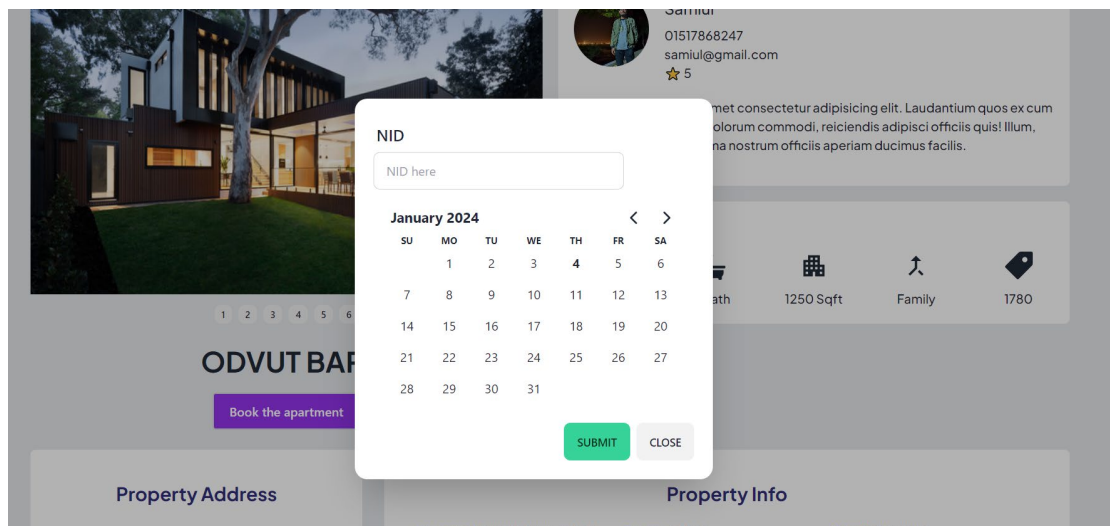


Figure 5.2.4.1: Property details page of “Bari-Vara”




Bari Vara

[To-Let](#) [About](#) [Contact](#) [PROFILE](#) [LOGOUT](#)

## Property Details

Apartment Details



1 2 3 4 5

Owner Details

**Karim**

01842330232  
karim@gmail.com  
★ 3.00

Meet Karim, a savvy and dedicated apartment property owner with a passion for creating comfortable and welcoming living spaces. Emily entered the real estate industry with a vision to redefine the rental experience and provide residents with more than just a place to stay - a true home.

Overview

2 Bed

2 Bath

1050 Sqft

Sublet

9000

### THE LODGE

Book the apartment

Property Address

Address: Road 1  
Area: Farmgate  
City: Dhaka  
Division: Dhaka  
Country: Bangladesh

Property Info

Property Id : 50aa7ed3-aa38-4122-a44b-ba12ab9da72b	Rooms : 10050	Year Built : 2005
Price : \$ 9000	Bedrooms : 2	Garage Size : 2 cars
Price Info : \$0.117 sq ft	Bathrooms : 2	Available From : 2024-02-01
Property Size : 1050	Custom Id : 68	Structure Type : Brick
Property Lot Size : 1,200 ft2	Garages : 2	Floors No : 3

Amenities

- Air Conditioning
- Swimming Pools
- Sporting Facilities
- Gym
- Clubhouse

- LAndscaped Gardens
- Wide-Open Spaces
- Parks
- Package Lockers
- Spa

- Surveillance Cameras
- Generator

Review

**Nadim**

1/17/2024, 2:46:57 AM  
★ 4

Nice Home....

Submit Review

Your Name

Email

Apartment Rating

Owner Rating

Review

SUBMIT

Basa Vara

[Rent](#)
[To-Let](#)
[About](#)
[Contact](#)
[SignIn](#)

Figure 5.2.4.2: Property details Page of “Bari-Vara”

### 5.2.5. Profile Page:

Here user can edit the profile, send owner request, see the apartment that they have been booked. If user is an owner, then they can add flat, see the flats that they have been posted for rent. Owners can also see the rent list where they can see the tenants who has placed a booking for their flat.

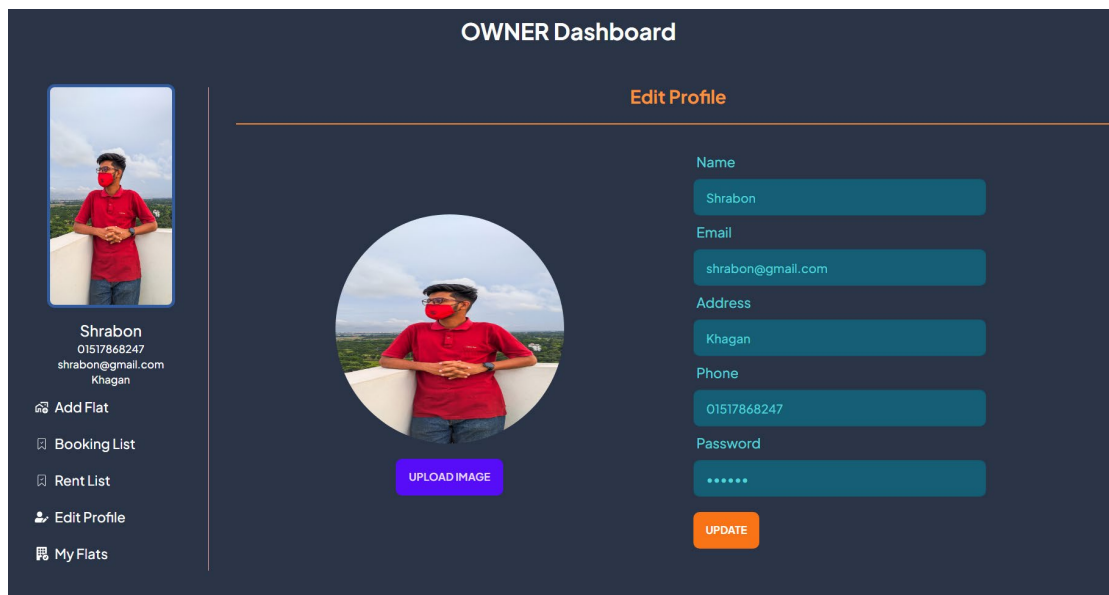


Figure 5.2.5.1: Profile Page of “Bari-Vara”

### 5.2.6. Edit Profile:

User can edit profile here by providing address, phone no, updating profile picture and request for to be an owner.

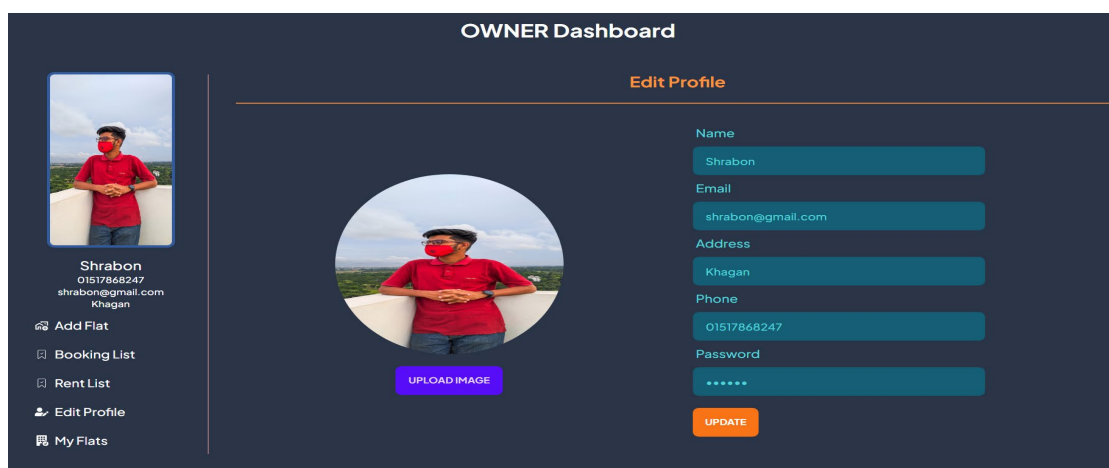


Figure 5.2.6.1: Edit Profile Page of “Bari-Vara”

### 5.2.7. Add Flat:

Here owners can add flat by providing flat details like title, address, no of bedroom, no of bathroom bathroom, available from, total size of the apartment, address and apartment image.

**OWNER Dashboard**

**Property Information**

Title  Title

**Property Information**

ID  Price

No of Bedrooms  No of Bathrooms

Sqft  Available from

**Property Address**

Address  Area

Area  Area

**Property Image**

Pick a file

**ADD FLAT**

**Shrabon**  
01517868247  
shrabon@gmail.com  
Khagan

**Add Flat**

Booking List

Rent List

Edit Profile

My Flats

Figure 5.2.7.1: Add Flat Page of “Bari-Vara”

### 5.2.8. Booking List:

Here tenants can see the flats which they have been booked and check if it is available or not and the owners has approved their request.

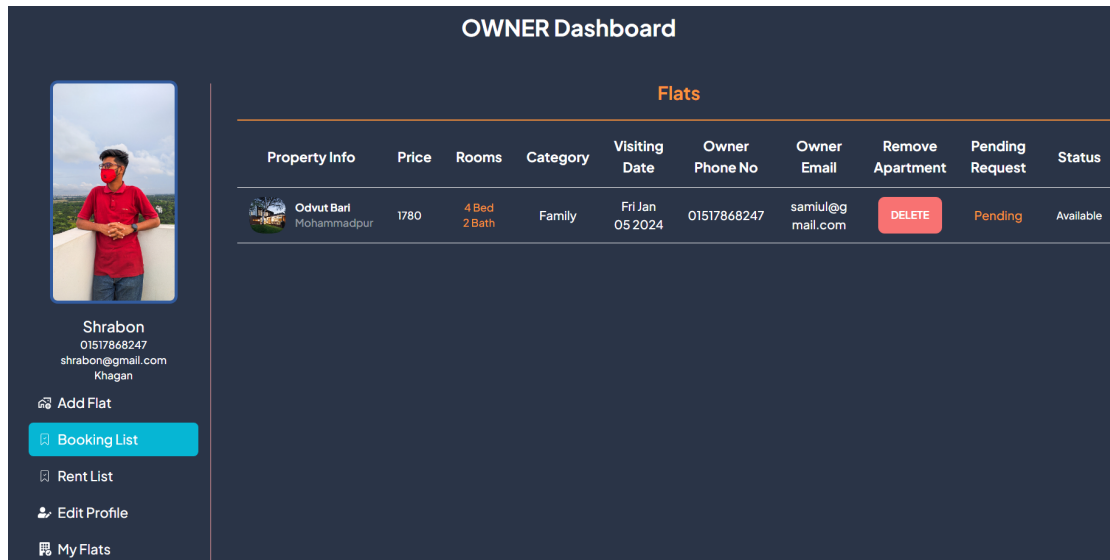


Figure 5.2.8.1: Booking list page of “Bari-Vara”

### 5.2.9. Rent List:

Here owner can see the flats which they have been posted for rent. They can also approve the tenants request and the status of the apartment.

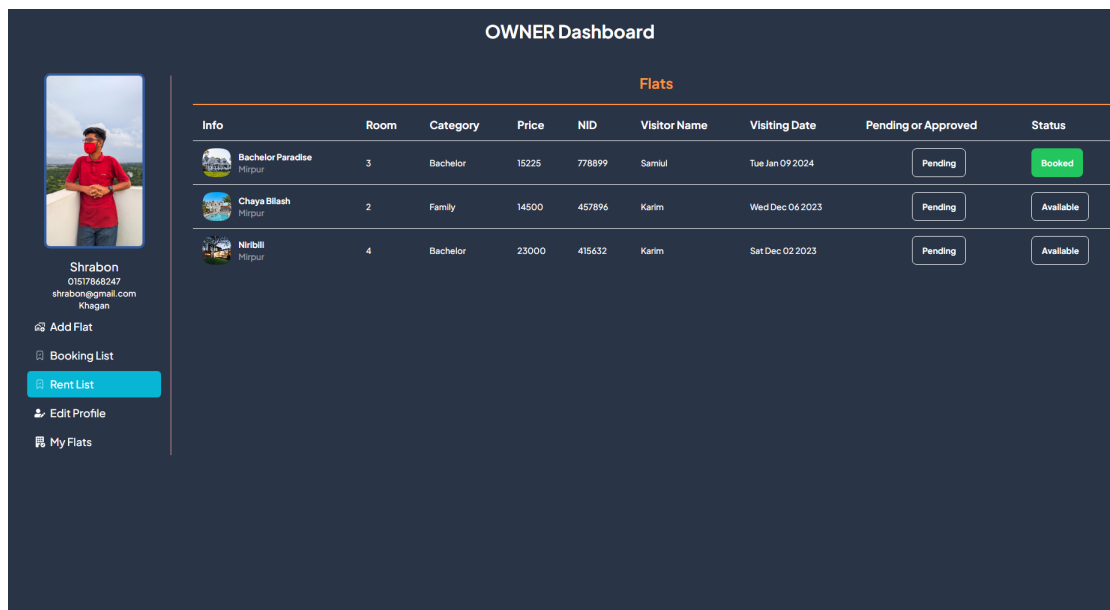


Figure 5.2.9.1: Rent list page of “Bari-Vara”

### 5.2.10. My Flats:

Here owners can see their apartment list with price, phone no, email, category, available from. They can remove their apartment.

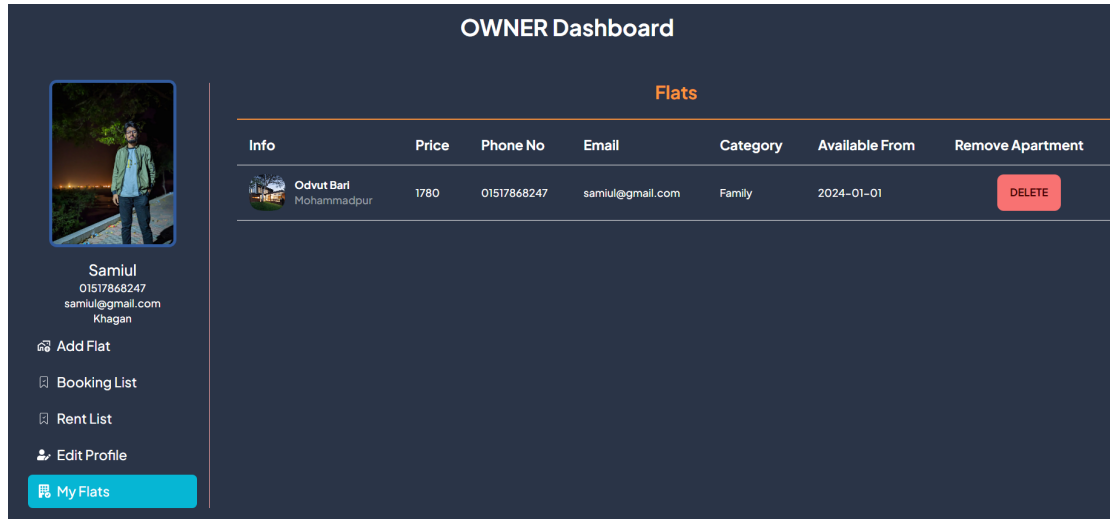


Figure 5.2.10.1: My Flats page of “Bari-Vara”

### 5.2.11. Admin Dashboard:

Here admin can see the analytics total owners, total properties, flat type analytics, total family, bachelor, sublet house.

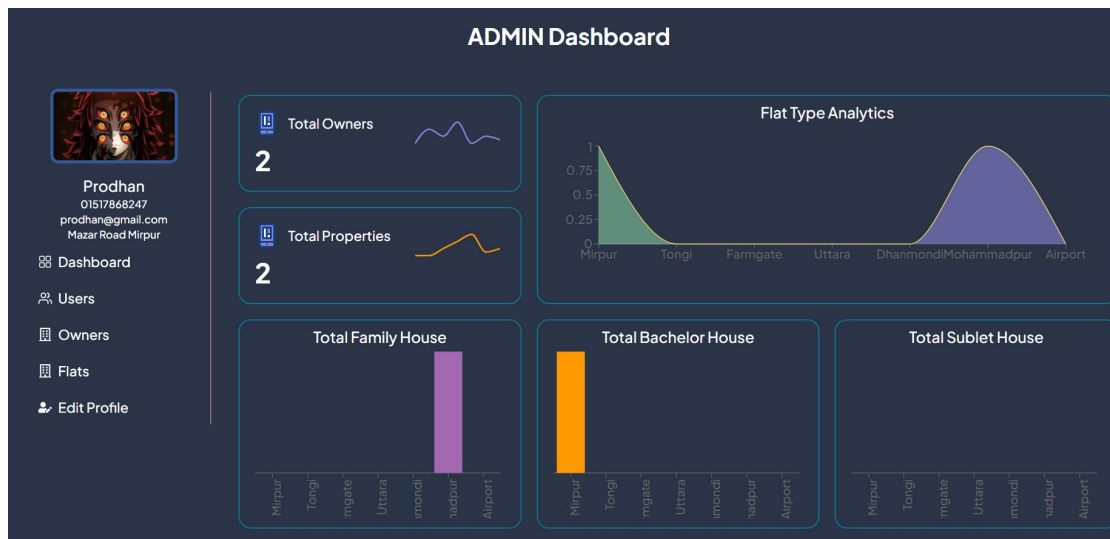


Figure 5.2.11.1: Admin dashboard page of “Bari-Vara”

### 5.2.12. User's page:

Here admin can see the total users. Admin can also see if any user has any owner request. Here an admin can accept or decline owner request.

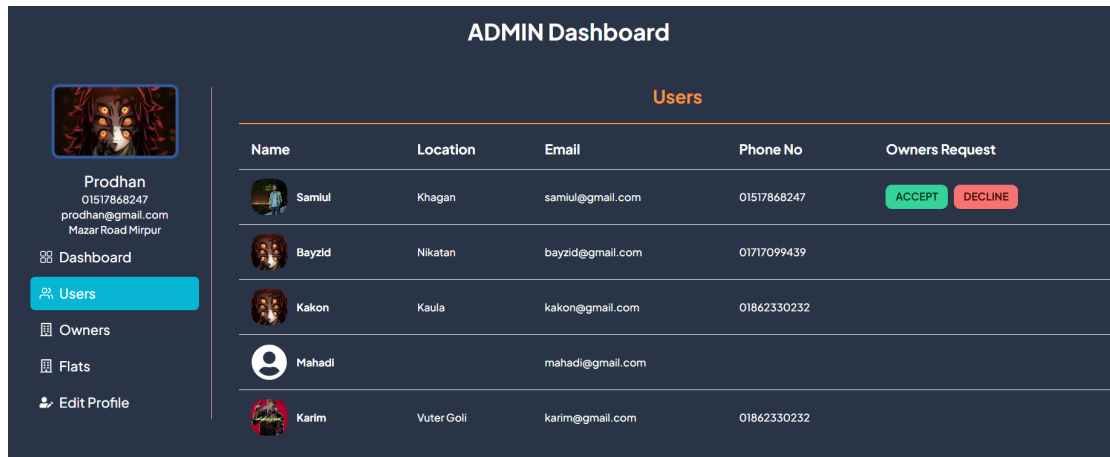


Figure 5.2.12.1: Users page of “Bari-Vara”

### 5.2.13. Owners Page:

Here admin can see the total owners. Admin can remove an owner permission.

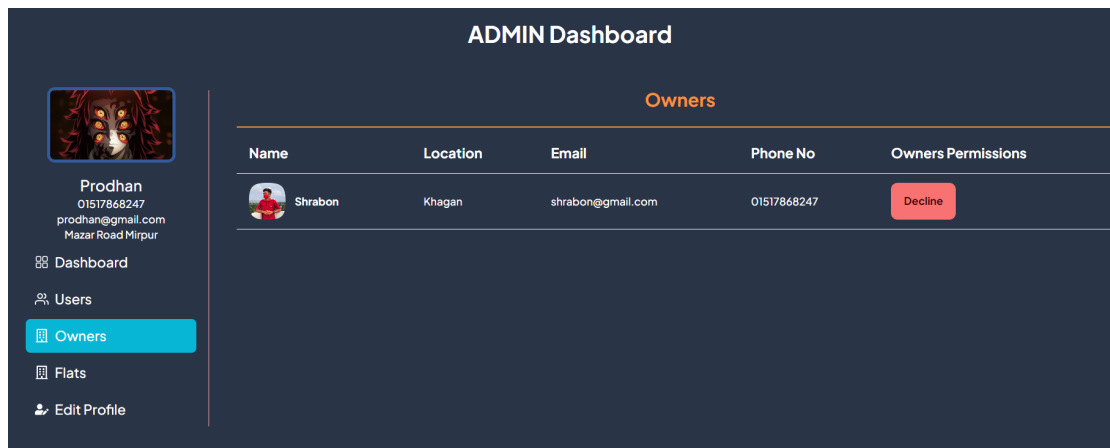


Figure 5.2.13.1: Owners page of “Bari-Vara”

### 5.2.14. Flats page:

Here admin can see the total apartment. An admin can delete an apartment.

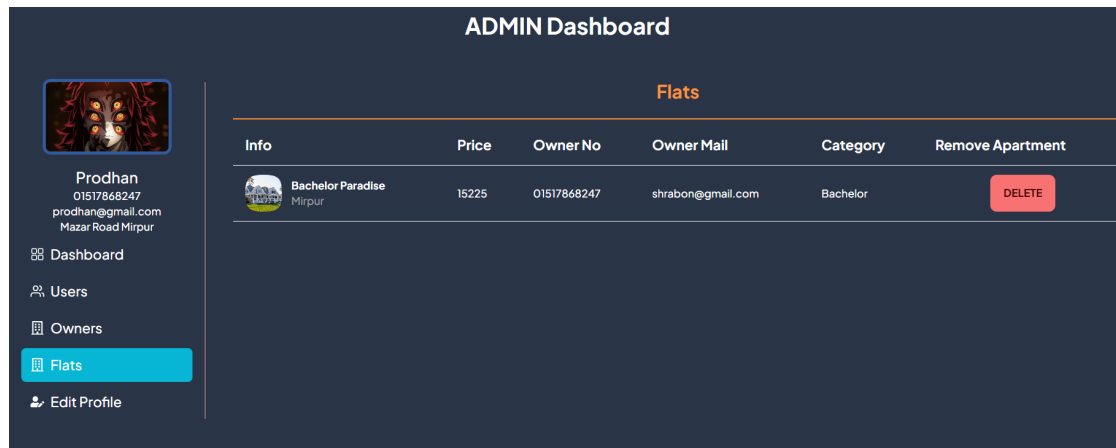


Figure 5.2.14.1: Flats page of “Bari-Vara”

### 5.3. Testing Implementation:

There are several test cases that have been applied to “Bari-Vara” web application.

TABLE 5.3.1: Testing Implementation

Test Case ID	Test Case Description
TC0001	Verify successful login with valid credentials
TC0002	Verify unsuccessful login with invalid credentials
TC0003	Verify the ability to create a new user profile
TC0004	Verify the ability to edit and update user profile
TC0005	Verify the ability to request to be an owner.
TC0006	Verify the creation of a new property listing
TC0007	Verify the ability to see the flat list
TC0008	Verify the ability to see the rent list
TC0009	Verify the deletion of a property listing
TC0010	Verify the functionality of the search bar
TC0011	Verify the application's response to an empty search
TC0012	Verify the ability for renters to inquire about availability

TC0013	Verify the booking process, including confirmation and cancellation
TC0014	Verify the ability to see booking list.
TC0015	Verify successful signup with valid credentials

#### 5.4. Test Results and Reports

All of the test case has been passed.

TABLE 5.4.1: Test Results and Reports

Test Case ID	Test Case Description	Expected Result	Status
TC0001	Verify successful login with valid credentials	User is logged in successfully	Passed
TC0002	Verify unsuccessful login with invalid credentials	User receives an authentication error message	Passed
TC0003	Verify the ability to create a new user profile	New user profile is created	Passed
TC0004	Verify the ability to edit and update user profile	User profile information is updated successfully	Passed
TC0005	Verify the ability to request to be an owner.	User successfully become an owner	Passed
TC0006	Verify the creation of a new property listing	User successfully has added a new property	Passed
TC0007	Verify the ability to see the flat list	User successfully able to see the flat list	Passed
TC0008	Verify the ability to see the rent list	User successfully able to see the rent list	Passed
TC0009	Verify the deletion of a property listing	User successfully able to delete the property	Passed
TC0010	Verify the functionality of the search bar	Relevant properties are displayed in search results	Passed
TC0011	Verify the application's response to an empty search	Appropriate message or	Passed



		default listings are displayed	
TC0012	Verify the ability for renters to inquire about availability	Inquiry is sent to property owner	Passed
TC0013	Verify the booking process, including confirmation and cancellation	Booking is confirmed and can be canceled	Passed
TC0014	Verify the ability to see booking list.	User can able to see the booking list	Passed
TC0015	Verify successful signup with valid credentials	User successfully verified as a user.	Passed

## CHAPTER 6

### IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY

#### 6.1. Impact on Society:

Bari-Vara web-app has vast impact on society. Bari-Vara app can have a big impact on society, affecting several stakeholders and facets of daily life in the neighborhoods. The following are some possible effects:

##### 6.1.1. Improved Efficiency:

Landlords and Property Managers: By streamlining administrative duties like selling properties, selecting tenants, and collecting rent, rental management systems help landlords and property managers work more efficiently. Consequently, this may lead to better-managed assets and services.

##### 6.1.2. Enhanced Tenant Experience:

Renters: Features like online rent payments, maintenance requests, and landlord communication offer tenants an enhanced rental experience. Improved landlord-tenant relations and increased tenant satisfaction may result from this convenience.

##### 6.1.3. Market Transparency:

Real Estate Market: By offering up-to-date data on available rental properties, rental prices, and tenant feedback, the app can help promote greater openness in the real estate market. Both landlords and tenants gain from this clarity.

##### 6.1.4. Community Development:

Local Economy: By promoting a robust rental market, effective property management can have a favorable effect on the local economy. This could draw in more investors and advance the community's general growth.

## **6.2. Impact on Environment:**

Bari-Vara web app's environmental impact can be impacted by a number of things, such as its features, design, and the behaviors it promotes. The following are possible effects on the environment that such an app could have:

### **6.2.1. Reduced Paper Usage:**

The shift to digital communication, lease agreements, invoices, and other documents can drastically cut down on the amount of paper used. As a result, there is less deforestation and the negative environmental effects of paper manufacture.

### **6.2.2. Energy Consumption:**

Energy is needed for the servers and data centers that house the application to function. To reduce their environmental impact, developers and service providers can implement energy-efficient technology and data centers that run on renewable energy.

### **6.2.3. Reduced Commuting:**

The necessity for in-person visits to rental homes may decrease with the implementation of features like virtual property tours and online application submission. This can therefore lead to a reduction in the environmental effects of commuting, including a drop in carbon emissions.

### **6.2.4. Sustainable Practices Encouragement:**

By encouraging landlords and property managers to implement eco-friendly methods in property care, such as energy-efficient equipment, water conservation, and waste reduction techniques, the app can support sustainable practices.

### **6.2.5. Remote Work Opportunities:**

One way to lessen the need for property managers to commute to an office is by providing them with a rental management system that allows them to operate remotely. Energy use and emissions linked to transport may decline as a result.

### **6.3. Ethical Aspects**

Bari-Vara web application creation and implementation bring up a number of ethical issues that need to be resolved to guarantee the equitable, open, and responsible use of technology. The following are some important moral considerations:

#### **6.3.1. Privacy and Data Security:**

**Ethical Consideration:** It is critical to protect the confidentiality and integrity of user data, including contact information, payment information, and personal data.

**Mitigation:** Adhere to data protection laws, use strong encryption, and secure authentication. Get users' informed consent and be open and honest about how you use their data.

#### **6.3.2. Fair Housing Practices:**

**Ethical Consideration:** It's critical to refrain from discrimination while listing properties and choosing tenants. The app ought to abide by the rules and ideals of fair housing.

**Mitigation:** Use filters and algorithms to stop discrimination on the basis of disability, gender, color, or other protected traits. Give users precise instructions on fair housing procedures.

#### **6.3.3. Transparent Algorithms:**

**Ethical Consideration:** Users should be aware of the decision-making process whether algorithms are used for tenant screening, property matching, or pricing.

**Mitigation:** Clearly explain the variables affecting algorithmic judgements. Steer clear of biased algorithms, and make sure they're audited and adjusted often to maintain fairness.

#### **6.3.4. Informed Decision-Making:**

**Ethical Consideration:** In order to make educated judgements, users—landlords and tenants alike—should have access to precise and thorough information.

Mitigation: Give accurate descriptions of the property, open and honest rental agreements, and disclosure of any pertinent data. Steer clear of tactics that could lead users astray.

#### **6.4. Sustainability Plan:**

Creating a sustainability plan for an app that manages rental properties requires defining tactics and policies to reduce environmental effect, guarantee moral usage, and promote long-term social and financial stability. Key elements to take into account in a sustainability plan are listed below:

##### **6.4.1. Energy Efficiency:**

Reduce the amount of energy needed to host and run the application. Run the application on data centers and servers that use less energy. Reduce server load by using effective algorithms and code optimization. Take into account using renewable energy sources to power infrastructure.

##### **6.4.2. Fair Housing and Non-Discrimination:**

The goal is to eliminate discrimination in property listings and tenant selection while promoting fair housing policies. Put in place filters and algorithms that stop biased judgement. Give users instructions and training on fair housing procedures. To guarantee fairness, audit and modify algorithms on a regular basis.

##### **6.4.3. User Education:**

Educate users on morally and environmentally responsible property management techniques. Include instructional materials on fair housing, energy efficiency, and ethical waste disposal in the app. Provide advice and best practices for managing properties in an eco-friendly manner.

## CHAPTER 7

### CONCLUSION AND FUTURE SCOPE

#### 7.1. Conclusion:

Bari-Vara web application comes with a revolutionary idea to solve the problem of apartment category. Nowadays people suffer a lot for searching a perfect apartment for them. They travel here and there to get a perfect apartment for them. Bari-Vara is trying to solve both family, bachelor and sublet type tenants. People can now find their suitable apartment in their budget range. People now have to visit Bari-Vara then search for an apartment. They can search the apartment by filtering them. There are two types of filtering options like category and place. They can filter the apartment by the places. Also, they can filter the apartment by the category. In Dhaka there are a lot of bachelors who suffer a lot for finding a proper residence for themselves. By using Bari-Vara web app now one bachelor can find which owners are giving their flat for a bachelor. Also, they can book the apartment, fix a date for visiting the apartment. The owners can now see the tenants who are willing to rent their apartment. They can approve them or reject them. Bari-Vara web application comes with a great idea to solve the problem of both tenants and owners. One owner can verify the tenants. This web app can reduce transport cost for renters. It also reduces the hassle of renters and owners.

#### 7.2. Scope for Further Developments

The rental management process is successfully automated and streamlined using Bari-Vara, which was developed with ReactJS. To make the system more reliable and feature-rich, there is always room for improvement and development. The following are a few possible areas for future development:

**7.2.1. Integration of VR:** Integration with VR will be a game-changing approach for Bari-Vara Rental management web application. Because then renters will be able to get the 3D view of the apartment from their home.

**7.2.2. Integration of augmented reality:** By using augmented reality renters can see the apartment in real time by visual, auditory. Both owners and renters can

communicate with each other's like they are in front of one another by person. Augmented reality can also enhance the user experience by customizing their flat. They can organize their home appliances. According to that they can ensure to themselves if the apartment is suitable for them or not. They can also the real time navigation of their apartment from sitting their house. They can customize their apartment by changing apartment color, room decoration etc.

**7.2.3. Google Maps:** On later time google maps will be integrated. It will help the renters to navigate easily. It will also help the renters to locate the apartment.

**7.2.4. Mobile App:** This web application will have a mobile app on later time. We know in real world many people are now using smartphone. So, if we introduce a mobile app version of Bari-Vara web application then it will be handier and more portable.

**7.2.5. Market analysis:** Bari-Vara will be added a feature called market analysis. In this section both owners and renters can analysis the rent of flat. Renters can see in which location the apartment rent is more reasonable. Owners can also detect which specific are providing more facilities according to their flat rent. They can also judge the flat rent. As a result, there will be market competitor.

**7.2.6. Apartment lease:** Nowadays many companies are trying to lease an apartment and make it as their office. On later time Bari-Vara web application will provide an option to select the apartment which are ready to lease that as an office. So that the corporate office owners can deal with them for long time profit.

**7.2.7. Notification:** There will be a notification option so that if any owner's choice list apartment will get available it will be sent notification to the renters. Or like if any renters are seeking house for that specific area. If any apartment on that area get available for his or her category it will send the notification to them. It will also send notification to the others renters if the apartment gets booked.

**7.2.8. Utilities bills:** On later time, Bari-Vara web app will also show the utilities bill to the tenants.

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## APPENDIX

Name	Description
HTML	The common markup language for websites is HTML. You can make your own website using HTML.
CSS	The language used to style an HTML document is called CSS. The CSS specifies how items in HTML should be shown.
ReactJS	The library for native and online user interfaces is called React. Create user interfaces by assembling JavaScript components, which are separate parts.
JavaScript	A programming language called JavaScript gives your website liveliness. This occurs in interactive media such as games, the way buttons react when pressed, data entry on forms, dynamic styling, animation, etc.
TailwindCSS	With Tailwind CSS, you can quickly create modern websites without ever leaving your HTML code because it is a utility-first CSS framework.
DaisyUI	Tailwind CSS now has a set of programmable colour names thanks to daisyUI. The values of these new colours are derived from CSS variables.
Firebase	Google offers a suite of backend cloud computing services and platforms for developing applications under Firebase, Inc. It supports a wide range of apps, including JavaScript, Node.js, Android, iOS, PHP, C++, Unity, and Java. It also hosts databases, services, authentication, and integration.
Axios	Axios is a Javascript library that implements the Promise API that is built into JS ES6 and is used to make HTTP requests using node.js or XMLHttpRequests from the browser. It allows client-side protection against XSRF and can be used to intercept HTTP requests and answers. It is also capable of cancelling requests.

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