

RentUsBd

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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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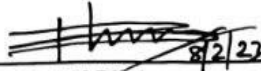
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APPROVAL

This Project titled "RentUsBd", submitted by Md. Robiul Hasan, 191-15-2516 and Saidul Alam, 191-15-2703 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 06 February 2023.

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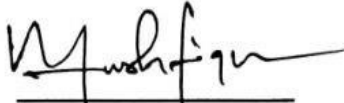
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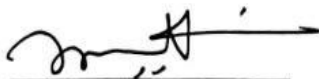
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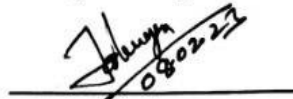
We hereby declare that, this project has been done by us under the supervision of **Zakia Sultana, Senior Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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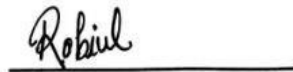
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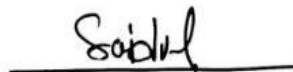


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ABSTRACT

"RentUsBd" connects renters and property owners online. Where renters can easily find their property. Today's urban renters need help finding suitable housing. Given the circumstances, a collaborative online space might be of great assistance. These apps allow property owners and renters to sign up, and renters can use them to find available properties by communicating with owners. This project created an online rental management app for property owners and renters. This web application is useful and easy to use, and it has many features that renters won't find on any other Bangladeshi house-rental website. The app made it easier and faster to find properties and ensured more rental options. once This web app will improve nationwide service. Its smart features inspired an online bright property rental service.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Property for rent has become an essential part of society in recent years. Housing, affects the economy, society, culture, and individual lives. This makes it one of the most important things affecting the overall quality of life. Increasing wealth has value only if it can be shared by all and is not used to address growing social deficits, one of which is housing shortages. Due to financial constraints and other factors, most families choose to rent rather than own a home. There are not enough rental homes of sufficient quality for all of these families. There is a very high demand for rental properties, and the number of available rental units needs to go up. Building property intended to be rented has various benefits, most notably for landlords who benefit financially from the tenants' monthly rent payments. Management is made more difficult by the rise in the number of tenants and landlords, which is particularly problematic for landlords who stand to lose significant amounts of money for advertising their rent [1]. According to the Bangladesh rental survey 2021–22, about 58.0% of homes in urban areas of the country are rented, but only 3.0% of homes in rural areas are rented. According to estimates provided by the Bangladesh Bureau of Statistics (BBS), housing and house rent account for 17.25 % of the monthly household consumption expenditures. When this number is added to the 5% of total spending that goes toward utilities, the amount a family spends each month on housing is almost a quarter of the total amount they spend [2]. Also, students from all districts come to Dhaka and other big cities to pursue higher education. 97% of students are bachelors and need a house to live in. But the main problem is that getting a place to rent is lengthy and takes a long time to processes who want to further their education travel to Dhaka and other cities throughout the country. 80% of the students in the country study from other countries and need accommodation. On the other hand, the biggest problem with renting is that finding it is time-consuming. For the primary objective of our service, which is to be the first to think about customer service, we will, of course, keep in mind the various categories of residential customers. Go to our website and agree to simple steps, such as clicking a

button to sign up for our logging into the account. In this model, the customer provides us with some information upfront so we can get in touch with them later and provide them with those services. When our customers are looking for a house, we must remember that they may find the perfect home for them at the most affordable price. Our website provides ways to make it easier.

1.2 Motivation

The first thing people need after shifting from one place to another is accommodation, but it is complicated and time-consuming. We want to create an online platform where people can easily find their desired accommodation. In 2019, when we started our university journey, we came from the village and looked for a home to live in, but it took time to find the desired home, and the rent of some properties was high. Furthermore, it wasn't easy to find a home by visiting every property. We want to solve these types of problems by creating the " RentUsBd platform. Everyone getting help out at the same time here. The " RentUsBd " platform will be helpful for both customers and owners.

1.3 Objective: Our primary goal is to assist those in those situations. So our objectives are:

- Excellent online rental management services.
- "RentUsBd" provides good quality properties that are well maintenance and verified owners.
- To produce a web-based system that allows renters to find property online and owners to manage their rental business effectively.
- Real-time messaging between owners and renters.
- 24/7 support system.
- To ease customer's tasks whenever they need to rent a home or property

1.4 Expected outcome

We hope that this website will change people's perceptions of house and apartment rentals.

- First, there is no longer a requirement for individuals to physically visit different homes in order to find a suitable rental.
- Owners and tenants can have productive conversations without meeting in person.
- Renting an apartment will reduce the time and hassle for both the tenant and the owner.

CHAPTER 2

BACKGROUND

2.1 Preliminaries

Decide who the website is for, whether it's for property owners, tenants, or both. Look at other property rental websites to see what they offer and what can be improved upon. Determine the features and functionality required for the website, such as property listings, property search, and user accounts. Select a content management system (CMS) or web development framework to build the website. Create a visually appealing layout and user experience for the website. Implement the features and functionality defined in the scope. Ensure that the website is functional and bug-free. Make the website live and accessible to the public.

2.2 Related work

An online rental system handles one part of the rental business. It does make other processing or customer support better, and it is cheaper and easier. On the other hand, finding a house is a very hard and complicated process. So online rental systems are used to rent homes and other properties. Because of this, it's getting more and more popular in our country. There are a lot of companies that do the same work. Bikroy.com is now known as Bangladesh's biggest website for selling and renting homes online [3]. "Bikroy.com" which is known as Bangladesh's largest online marketplace, has a section where people can rent or sell their homes. People have been able to buy and sell used items through this system. "RentUsBd" is an online marketplace that helps people find a property, a home, or even a place to do business. Our goal is to give our valued clients the most up-to-date marketing information and to make it easy for them to get in touch with developers, brokers, and landlords. As Bangladesh's ready-to-buy-and-sell platform, they've set up their system to give you as much information as possible about the property you're interested in at any time [4]. There is also a rental website named "rents.com.bd" but it is not yet developed; it is just an idea. They just made the site with domain hosting. "Rentometer.com" is a rental website in use. It is the most popular

website in the USA. However, there is no better website in our country. That is why we created a better online web-based rental application, "RentUsBd."

2.3 Comparative Analysis

Here is some main comparison factor between top renting apps with our application.

- User experience: All of the websites have a clean and simple design, with clear navigation. However, "RentUsBd" appears to have the most modern and user-friendly layout.
- Property listings: All of the websites have a large number of properties available for rent, with a good variety of options.
- Search functionality: All of the websites have basic search functionality, allowing users to filter properties by location, price, and other factors.
- Listing management: It is not clear from the websites if property owners or managers can easily list and manage their properties. But our Website will provide a clear listing option where the owner can easily advertise their property and renter can find the property.
- User accounts: All of the websites appear to have basic user accounts for tenants and property owners, but the specific features are not clear from the website. We have clear user dashboard.
- Customer support: Contact information for customer support is available on all of the websites, but the quality and availability of support is not known. Where we have better quality and 24/7 support system.
- Marketing: All of the websites have a good online presence, with active social media accounts and search engine optimization.
- Pricing: No information on pricing or fees for using the websites is provided.
- Contact: Those websites are not providing real-time conversation but we provide real-time conversation between renter and property owner.

2.4 Scope of the Problem

The ability for users to search and find properties based on criteria such as location, price, and number of bedrooms is fantastic, but it will be a problem if they are unfamiliar with the technology. The ability for users to book and reserve properties for

a specified period of time is critical because if it is not possible to maintain the booking, it will be a loss for both parties. The management of user accounts, including the ability for users to create and edit their profiles, as well as view their booking history, is available, but in some unexpected situations, the server may not be working and they cannot access it.

2.5 Challenges

When we build our website we face the following challenges, the market for online property rental services is highly competitive, and new websites must compete with established players for users and properties. Attracting and retaining users can be a challenge for a new property rental website. Building trust with users and ensuring the security of their personal and financial information is crucial for the success of a property rental website. Verifying the authenticity and accuracy of property listings and ensuring that properties meet minimum standards can be challenging. Designing a user-friendly and intuitive website that is easy for users to navigate and find the information they need. Creating and managing high-quality content, such as property descriptions, photos, and rental rates, that accurately represents the properties. Developing and executing a marketing and promotion strategy to attract and engage users, and drive conversions. Ensuring that the website complies with relevant laws and regulations, such as data privacy laws, accessibility requirements, and housing laws. Developing and maintaining a high-performing and reliable website with a scalable infrastructure can be challenging, particularly as traffic and user numbers grow.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Model(BPM)

The action of describing processes of an organization, as part of business process management and systems engineering, is referred to as business process modelling, or BPM for short [5]. This is done so that existing business processes may be evaluated, enhanced, and automated. BPM is often carried out by business analysts, who have competence in the modelling discipline; by subject matter experts, who have an in-depth understanding of the processes that are being modelled; or, more frequently, by a team consisting of both business analysts and subject matter experts. Alternatively, utilizing process mining techniques, the process model may be constructed directly from the logs of occurrences. The goal of most businesses is to either enhance the speed of their processes or decrease the amount of time it takes for them to complete a cycle. Other goals include improving quality or cutting costs in areas such as labor, materials, scrap, or capital. In the real world, the need of documenting requirements for an information technology project often serves as the impetus behind a management decision to invest in business process modelling.

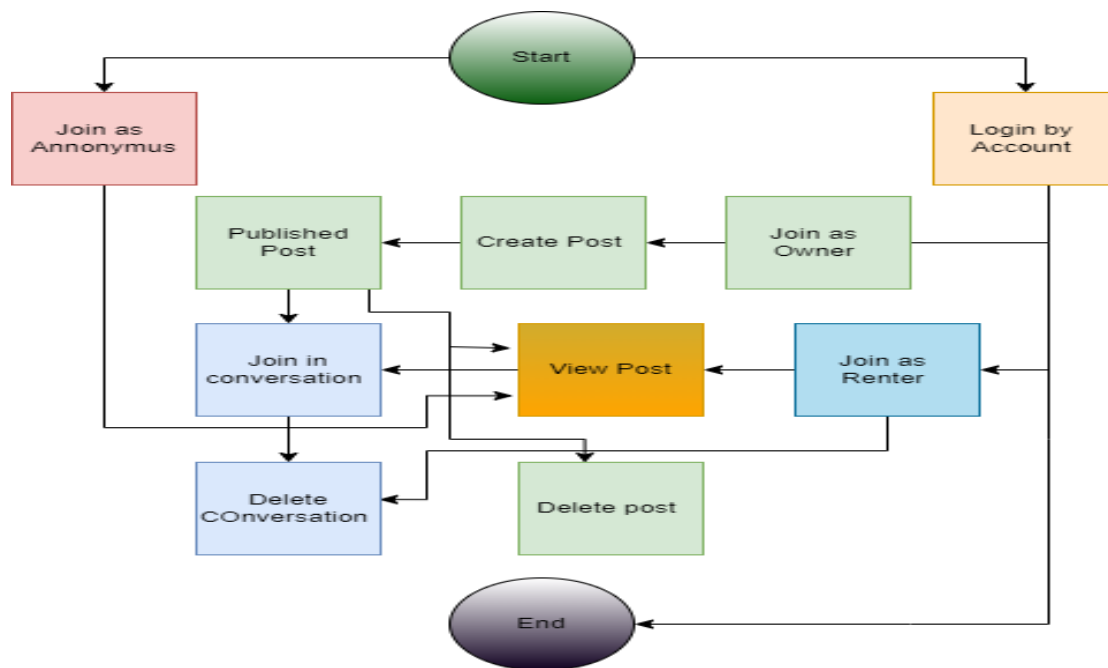


Figure 3.1: Business process model

3.2 Software Development Life Cycle

Along with gaining an idea of the aim of the website, you should also inquire as to who uses it. Or being aware of the demographics of the audience you are trying to reach, such as their age, gender, or level of computer competence. When the designer has a solid grasp of the computer environment, they will be better equipped to choose the appropriate technologies to implement. The last issue that needs answering is who exactly will be providing the information that will be included on the website.

Any project involving web development requires a methodology, which must be adhered to in order to guarantee the project's consistency and completion. The steps that make up the web development life cycle are as follows: planning, analysis, design, development, testing, implementation, and maintenance.

Planning: The main part of a project! What exactly is the function of this website? Who exactly is going to use this website? What kind of a computer environment do they have? Who owns the website, and who are the creators of the content there?

Analysis: During this phase, the requirements that will be needed for the project will be compiled and assessed.

Design and development: Which format for a website's page layout is most suitable? How can the user benefit from the many types of multimedia?

Testing: Is the information on the website accurate? Is there a problem with the website's functionality? Is it possible for users to locate the information they require? Is it simple to use the navigation system?

Implementation and maintenance: How are the website uses available online? How often is the website's content updated? Who is supervising making changes to the content? Will the website be subject to surveillance?

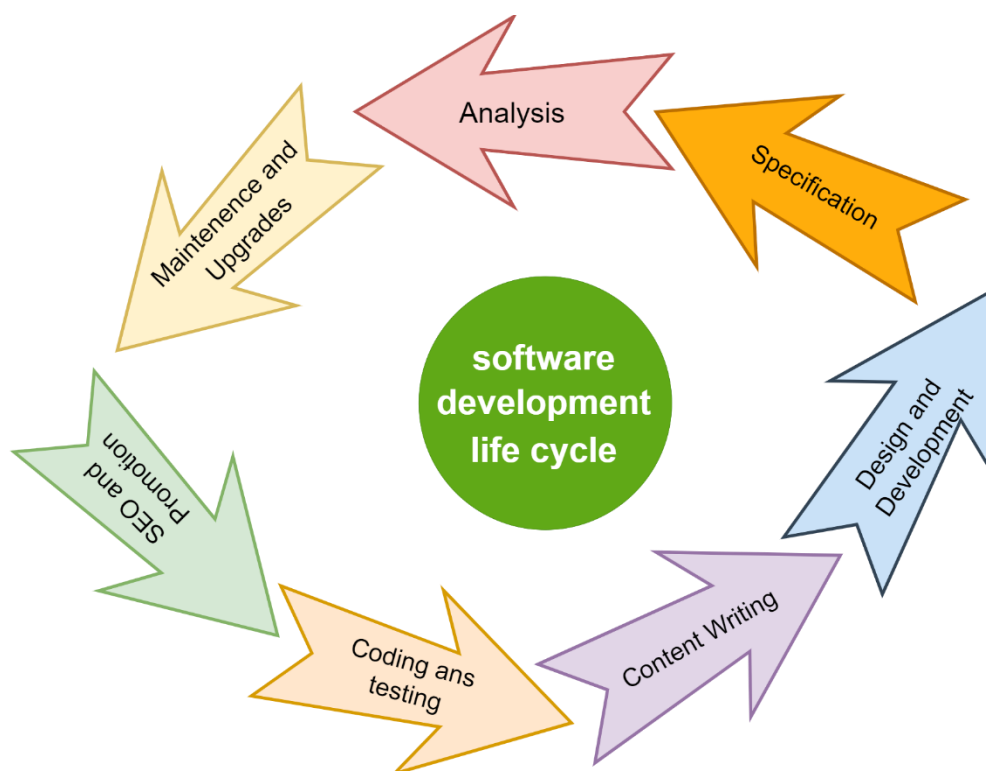


Figure 3.2: software development life cycle

3.3 Requirement Collection and Analysis

“An SRS is a document that details the intended features and functionality of the product. Additionally, it specifies the features the product must have in order to satisfy all customers and other interested parties” [6]

3.3.1 Hardware Requirements

We need certain fundamental materials to construct this project.

➤ Hardware interface

- A private Computer
- Processor: intel i3 5600U
- HDD: 256 GB
- Ram: 4 GB
- Processor: 3.20 GHz Clock speed

➤ Software Interface

Operating System(OS): windows 7/8.1/10 and Linux or Solaris.

Programming Language: JavaScript

User interface: HTML and CSS.

Browser use: Explorer, google chrome and others.

Database: MongoDB and Firebase.

3.3.2 Technological Requirements

While developing this project, we made use of a variety type programming languages and framework. This allowed us to create an application that was easier to navigate and utilize.

For Frontend: HTML5, CSS and Bootstrap5, JavaScript & JavaScript DOM, React.

For Backend: JavaScript, Express framework, Node.js.

Database: Firebase for authentication real-time database and MongoDB.

Server Use: Windows 10.

Operating System(OS): Microsoft Windows.

3.3.2.1 HTML5

The abbreviation for Hypertext Markup Language (HTML) is "HTML." It is an industry-standard markup language for the production of web pages. Using HTML elements, which are the fundamental components of a website, such as tags and attributes, it is possible to create new sections, paragraphs, and links, as well as organize their structure. [7] It contains certain tags, and by using them, we are able to layout our information in the website as we see fit; but, by using HTML, we are unable to beautify or provide style to our knowledge in a manner that would entice people to visit our website. It enables browsers such as Firefox, Chrome, and Internet Explorer, among

others, to present our material correctly and assists search engines in locating information across billions of websites based on the tag. It is the fundamental element that must exist on any website. These days, web developers claim that HTML is outdated and that they construct websites using different template languages.

3.3.2.2 CSS3

CSS stands for Cascading Style Sheets, and it is the language used to describe the appearance of Web pages, including their colour, layout, and fonts. It is possible to modify the presentation so that it is compatible with a wide variety of devices, including printers, big displays, and tiny screens. CSS is not reliant on HTML and may be implemented with any markup language that is built on XML. [8] The split between HTML and CSS makes it simpler to manage websites, exchange style sheets among pages, and adapt websites to a variety of contexts. The distinction between the presentation and the structure, or the content, of anything, is known as the separating of structure and presentation. Among the most useful parts of CSS is called "media query," and it enables us to display our material in a manner that is appropriate for the display size of each of our devices.

3.3.2.3 Bootstrap5

“When it comes to designing a website that is responsive and user-friendly on mobile devices, the HTML, CSS, and JavaScript framework known as Bootstrap is by far the most popular option” [9]. It does not cost anything to download or make use of it. It's the front-end framework that makes the process of developing websites simpler and more efficient. It has HTML and CSS-based page layouts for things like typography, buttons, forms, tables, modals, navigation, and image carousels. In addition to that, it supports plug-ins written in JavaScript. It makes it easier for you to build designs that are responsive. In order to make a website responsive to the screens of all different types of devices, we make use of their components with a grid system. In addition to this, they utilize a pleasant colour tone that is extremely easy on the eyes of human beings.

3.3.2.4 JavaScript

“JavaScript is a programming language that gives you the ability to generate material that is dynamically updated, manage multimedia, animate graphics, and do pretty much anything else you want” [10]. Because of its straightforward syntax, a great number of novice programmers choose JavaScript as their initial language of study.

3.3.2.5 Document object model(DOM)

“The Document Object Model, also known as DOM, is a data representation of the elements that compose the structure and material of a document that is published on the World Wide Web. This guide would introduce the document object model (DOM), then investigate how the DOM stores an HTML document in memory, and finally explain how to use application programming interfaces (APIs) to create online content and apps” [11]. Simply JavaScript scripts use it to alter or remove HTML tags. New items, as well as the insertion of existing ones, can be added to the page via DOM. Through the Document Object Model (DOM), we may also alter the attribute and insert a dynamic link into the webpage. The Document Object Model (DOM) is used by developers at times to apply conditional styling to HTML in order to provide the site visitor with a readable view. We can add functionality to the site by associating events like clicks, key presses, and submits with predefined responses.

3.3.2.6 Node.js

“Node.js is the framework for developing high-performance, scalable network applications that are based on the JavaScript runtime in Google Chrome. "Node.JS's event-driven, non-blocking I/O is perfect for real-world applications that use a lot of data and run on many different devices” [12]. A common job for a web server is to open a file on the server and send its contents back to the client. Node.js is great for making real-time web apps that use push technologies and Web Socket. These connections allow both the client and the server to start communicating, which makes it possible for them to trade data with one another. This is very different from the usual online response model, in which the client always makes the first move to get in touch. One may make the case that this technology, in the form of Flash and Java applets, has been available to us for many years. In fact, however, those were only sandboxed environments that made use of the web as a transport protocol in order to convey their

contents to the client. In addition, Flash and Java applets were executed in a sandbox and frequently operated over ports that were not standard, both of which may have necessitated the need for additional permissions.

3.3.2.7 Express framework

“Express is a web application framework written in Node.js that offers a wide range of functionality for the construction of web and mobile applications. It can be used to construct web applications with a single page, many pages, or a hybrid layout. It is a layer that was constructed on top of Node.js, and it assists in the management of servers and routes” [13]. In order to get started with Express JS, the first thing we need to do is gather some JavaScript and HTML. Express JS makes the management of web apps more straightforward. It is a JavaScript-based technology that is an element of MEAN, which is part of the software architecture.

3.3.2.8 Firebase real-time database

“The Firebase Real-time Database is a cloud-hosted NoSQL database that lets you store data and keep it in sync between users of your app in real time” [14]. By using such a database, one of the most significant benefits is that we do not need to reload the website. The modifications will be triggered automatically by Firebase whenever there is any kind of alteration to the database. Another justification for using it is the fact that there is no cost involved. There is no need for us to be concerned about purchasing hosting.

3.4 Basic use-case Diagram

“Use case diagrams are actually created during the early stages of software development, and use case modeling is frequently utilized for a wide variety of purposes. Specify the environment in which a system is operating.. Figure shows the fundamental outline of this system. It demonstrates that the administrator has authority over not just the database but also the whole system. On the website, renters can look for homes to rent, and owners can list the details of their rental units. The administrator will be responsible for making changes and monitoring the system. The system will

need owners and renters to register, and once this is done, the data from the registrations will be kept in a database for future investigation and verification.

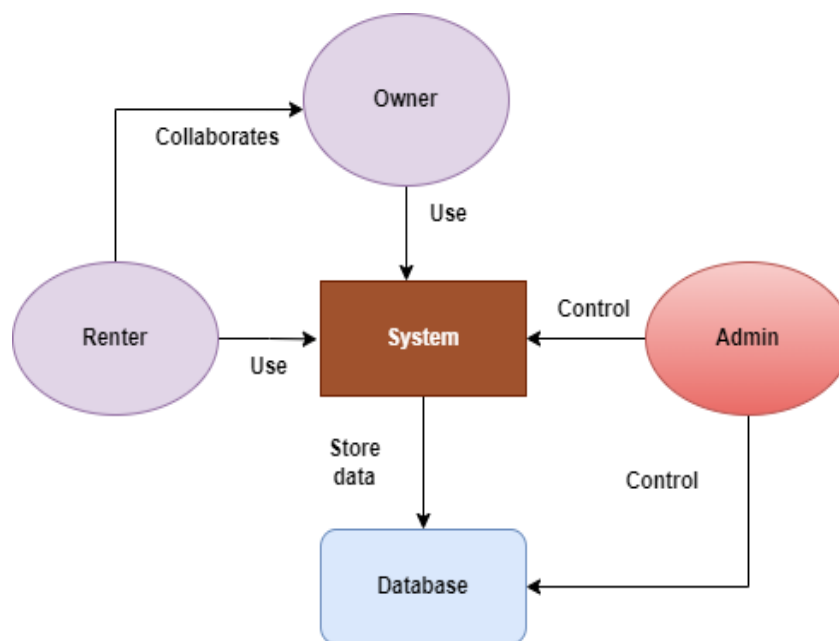


Figure 3.3: Basic diagram of the system

3.4.1 Overall Use Case Diagram: In this complete projection of the system's use-case diagram. There are three distinct user types in this system: which are admins, renters, and owners. After an auspicious registration that has been validated, owners and renters are both able to utilize this system. The system allows for extensions and modifications to be made by administrators. The administrator will keep a watchful eye on the whole system. It is possible for owners or tenant users to extend it, but modifications are no longer allowed. That means property owners could post ads for their homes, and prospective renters might begin a discussion with the owner in a chat window that was specifically designed for that purpose.

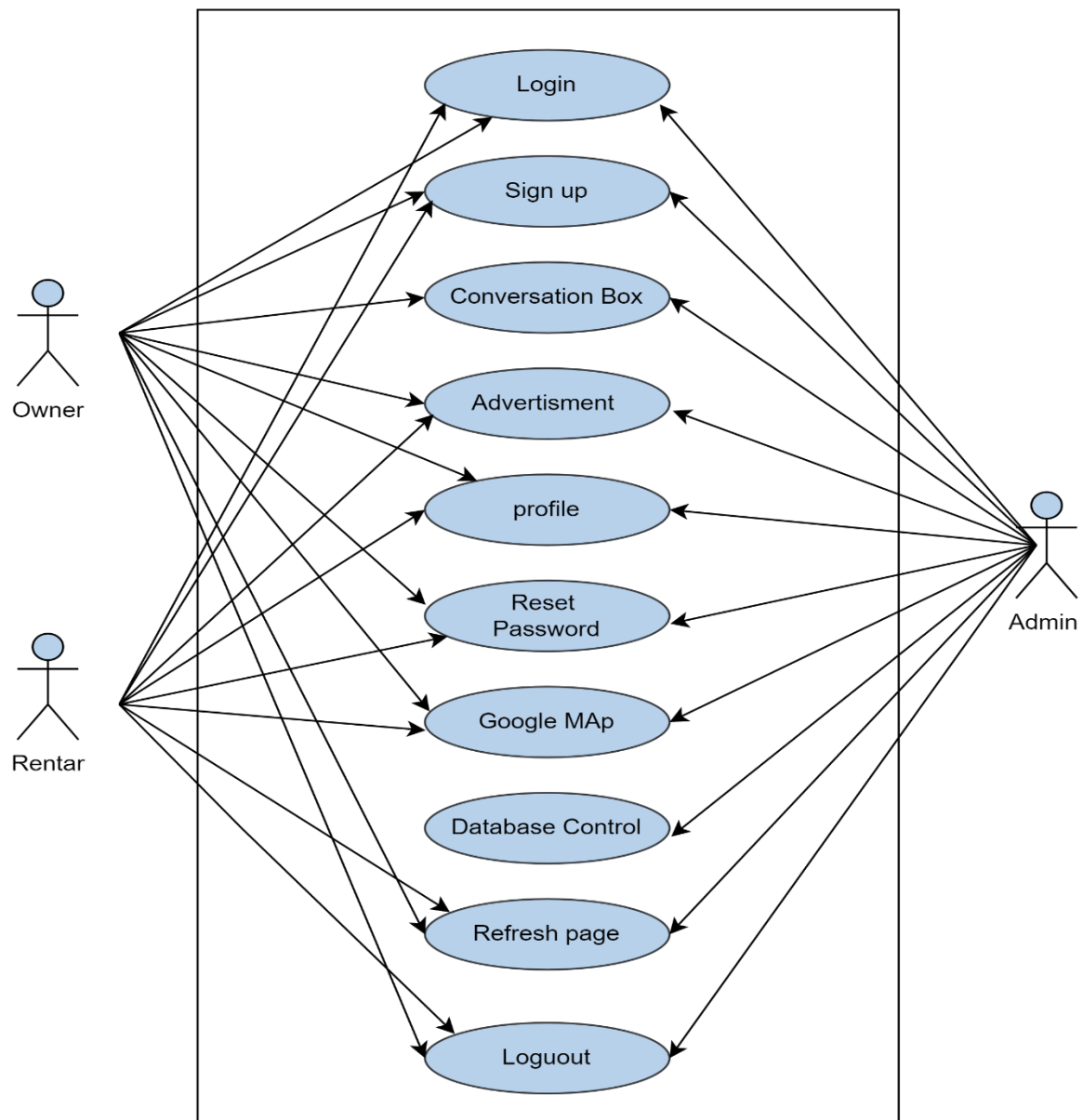


Figure 3.4: Total Use-Case Diagram of the System.

3.4.2 Admin Use Case Diagram: Figure Describe the use case diagram for system administration. It outlines the many kinds of system processes that need the attention of an administrator. After registering, administrators will be able to log into the system using this page. The administrator has the ability to handle the database and can do things like to remove or change entries in the database. They also have access to Google Maps, and the dialogue system makes it easy for them to get in touch with one another. Resetting the password and refreshing the page are both actions that the administrator mistake.

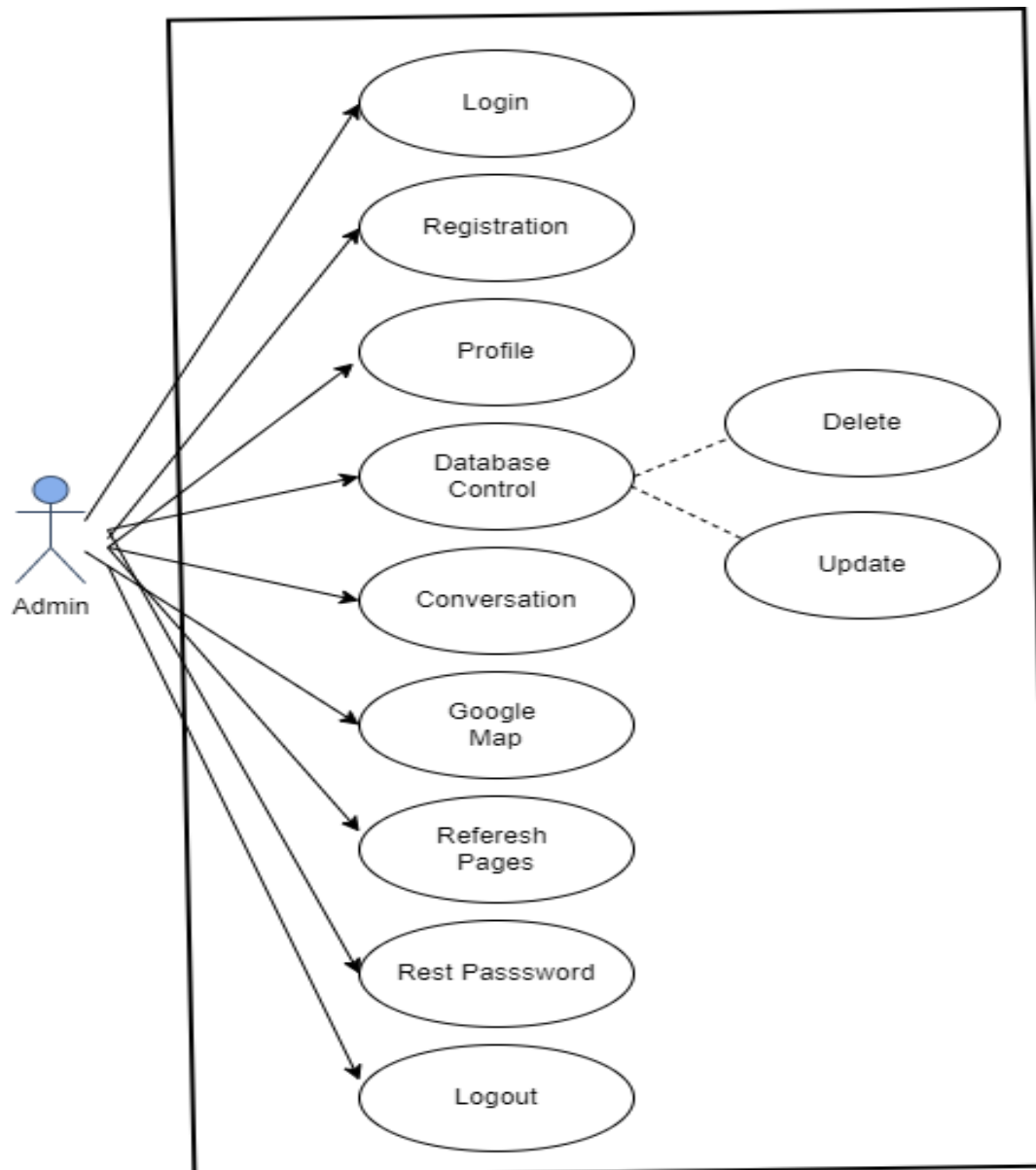


Figure 3.5: Admin Use-Case diagram

3.4.3 Owner Use Case Diagram: The use-case diagram that was developed by the owner of the system is shown in the figure. It gives an indication of the kinds of system operations that are carried out by the owner. In this section, owners may register their accounts with the system and log into their accounts. Additionally, they had the ability to begin a dialogue with prospective renters and modify or remove their home's advertisement.

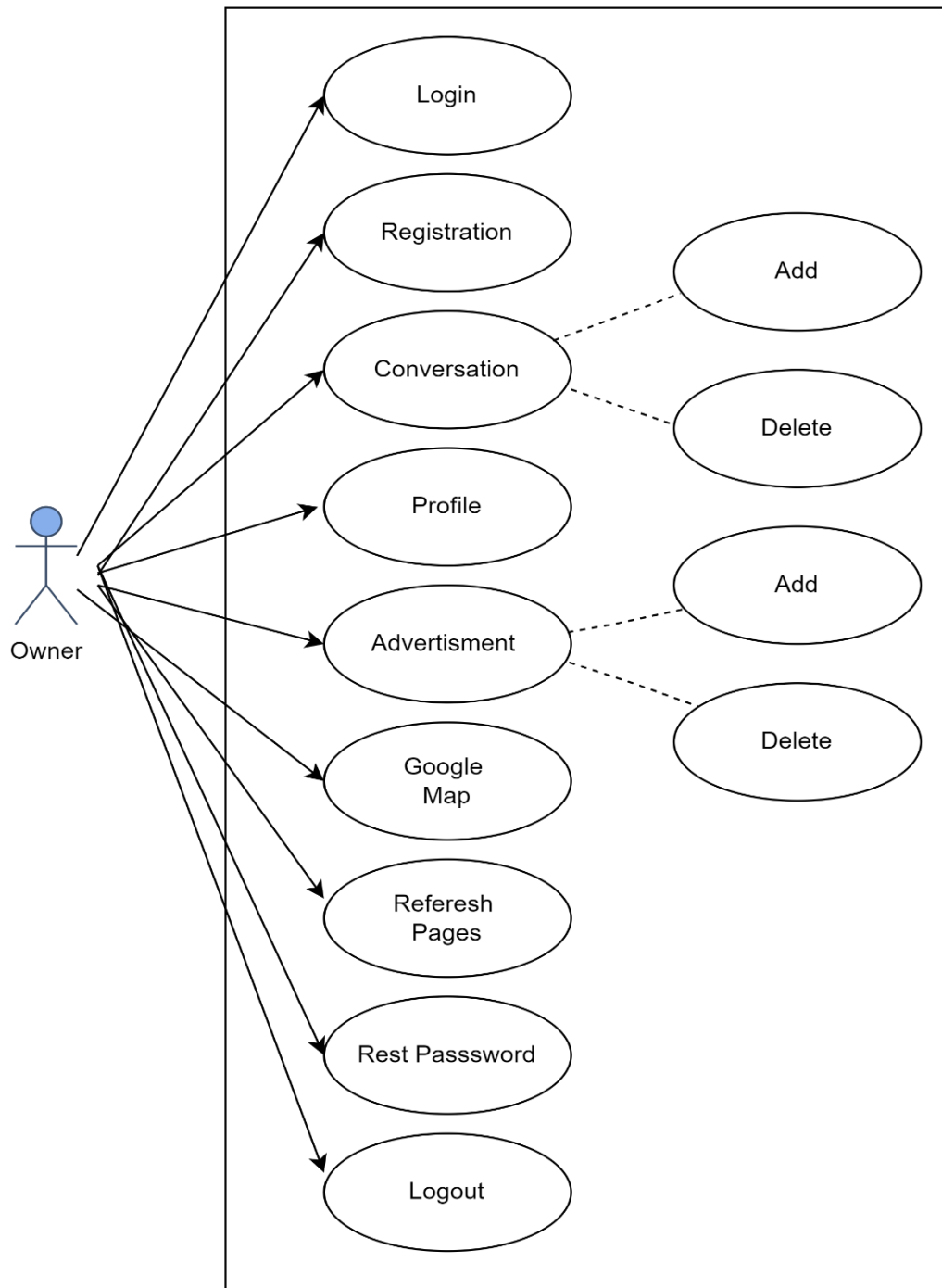


Figure 3.6: Owner Use-Case diagram

3.4.4 Renter Use Case Diagram: The schematic of the tenant use case for the system may be seen in the figure. It demonstrates the many kinds of procedures that are carried out by a renter. Tenants who have already registered their accounts may access this section of the system and log in. The tenant is able to set up their own profile and change the password at any time. In addition to that, make contact with other people via the use of a conversation system.

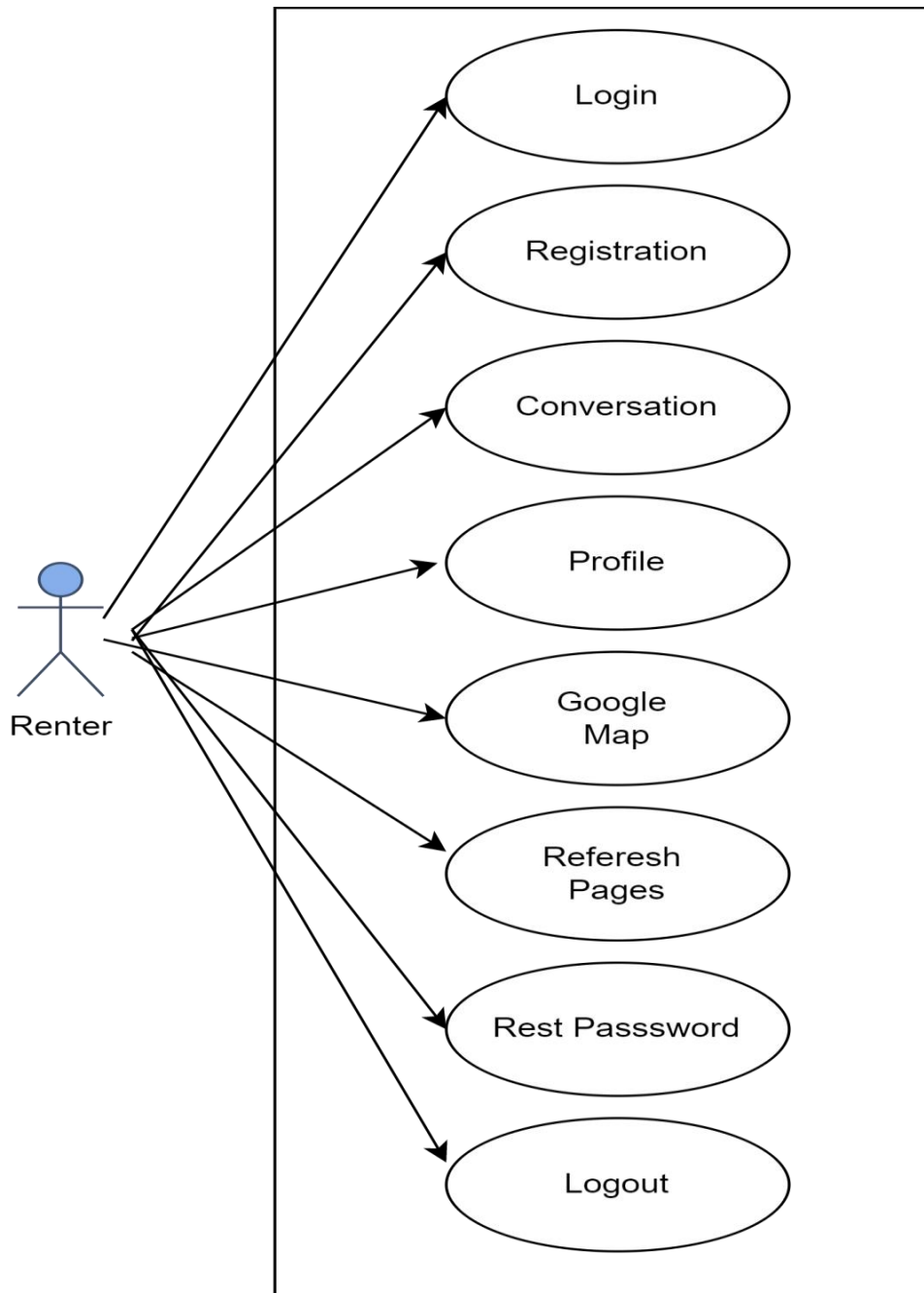


Figure 3.7: Renter Use-Case Diagram

3.4.5 ER Diagram

Entity Relationship Diagram, or ERD, is a diagram that shows how the entity sets in a database are related to each other. In other words, ER diagrams help to explain how databases work from a logical standpoint. Entities, attributes, and relationships are the three main ideas that are used to make ER diagrams [15].

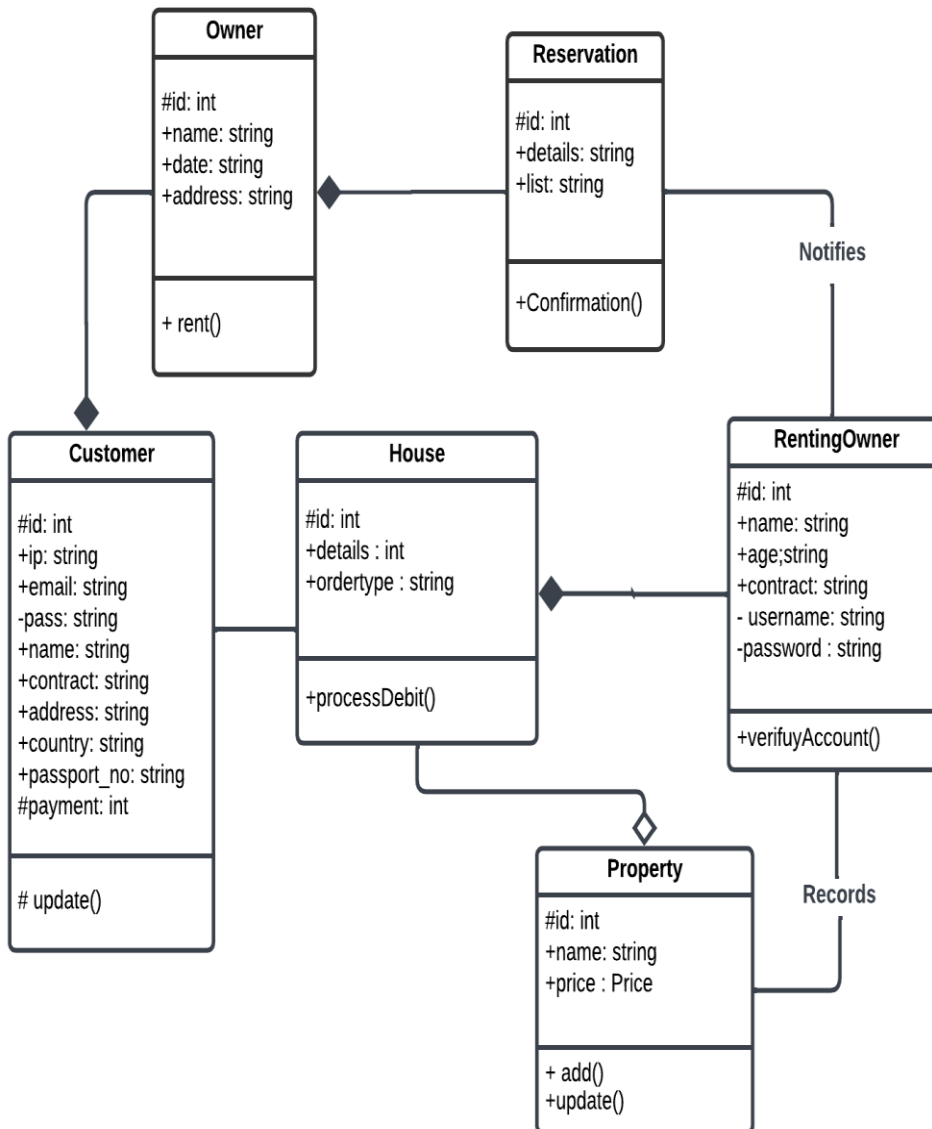


Figure 3.8: ER Diagram.

3.4.6 ER diagram Description:

Customer: In this diagram, the user table represents the database. There are four characteristics. This is where the identification of the client and their details are defined.

- Customer_name: attribute of database that determines the name of the client.
- Customer_id: Customer Id that serves as the primary key.

- Customer_IP: The IP address is another property that describe the customer “A device's identity on the internet or a regional network is denoted by its IP address, which is a one-of-a-kind address. The abbreviation "IP" refers to the "Internet Protocol," which is a collection of rules that dictates the structure of data that is sent over the internet or a local network” [16].
- Customer_email: An additional characteristic of the table that defines the email address of the customer.
- Customer_pass: Another characteristic of the table that defines the password for the client.
- Customer_contract: An even further property of the database that defines the customer contact.

Owner: When an owner posts an advertisement, a connection is created between the Product database and the customer table. This relation is referred to as the Order relation, and it serves as the verb. There are three characteristics about it.

- Owner_name: attribute of database that determines the name of the owner.
- Owner_id: owner Id that serves as the primary key.
- Owner_IP: The IP address is another property that describe the owner “A device's identity on the internet or a regional network is denoted by its IP address, which is a one-of-a-kind address. The abbreviation "IP" refers to the "Internet Protocol," which is a collection of rules that dictates the structure of data that is sent over the internet or a local network”.
- Owner_email: An additional characteristic of the table that defines the email address of the owner.
- Owner_pass: Another characteristic of the table that defines the password for the owner.
- Owner_contract: An even further property of the database that defines the owner contact.
- Owner_address: A string attribute that describe the owner location.
- Owner_country: A string attribute that describe the owner country.

Add-Property: Add Property is a section where you can enter all of the information about the property. And all information about the property will be stored in the database.

- Property_Title: attribute of database that determines the name of the property.
- Property_id: Property Id that serves as the primary key.
- Property _Details: This is a string attribute that describe the details of the property size, rent, room, bath, kitchen, garage, gas, elevator and the images of the property.
- Property Rent_amount: Here the amount is the property rent is a double attribute.
- Property_city: The location of the Property area.
- Property_area: This is a string attribute, which describe the location of the property.

3.5 Logical Data Model

A data flow diagram is a method of graphically showing the movement of information through a system or process. The DFD also shows information about what each entity puts out and what it takes in, as well as the process itself of the website. There is no control flow in a data-flow diagram, which means there are also no decision rules or loops present. A flowchart is a diagram that shows the steps that are taken based on the information [17].

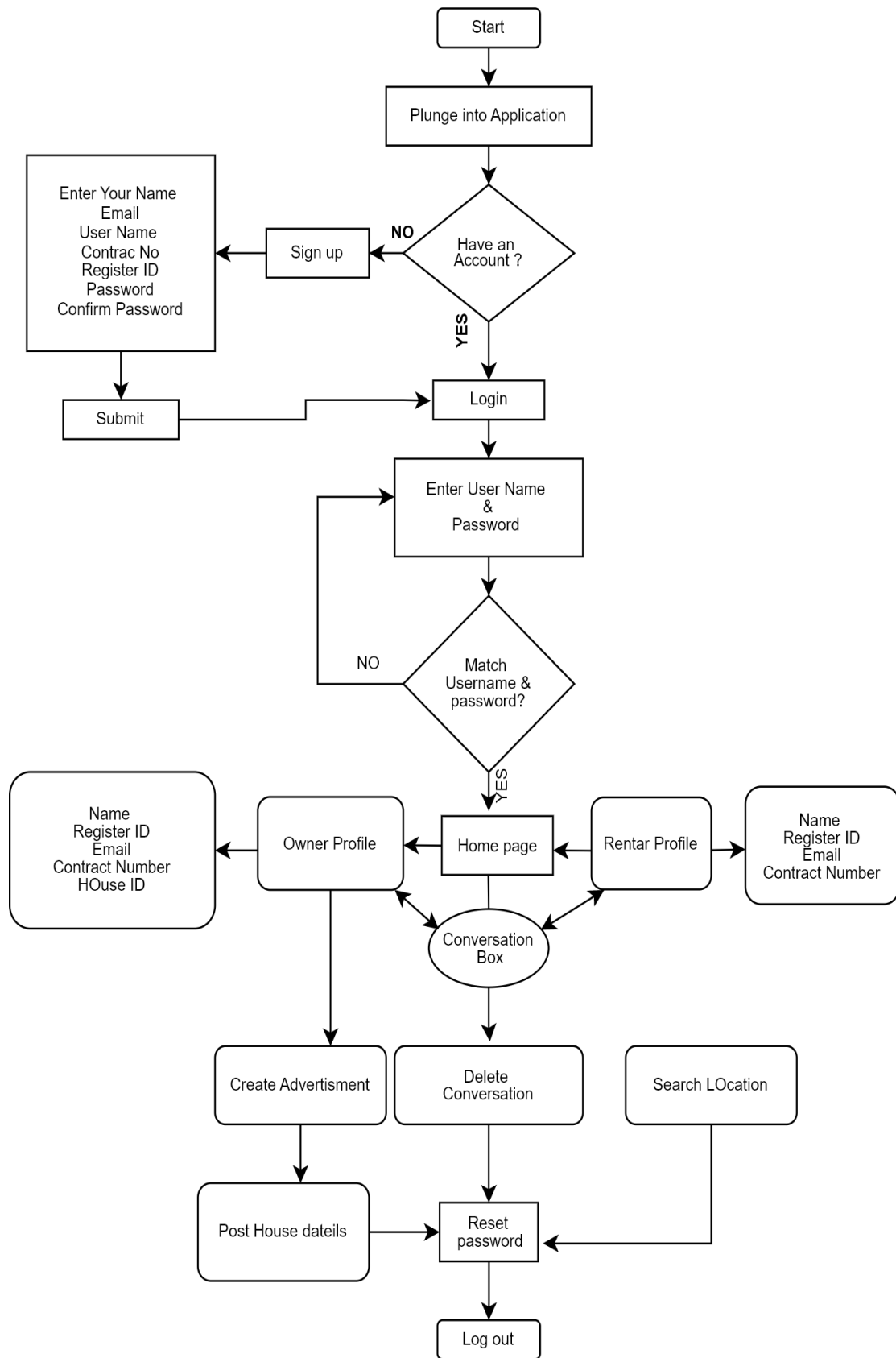


Figure 3.9: Logical data model

3.6 Design Requirement

- **User-Friendly Interface:** A clean and intuitive interface that is easy for users to navigate and find the information they need.
- **Responsive Design:** A responsive design that adapts to different screen sizes and devices, ensuring a consistent user experience on desktop, tablet, and mobile devices.
- **High-Quality Images:** High-quality images of properties, including photos, floor plans, and virtual tours, to help users get a clear understanding of the properties they are interested in.
- **Clear and Concise Information:** Clear and concise information about each property, including details such as location, size, amenities, and rental rates.
- **Search and Filter Features:** Advanced search and filter features that allow users to quickly and easily find properties that meet their specific requirements.
- **User Accounts:** The ability for users to create and manage their accounts, including the ability to view their booking history and make payments.
- **Booking and Payment Processes:** A streamlined booking and payment process that is simple and secure for users.
- **Customer Support:** A dedicated customer support system, such as live chat or email, to assist users with any questions or issues they may have.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

The user interface is one of the most important parts of any website. Depending on who is using it The success of a website depends on how easy it is to use and how it looks. So that we pay the most attention to making the interface as easy to use as possible. We make a system that is simple, easy to find, and clear. Our users will like an interface that lets them access all features with a single tap of the finger. On the road: When building the website, it wasn't easy to make an interface that was easy to use. easy for our users to use. Also, we use flat, natural colors that are easy on the eyes on our website. After this part, we will talk about all the tabs on our website. This is why, at first, we create a UI-UX design for the whole website's front end and then implement it.

4.2 Back-end Design

Backend design using Node.js is a popular approach for building scalable and efficient web applications. Node.js is an open-source, cross-platform JavaScript runtime environment that enables developers to write server-side code in JavaScript. This allows developers to use a single language for both the front-end and back-end of their applications, improving efficiency and reducing the need for context switching. Node.js is built on top of Google's V8 JavaScript engine, making it fast and lightweight. This makes it well-suited for real-time applications and high-traffic websites, where performance is critical. In a Node.js-based backend design, data is typically managed using a database, such as MongoDB or MySQL. Node.js provides a number of libraries and frameworks, such as Express.js and Koa.js, that make it easy to connect to and interact with databases, and to build RESTful APIs. Node.js also supports several concurrency models, including event-driven programming and asynchronous programming, making it possible to build highly scalable and performant backends that can handle large numbers of requests. In addition, Node.js has a large and active community of developers, who contribute to the development of the platform and its associated tools and libraries. This makes it easy to find support, resources, and

solutions to common problems when building backend systems using Node.js. Overall, Node.js is a powerful and flexible platform for building backend systems, and its popularity and versatility make it a popular choice for many web developers.

4.3 Project Design

RentUsBd is a virtual web site where people can search for property according to their needs. The owner can add his house here, and buyers can talk to him and find his house based on their preferences. So we designed our website keeping in mind owners' and renters' needs.

Description: Our project has a database which contains website data, and we mainly use MongoDB to store our users' data. This website has many property and commercial space advertisements so that renters can easily find their preferred properties or homes.

- People may explore available properties by registering for free on our website and then browsing through the list of available properties.
- After registration, anybody is able to see and publish advertise on the website, indicate that it satisfies the conditions that they have specified.
- There are going to be three different sorts of members on our website Owners, visitor, and administrator.

4.4 Project page layout

- Home
- All properties
- Add properties
- Conversations
- About us
- Contract up
- Login
- Sign up

4.4.1 Home

On our homepage there are two sections: on the top left side we can see the navigation bar; at the beginning of the navigation bar we can see our website logo; then we can see the rest of the sections; and on the right side we can see the login and signup buttons. Then we can see the search bar or browse properties, where we can select the city area and category according to our convenience, and then we can see the top categories. The top categories mainly indicate popular categories like "house rent," "hostel," "only for boys and girls," and "single room," which are in high demand. And I can select all the ads under the top categories. Top Categories Following that, we can see the most popular listing properties, as well as our copyright section, other policies, and various types of reviews and stories. Which is the footer sections.

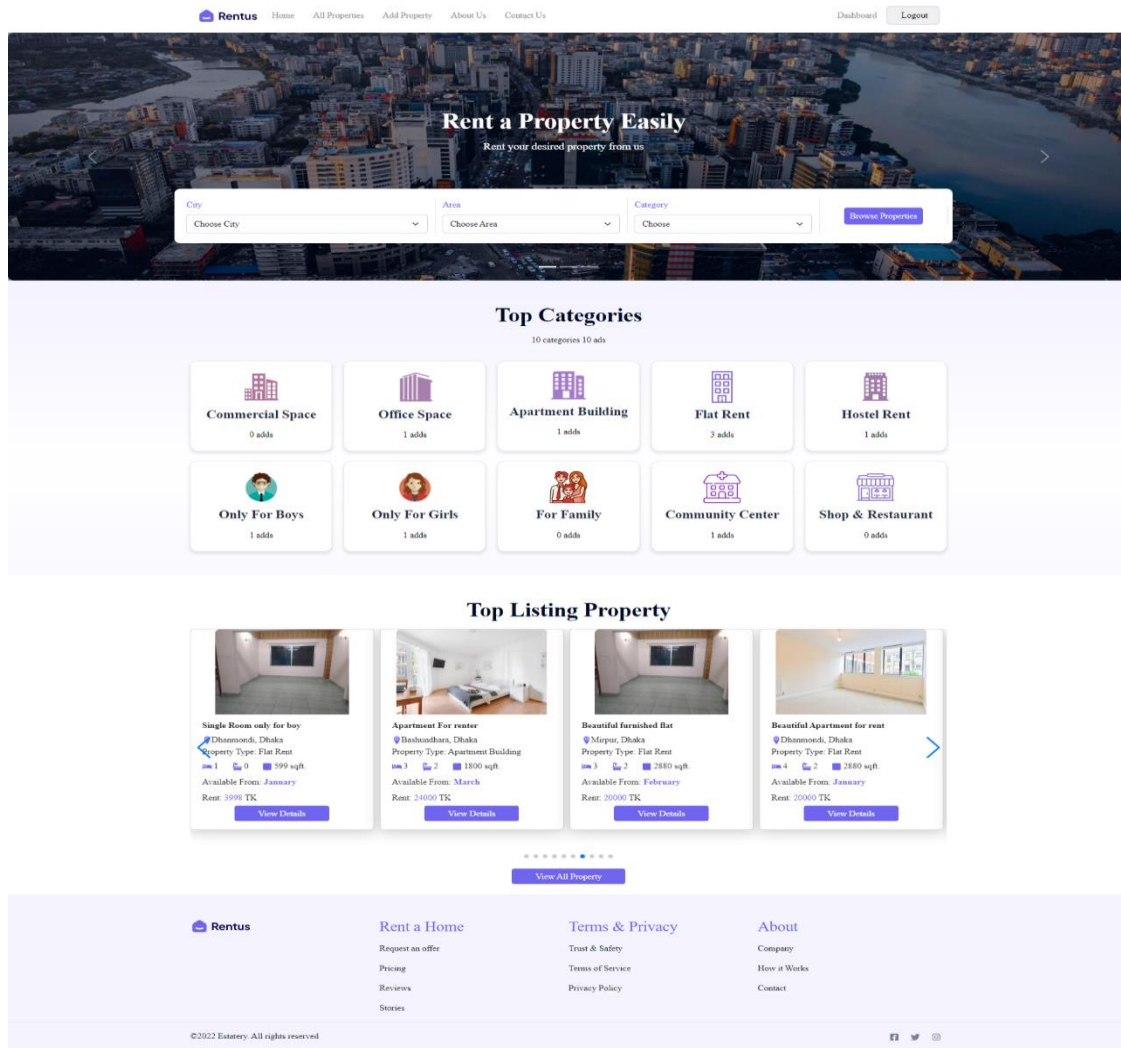


Figure 4.1: Home page

4.4.2 All property:

Apartments, regular houses, bachelor houses, and other types of properties are listed on the all properties page of our website. A renter can easily find his or her desired property from among all the properties. In some cases, they can search for their properties by, for example, price, city, rent flats for men, commercial space, restaurant, community center, and everything else. He can choose the month he needs blood, as well as the number of bedrooms and seats—almost everything is easily found through the filter on the all properties page.

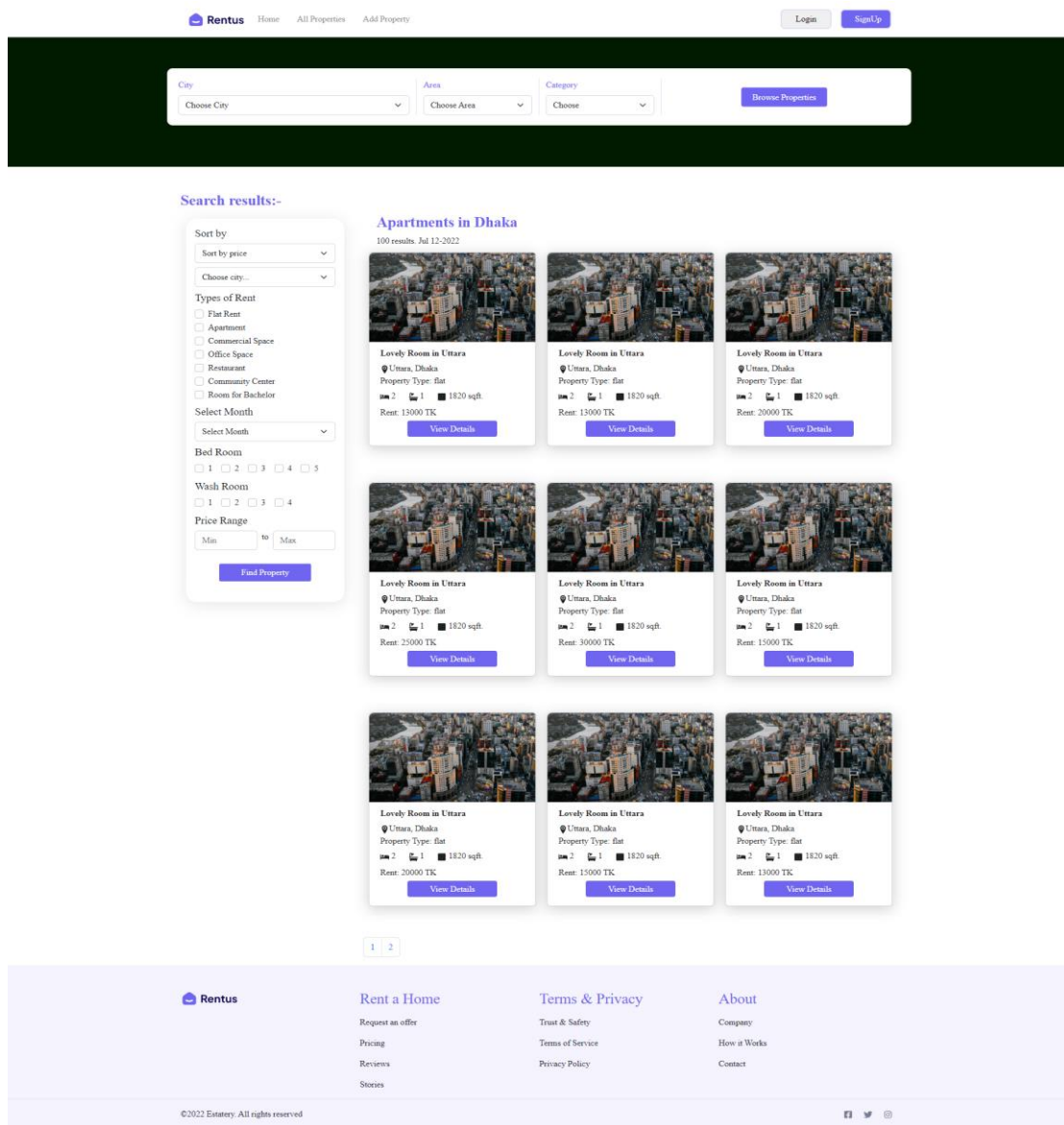


Figure 4.2: All Properties Page

4.4.3 Add Properties

On our website, the "add property" page is the most important because here the owner can add his property and give all the necessary information. In this case, first, the sealer has to give his information, such as a phone number, name, and email address, and then give such property details. Like Title Property Details Size of the Property Gas Room City Area Category Address Rent Amount Whether or not there is an elevator, and whether or not he wants to include pictures of his property; by including pictures of the property, the tenant can easily get an idea of the property without having to visit the location.

The screenshot shows the 'Add Your Property For Rent' page on the Rentus website. The page has a navigation bar with 'Rentus', 'Home', 'All Properties', and 'Add Property' links, along with 'Login' and 'Sign Up' buttons. The main heading is 'Add Your Property For Rent'. The form is organized into several sections:

- Personal Information:** Fields for Name*, Phone No*, and Email*.
- Rental information:** Field for Property Title* with a placeholder 'enter property title'.
- Property Details:** A large text area for 'write details of a property'.
- Rent:** Field for 'rent amount' and a checkbox for 'Negotiable'.
- Property Size:** Fields for 'size of a property in sqft.', 'City*' (with a 'Choose City' dropdown), and 'Area*' (with a 'Choose Area' dropdown).
- Rent Category*:** A dropdown menu with 'Choose' selected.
- Address*:** A large text area for 'write details of your property'.
- Room*, Bath*, Kitchen*:** Three separate text input fields.
- Garage*, Gas*, Elevator*:** Three separate dropdown menus.
- Upload Property Image:** A 'Choose File' button and 'No file chosen' text.

The footer contains the Rentus logo, navigation links for 'Rent a Home', 'Terms & Privacy', and 'About', and social media icons. Copyright information for 2022 is also present.

Figure 4.3: Add Properties Page

4.4.4 Login

The login page is very important because without login, an owner can't add his property
 ©Daffodil International University 29

and a renter can't have a conversation with the owner to find his desired bus; they can only view the post. In the case of login, we can see two sections at the beginning: the first one is using Google login, and the second one is logging in through Facebook, so we can log in using a social account. We can also log in using our email address, username, and password.

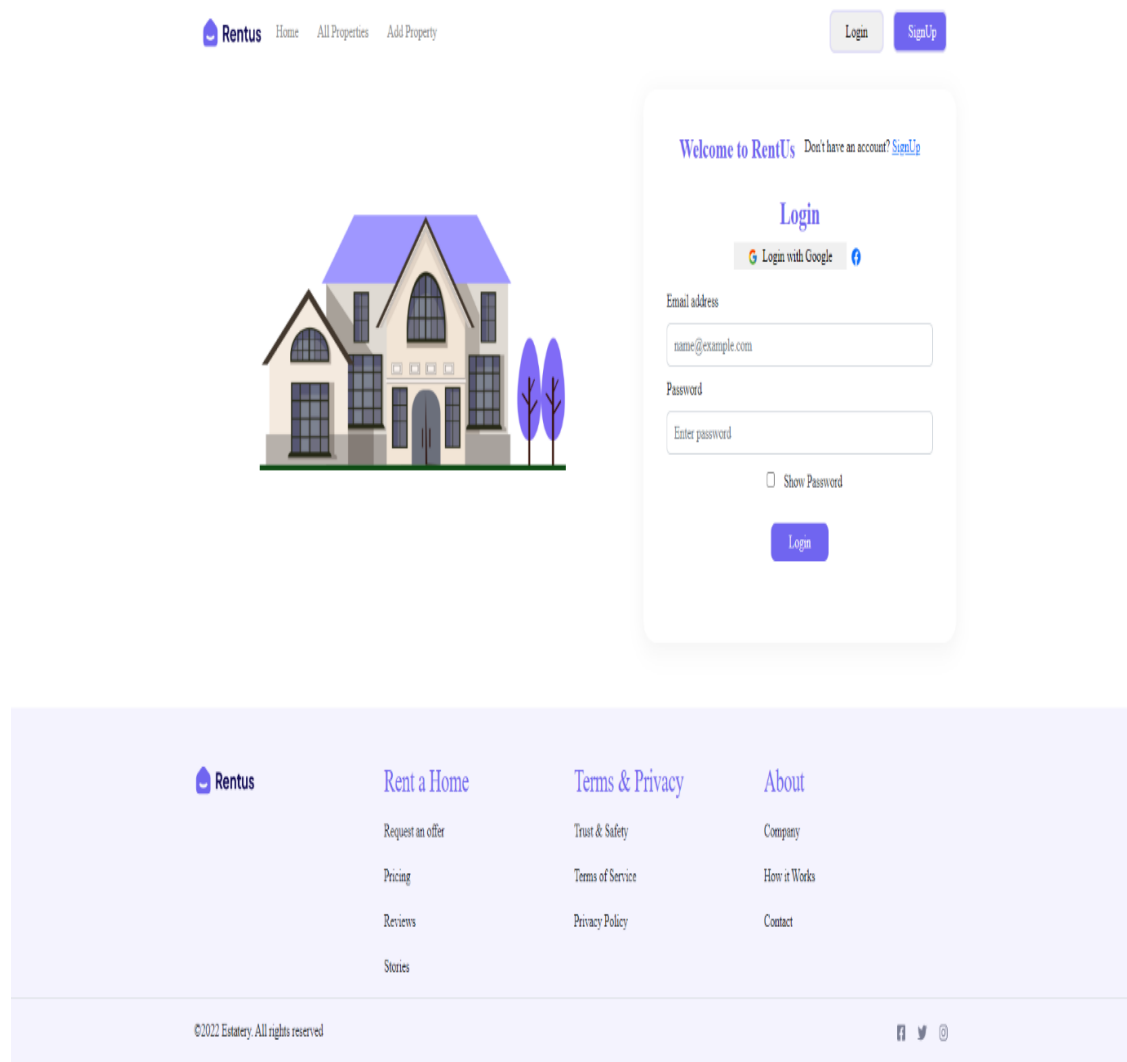


Figure 4.4: Login Page

4.4.5 Sign-up

When a user does not have an account, if he wants to post an ad, he must first open an account. For that, he must first sign up with his full name, email address, phone number, and password, and then verify the signup through a confirmation code.

The screenshot displays the sign-up page for Rentus. At the top, there is a navigation bar with the Rentus logo and links for Home, All Properties, and Add Property. On the right side of the navigation bar are buttons for Login and SignUp. Below the navigation bar is a large illustration of a house with a blue roof and two trees. To the right of the illustration is a sign-up form. The form has a heading 'Welcome to RentUs' and a link 'Have an account? Login'. Below this is a large 'Sign Up' heading. The form contains several input fields: 'Name' with a placeholder 'Enter your name', 'Email address' with a placeholder 'name@example.com', 'Phone Number' with a placeholder 'Phone', 'Password' with a placeholder 'Password', and 'Confirm password'. There is also a checkbox labeled 'Show Password' and a 'Sign Up' button at the bottom of the form. The footer of the page features the Rentus logo, a list of links including 'Rent a Home', 'Terms & Privacy', and 'About', and social media icons for Facebook, Twitter, and Instagram. The footer also includes the copyright notice '©2022 Estately. All rights reserved'.

Figure 4.5: Sign-up Page

4.4.6 Contact-us

Through the "Contact Us" tab on our website, any user who visits it can get in touch with us to provide any information about errors or bugs that they encountered while using our site on their end. Every report will come to us in the form of a letter in the mail. One piece of business information needs to be communicated right this minute. If any of our users find that our work is to their liking and they are interested in having us develop a new website for them, then they can let us know, and the developers here will be grateful to them.

The screenshot shows the 'Contact Us' page of the Rentus website. The navigation menu includes 'Home', 'All Properties', 'Add Property', 'About Us', and 'Contact Us'. The 'Contact Us' page features a heading 'We'd Love to Hear From You :-' and an illustration of a house. The contact form includes fields for Name, Email (pre-filled with 'owner4@gmail.com'), Phone, and Message. Below the form are 'SEND MESSAGE' and 'EMAIL US' buttons, separated by an 'OR' separator.

Figure 4.6: Contact-us Page

4.4.7 About-us

By visiting the page under "About Us," visitors to our website can acquire further knowledge about the individuals who are responsible for maintaining this website. Despite the fact that this was a project for school, we want to continue working on it in the future.

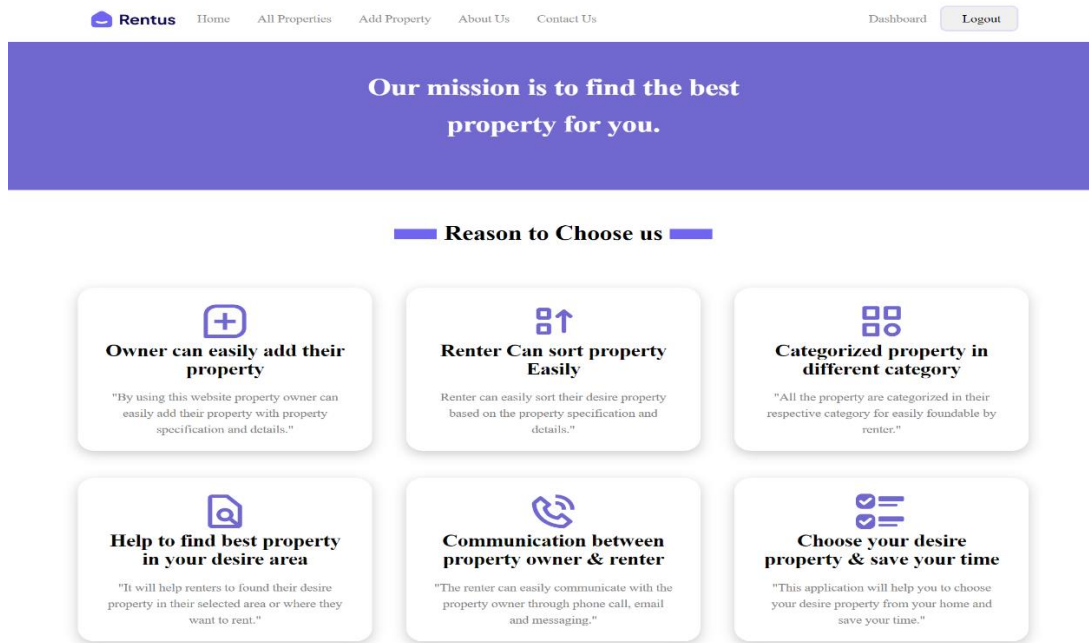


Figure 4.7: About-us Page

4.4.8 Conversation

After entering a property, if the renter likes it, they can message the property owner, and with a conversation, they can decide.

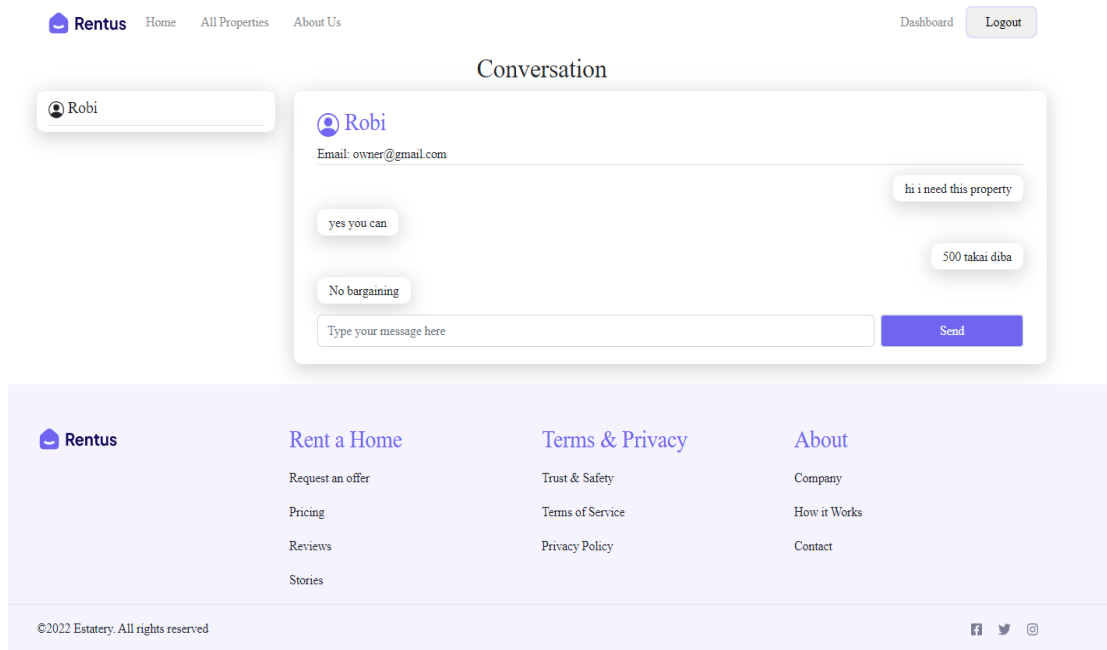


Figure 4.8: Conversation

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

We came to the conclusion that Google Firebase would be the best back end solution for this project. In addition, we decided to use Firebase Real-Time Database as our storage engine for the storage of basic data, and we chose Firebase File Store as our storage engine for the storage of basic files. We made the decision to utilize Firebase Email/Password Authentication as the user authentication method given that Firebase enables authentication. The bulk of the architecture of our database is shown down below. The following is an overview of a database implementation at a high level

Users: This table will hold information about system users, like their names, addresses, and other personal details, as well as their login credentials and other personal details, like their username and password, property details, and location.

Renter: This table will hold information on the user who signs up with the system, with personal and account-related details (user name, and contact info).

Cookies: “Cookies are teeny, tiny snippets of text that are sent to your web browser by the websites that you visit. They make it possible for a website to remember information about your visit, which may make it simpler for you to revisit the site in the future and can also make the site more helpful to users” [9]. Pixels, local storage, and other technologies, like unique identifiers that can be used to identify a browser, app, or device, can also be used to reach these goals. It is possible to accomplish the aforementioned goals by utilizing technologies such as cookies and others, as detailed elsewhere on this page. Also, cookies are extremely little files that are transferred from a web application to a web browser when a user browses the internet. When a user downloads pages from a website, cookies are automatically downloaded along with the HTML code for those pages. When a Web browser first requests a file from a Web server, the server generates a cookie that contains information about the request and delivers the cookie to the browser along with the document. Cookies are used to keep track of information about previous file requests. The cookie will be transmitted to the

server the next time a request is made from the browser to the server. When this happens, the cookie will be sent along with the request. Along with the data file that was requested, the server also sends back an updated version of the cookie.

Database Design: When a user registers for an account on our website or logs in, the information that they provide is readily stored in our database. This ensures that the user's information is immediately accessible the next time the user logs in, using the information that has been saved in our database. If user login information is matched, they may access more than here. When a client places an order for a meal, if he chooses to "add to cart" and offers that information, it will be kept in the database. This ensures that if the consumer revisits this site for whatever reason, he will be able to do so quickly and easily. To put it another way, we can easily store any data by utilizing a database.

rentUsBd.users

STORAGE SIZE: 36KB LOGICAL DATA SIZE: 1.01KB TOTAL DOCUMENTS: 12 INDEXES TOTAL SIZE: 36KB

[Find](#) [Indexes](#) [Schema Anti-Patterns 0](#) [Aggregation](#) [Search Indexes](#)

FILTER { field: 'value' }

QUERY RESULTS: 1-12 OF 12

```
_id: ObjectId('63b1aa0da53dfa5f727b40ae')
name: "robiul"
email: "robiul@gmail.com"
role: "admin"
```

```
_id: ObjectId('63b70dea813bb92324b9c93e')
name: "The Wizard"
email: "wizard@wizard.coma"
role: "buyer"
```

```
_id: ObjectId('63b71de2ede9b4af2ae638e')
name: "Property Owner 2"
email: "owner2@property.com"
role: "seller"
```

```
_id: ObjectId('63b81d53d7c232bhrfA8Q399')
```

Figure 2.4: User_Information from Database

rentUsBd.productCollection

STORAGE SIZE: 36KB LOGICAL DATA SIZE: 4.29KB TOTAL DOCUMENTS: 10 INDEXES TOTAL SIZE: 36KB

Find Indexes Schema Anti-Patterns 0 Aggregation Search Indexes

FILTER { field: 'value' }

QUERY RESULTS: 1-10 OF 10

```

_id: ObjectId('63b854d74b5742fe64d75c0a')
name: "Md.Robiul Hasan"
address: "Dhanmondi 32"
rent: 20000
month: "January"
area: "Dhanmondi"
bath: 2
category: "Flat Rent"
city: "Dhaka"
details: "ijdhfiudbnvc"
elevator: "Available"
email: "owner@gmail.com"
garage: 1
gas: "Available"
kitchen: 1
phone: "01761374488"
propertySize: 2880
room: 4
title: "Beautiful Apartment for rent"
image: "https://i.ibb.co/sgb4Dxs/images-3.jpg"

```

Figure 2.5: property details from database

5.2 Implementation of front-end Design

The front end is where the user works. Because of this element, we were able to make a design that was easy to use. Everyone can use this app because it is easy. Front-end apps are the ones that the user interacts with directly. The data must be turned into a graphical interface on the front end so that it is easy for users to read and interact with. The front end is where the user's audience can be found. One example of this kind of work is an online application. There are three parts to this application. First comes the front end, then the database, and then the back end. Some language is used on the front end. We use JavaScript, Bootstrap 5, HTML5, CSS3, and React Js for the front end. The application is put together with HTML and CSS. Using HTML, you can make a

header and a footer. Also, how the app shows text and images, as well as how media and pictures look. HTML and CSS are what hold the website together. Because of JavaScript, our website can now do more. Once the front-end part of the site is done, the user can interact with it by clicking a button and entering information like a name or email address.

5.3 Implementation of back-end Design

The project's backend is very important to me. Our system's centralized front end is insufficient to handle all of its functions. The most important parts are automatically updated by a server in the background. Express.js, Node.js, and MongoDB make up the backend architecture. The database contains all of the relevant data. The information in MongoDB is reliably ordered in a sequential fashion. The database stores a variety of data sets, such as all property list, all user, user feedback, conversation, and others. saved information for a specific archive. If a renter decides to rent a property, for instance, from the website's previous product page, their information will be saved in the user database collection. Any updates, new features, or blog posts produced by the admins will be archived here.

5.4 Object of the Testing

With the purpose of ensuring that the web application is trustworthy, easy to use, and provides the features and functionality necessary for effective and uninterrupted communication between the owner and the renter. Locating and fixing all kinds of application flaws while preventing access by cybercriminals at the same time, giving the users an experience that is simple and unbroken in terms of service. Testing a website should be done at several stages during the process of designing and developing a website. An evaluation of the page's content, functionality, and usability ought to be included in this testing. The following are some fundamental procedures that may be taken to verify both content and functionality:

- To determine or become aware of a mistake in a procedure while carrying out the execution of the program.
- In order to successfully implement a test case, it is required to discover all of the flaws.
- Test planning should be developed before program testing starts.

- The user's needs should be taken into consideration when developing the tests, which should be executable.
- For greater reliability, the testing must be carried out by an impartial third party.

5.6 Strategies of Testing

The correct completion of the testing of the different features on our website, as well as the performance of the various instructions in the correct manner in accordance with the appropriate process, is what makes the test plan on our website so important. We are utilizing the technique of test planning because without test planning, the quality of the software will be really low of our website, and it will not be able to function in an appropriate way.

- Unit Testing
- Integration testing

5.6.1 Unit Testing: We have built our website using the unit test so that we can perform both positive and negative testing, and at the same time, we can make effective use of our many different visual objects by linking them to the database. This will allow us to test in both directions. When it comes to the successful completion of this undertaking, certain kinds of OS are preferable than others. Unit testing is going to be employed and carried out in the right way.

5.6.2 Integration testing: Through the use of integration testing in the development of our website, we are able to accurately test two or more interconnected apps. Integration testing covers everything, beginning with the simplest components and working its way up to the most difficult add-ons and modifications to the database.

5.7 Our testing Strategies

Table 5.1: Testing Table

Serial No	Testing Are
1	Test that the behavior of the Java script in a variety of browsers to ensure its correct operation (IE, Firefox, Chrome, Safari, and Opera).
2	Ensuring that the software is dependable and functions appropriately across a variety of contexts, such as a wide range of network connections, device configurations, and device usage and responses.
3	Verify that a confirmation notice appears whenever an action is performed to update or remove data.
4	Analyze what happens when a user deletes all the cookies while logged in of the site.
5	Check that the data in the cookies is encrypted.
6	Testing the web's security and privacy settings to ensure that personal information is kept confidential and complies with any and all applicable regulations and standards.
7	Check to see if the data in the dropdown has been shortened as a result of the size of the field. Checking to see if the data is maintained by an administrator is another important step.
8	In order to verify the accuracy of the data, incorrect data should be entered into the database.
9	Check the triggering conditions.
10	Performing an analysis of the application's usability to ensure that both the owner and the user will find it to be easy and straightforward to operate.
11	Make sure you're using HTTPS to submit any pages that ask for sensitive information, such as login credentials or answers to secret questions (SSL).

5.8 Test Result report

Table 5.2: Case 01

Case	Serial No: 01
Testing purpose	For user authentication to work,
Test data	Simply choose the Create Account option in order to set up a new user.
Expected Result	User profile activated
Result	Passed

Table 5.3: Case 02

Case	Serial NO: 02
Testing purpose	For the behavior of the Java script in a variety of browsers to ensure its correct operation (IE, Firefox, Chrome, Safari, and Opera).
Test data	Applications run on many devices and web browsers.
Expected Result	Run successfully .
Result	Passed.

Table 5.4: Case 03

Case	Serial NO: 03
Testing purpose	Ensure the cookies are safe.
Test data	Check whether the cookies Make that the data in the cookies is kept securely.
Expected Result	Cookies are encrypted.

Result	Passed.
--------	---------

Table 5.5: Case 04

Case	Serial NO: 04
Testing purpose	For Deleted cookies.
Test data	Check whether the cookies are still there after deleting them when logged out.
Expected Result	Cookies are removed successfully.
Result	Passed.

Table 5.6: Case 05

Case	Serial NO: 05
Testing purpose	Checking the security, personal information, and Is privacy safe or not?
Test data	Is there a personal information privacy and security safeguard? and whether the information is being trafficked from the database.
Expected Result	All the data are safe in the database
Result	Passed.

As a result, we employ Performance Testing instruments to address the aforementioned issues.

CHAPTER 6

IMPACT IN SOCIETY, ENVIRONMENT AND SUSTAINABILITY

6.1 Impact on society

A home rental application makes it easier for people to search for and find rental properties, reducing the time and effort required for this process. By making the rental process more accessible, the application can help people, especially those with disabilities, find suitable homes more easily. With clear information and easy-to-use filters, the application can provide tenants with a better understanding of available properties and help them make informed decisions. The application can provide a platform for landlords to showcase their properties, leading to increased competition and potentially lower rent prices.

6.2 Impact on Environment

Reduced paper usage by providing a digital platform for the rental process, the application can help to reduce the use of paper and contribute to the reduction of deforestation and paper waste. By allowing people to search and apply for rental properties online, the application can reduce the need for physical visits to properties, potentially reducing carbon emissions from transportation.

6.3 Ethical Aspects.

The ethical aspects of our website can encompass a wide range of issues, like:

Privacy: The website should protect the privacy of its users by clearly disclosing how their personal information is collected, stored, and used, and giving users control over their own data.

Security: The website should take appropriate measures to ensure the security of user data, such as encryption, firewalls, and regular security updates.

Fair use of content: The website should respect the copyright and intellectual property rights of others by only using content that is legally obtained and properly credited.

Transparency: The website should be transparent about its business practices, including any advertising or sponsorship arrangements, and avoid deceptive or misleading practices.

Accessibility: The website should be accessible to people with disabilities and conform to accessibility standards, such as the Web Content Accessibility Guidelines (WCAG).

Responsibility for user-generated content: The website should have policies in place for managing user-generated content, such as comments or reviews, and be responsible for removing illegal or harmful content.

Respect for user freedom: The website should avoid practices that restrict the freedom of users, such as censorship or the manipulation of information for political or commercial gain.

Adhering to these ethical principles can help to build trust and credibility with users, and promote a responsible and sustainable in our website.

6.4 Sustainability Plan

We take some action for sustainability for our website, eco-friendly tips for renters, information on local recycling programs, and links to green initiatives. The website can only partner with ethical responsible owners and organizations and avoid fake advertising.

CHAPTER 7

CONCLUTION AND FUTURE SCOPE

7.1 Discussion and Conclusion

In this report, a plan has been made for how to make an online, web-based, smart property rental system. The system has the potential to provide a framework that enables managers to complete reasonable activities within reducing time. This system was developed with the requirements of rental property owners and renters in mind. Additionally, a number of user-friendly interfaces have been implemented. The real-time chat system will enable flexibility over usage, as well as the connection between the owner and the renters. Additionally, users will greatly benefit from the position tracking system since it will be simple to locate their home on a map using the information provided by the system. Also, the system has been changed to include a secure way to store personal information and a way to prove who you are. This makes the system safer. This package might be pretty good at meeting all of the above-mentioned criteria from the user community.

7.2 Scope for Future Development

In the future, we will attempt to mediate a lease agreement between the property owner and renter, and we will include a payment section here to reflect our role as an unusual part of the present. Since we're just getting started, our top priority is adding fancy features like Google Maps. In future, we will make apps for Android and iOS.

Reference:

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