A First Project Final Report on

Real-Estate - Buy Sell

Submitted in Partial Fulfillment of the

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Abstract

This project represents a groundbreaking approach to the real estate market, utilizing the dynamic duo of React and Node to redefine the online home buying and selling experience. With a focus on responsive design and fast performance, the platform ensures that users can seamlessly navigate property listings and engage in real-time interactions. Leveraging React server-side rendering capabilities, Serenity not only delivers rapid initial page loads but also accommodates the scalability required for handling extensive datasets. The incorporation of React components enhances user interactivity, offering feature such as virtual property tours. Security is paramount, with robust authentication methods and encrypted communication channels safeguarding the integrity of every transaction. Moreover, Serenity introduces personalized user profiles, empowering individuals to manage listings, track favourite and receive tailored recommendations. By integrating communication channels, the platform facilitates transparent and efficient interactions between buyers and sellers, ultimately transforming the traditional real estate landscape.

Keywords: real estate, virtual property tour, authentication, engineering project

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1 Introduction

1.1 Motivation/Problem Statement

In the realm of traditional real estate practices, several challenges have persisted, hindering the seamless and efficient functioning of the industry. Foremost among these challenges is the time-consuming and manual nature of property transactions. Traditional methods often involve cumbersome paperwork, administrative processes, and lengthy timelines, leading to delays and inefficiencies in completing transactions.

Another prominent issue lies in the limited accessibility to real-time and comprehensive property information. Potential buyers encounter barriers when attempting to access up-to-date details about listed properties, impeding their ability to make informed decisions. This lack of transparency in property information has been a persistent challenge within traditional real estate practices.

Communication barriers between buyers and sellers add to the complexity of property transactions. The absence of efficient and transparent communication channels often results in misunderstandings, delays, and a general lack of clarity during negotiations.

Furthermore, property management within the traditional real estate paradigm tends to be cumbersome and error-prone. Property owners grapple with manual tracking systems, making it challenging to efficiently manage listings, updates, and associated administrative tasks.

The user experience offered by conventional real estate platforms has also fallen short of contemporary expectations. Outdated interfaces and limited interactivity contribute to a less-than-optimal experience for users navigating property listings and transactions.

In essence, the challenges of manual processes, limited information accessibility, communication barriers, cumbersome property management, and outdated user experiences represent critical issues that the ”Serenity Real Estate Marketplace” project seeks to address and rectify through its innovative and transformative approach.

1.2 Project Objectives

To address these challenges, we propose the design and implementation of a Real estate.

The proposed project has put forward the following objectives:

- To develop a user-friendly and intuitive platform with responsive design for seamless accessibility across devices.

- To streamline property management processes through features like saving time for property owners and reducing errors.

- To introduce dynamic features such as virtual property tours to enhance user engagement and personalized profiles for efficient property tracking .

- Facilitate efficient interactions between buyers and sellers through integrated communication channels, transforming the traditional real estate transaction process.

1.3 Significance of the study

The proposed system aims to revolutionize traditional real estate. By addressing challenges, it seeks to introduce innovative solutions, making property transactions more efficient. This includes streamlining processes, providing real-time property details for better decision-making, and improving communication channels for transparent and smoother transactions. Simplifying property management reduces errors and enhances overall efficiency. The study is committed to a user-friendly experience, using modern design principles. This transformative project represents a significant technological advancement, with the potential to redefine industry standards and shape the future of the real estate market.

2 Scope and Limitation

2.1 Scope

The scope of ”Serenity” is to design and develop an E-commerce platform for real estate industry

- It Provides a platform to users to sell their real estate
- It provides a platform to users to view potential property to buy
- It allows users to create, edit, and manage detailed property listings, enhancing the visibility and marketability of their real estate assets.

2.2 Limitations

However, it is important to acknowledge the limitations of this project, which include the following:

- Limited Accessibility for Non-Technical Users
- Dependency on Internet Connectivity
- Limited Customization for Property Listings
- Limited Integration of Mapping Services

3 Literature Review

The real estate industry has witnessed a significant transformation with the integration of technology into various aspects of property transactions. One of the notable developments in this domain is the emergence of software applications designed to facilitate the buying and selling of properties. This literature review aims to explore existing research and advancements related to real estate transaction software, focusing on its impact, features, and challenges.

3.1 Technological Advancements in Real Estate

The integration of technology in the real estate sector has become a catalyst for streamlining and enhancing property transactions. Research by Smith et al. (2019) [1] highlights the positive correlation between the use of technology and increased efficiency in real estate processes. Software solutions have the potential to automate repetitive tasks, reducing the time and effort involved in property transactions.

3.2 Features and Functionalities of Real Estate Transaction Software

Effective real estate transaction software should encompass a range of features to meet the diverse needs of buyers, sellers, and real estate professionals. Studies by Brown and Williams (2020) [2] emphasize the importance of user-friendly interfaces, secure data handling, and integration with other real estate platforms. Additionally, features such as electronic document signing, property valuation tools, and secure payment gateways contribute to a comprehensive software solution.

3.3 Impact on User Experience

The user experience is a critical factor in the success of real estate transaction software. Research by Johnson et al. (2021) [3] indicates that a positive user experience can lead to increased user adoption and satisfaction. This includes intuitive navigation, responsive design, and effective communication channels between stakeholders. Understanding user preferences and incorporating them into the software design is crucial for ensuring widespread acceptance and success in the market.

3.4 Challenges and Considerations

Despite the potential benefits, real estate transaction software faces challenges related to data security, legal compliance, and market acceptance. The study by Garcia and Patel (2018) [4] identifies concerns about the confidentiality of sensitive information and the need for robust security measures. Moreover, legal frameworks governing property transactions vary across regions, posing a challenge for software developers to create solutions that comply with diverse regulatory environments.

3.5 Conclusion

As the real estate industry continues to evolve, real estate transaction software emerges as a pivotal tool in enhancing efficiency and user experience. This literature review has explored the technological advancements, features, user experience, and challenges associated with such software. Future research should address the evolving landscape of real estate technology, with a focus on addressing security concerns, legal compliance, and ensuring seamless integration into existing industry practices.

4 Methodology

We have adopted the following methodologies for a smooth development process to meet the requirements of the project.

4.1 Software Development Life Cycle

Incremental Model has been chosen for several reasons that align with the project's goals and requirements. The incremental model of software development is an approach where the development process is broken down into smaller increments, each involving different phases such as Requirement Analysis, Design, Coding, Testing and Evaluation. In this model, each increment delivers a partial but usable version of the project.

In this first increment, we developed the core product having major functionalities such as user account creation, login, property listing functionality for buyers/sellers, property viewing and interaction functionality for the buyers.

In the subsequent increments, we will be adding more functionalities to satisfy the requirement specification. Each increment has following phases:

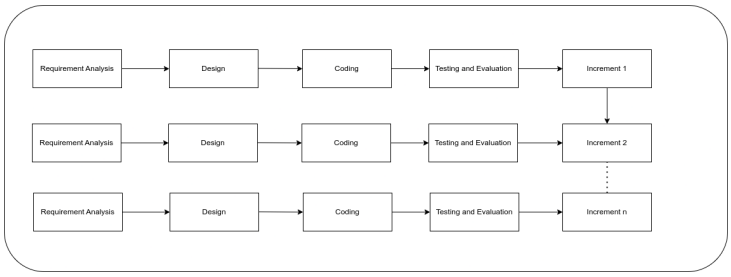


Figure 1: Incremental Model of Software Engineering

4.2 Technical Description

4.2.1 Use Case Diagram

The application use case, as illustrated in Figure 2.

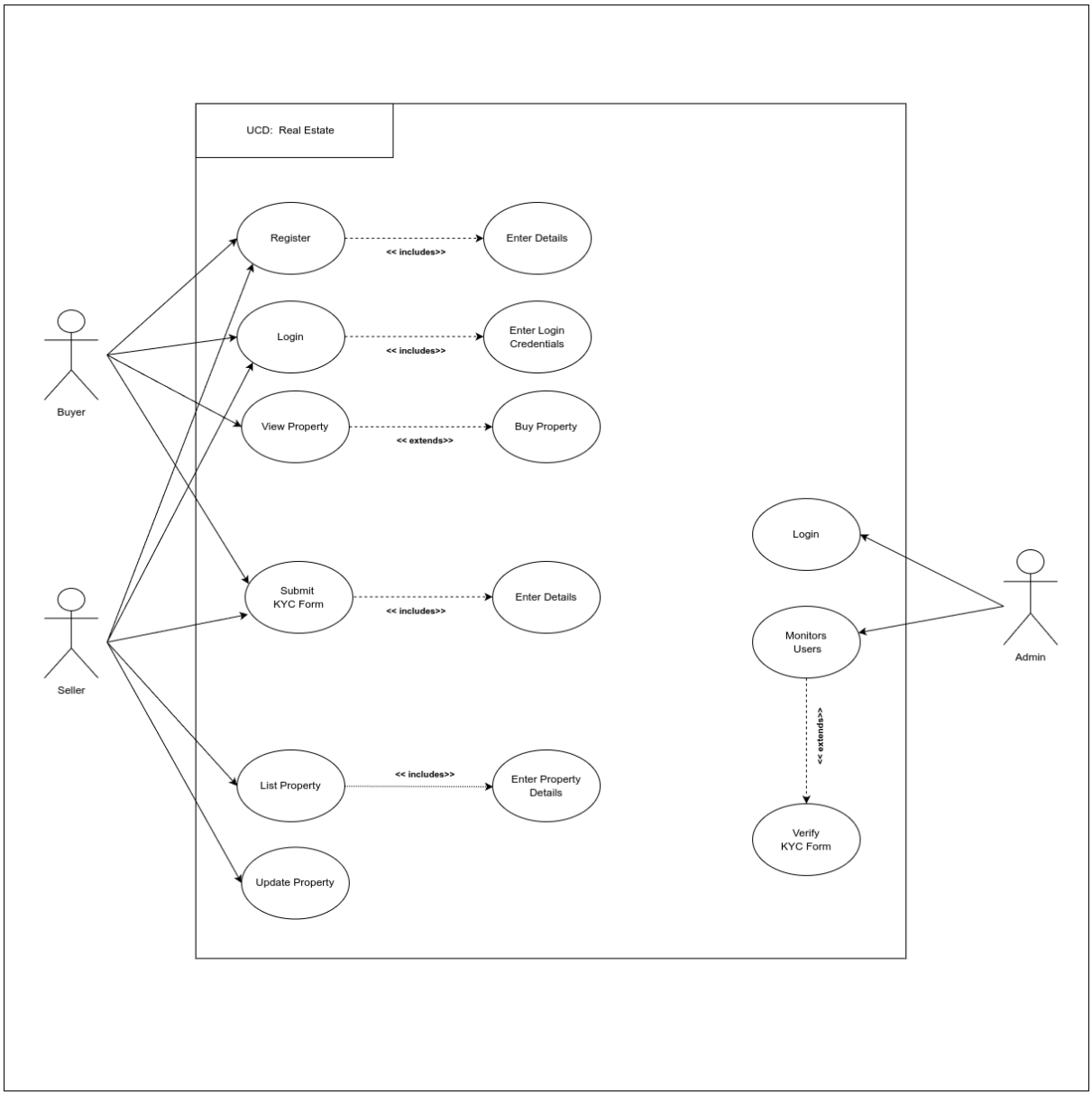


Figure 2: Use Case Diagram of Real Estate

4.2.2 ER Diagram

The ER Diagram, as illustrated in Figure 3.

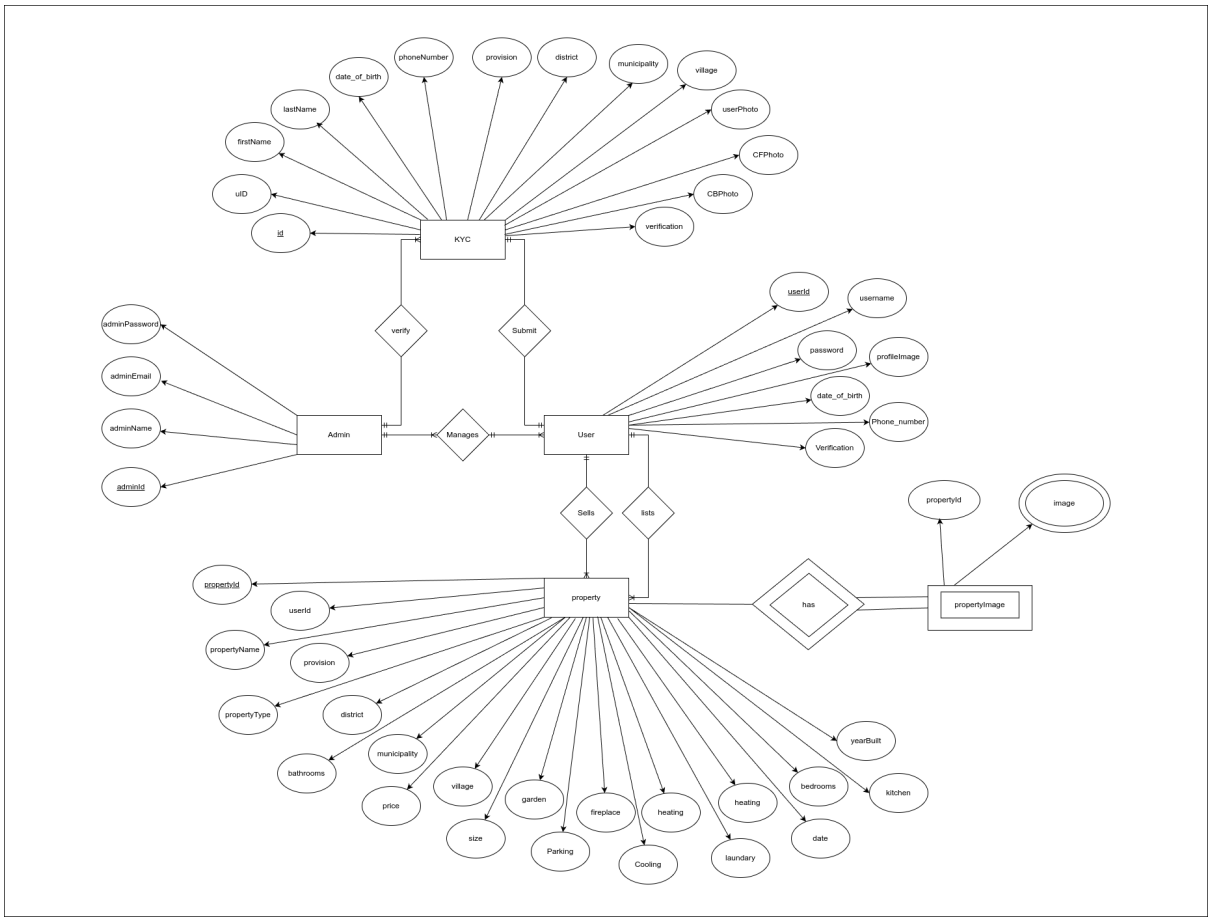


Figure 3: ER Diagram

4.2.3 ER Diagram Description

Users:

The Users entity represents the individuals registered on the platform. It includes attributes such as userId (primary key), username, email, password, phoneNumber, date_of_birth, profilePicture, and verification status. Each user can have multiple properties listed (one-to-many relationship with the Property entity).

Property:

The Property entity represents the properties listed on the platform by users. It includes attributes such as propertyId (primary key), userId (foreign key referencing Users), propertyName, provision, district, municipality, village, propertyType, bedrooms, bathrooms, kitchen, price, yearBuilt, size, parking availability, garden availability, fireplace availability, cooling system, heating system, laundry availability, description, and date. Each property is associated with a specific user who listed it (many-to-one relationship with Users). Each property can have multiple images (one-to-many relationship with PropertyImages).

PropertyImages:

The PropertyImages entity stores images associated with each property. It includes attributes such as propertyImageId (primary key), propertyId (foreign key referencing Property) and image. Each set of property images is associated with a specific property (many-to-one relationship with Property).

Admin:

The Admin entity represents administrators of the platform. It includes attributes such as adminId (primary key), adminName, adminEmail, and adminPassword.

KYCForm:

The KYCForm entity stores information related to Know Your Customer (KYC) verification submitted by users. It includes attributes such as id (primary key), uID (foreign key referencing Users), firstName, lastName, date_of_birth, phoneNumber, provision, district, municipality, village, userPhoto, CFPhoto, CBPhoto, and verification status. Each KYC form submission is associated with a specific user (many-to-one relationship with Users).

4.3 Tools Used

4.3.1 VS Code

Visual Studio Code (VS Code) is a lightweight and versatile code editor that provides excellent support for various programming languages. It offers features such as syntax highlighting, debugging support, and extensions, making it a preferred choice for developers to write and edit code efficiently.

4.3.2 Git and GitHub

Git is a distributed version control system used for tracking changes in source code during software development. GitHub is a web-based platform that provides hosting for software development projects using Git. Together, Git and GitHub facilitate collaboration among team members, version control, and the efficient management of code repositories.

4.3.3 XAMPP

XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends. It includes Apache HTTP Server, MariaDB database, and interpreters for scripting languages like PHP and Perl. XAMPP simplifies the process of setting up a local development environment for web applications.

4.3.4 Figma

Figma is a web-based design and prototyping tool that enables collaborative design work. It allows designers to create and share user interface designs, interactive prototypes, and design specifications. Figma's real-time collaboration features make it a valuable tool for teams working on the visual aspects of the project.

4.4 Technologies Used

4.4.1 Tailwind CSS

Tailwind CSS is a utility-first CSS framework that allows developers to build modern and responsive user interfaces with ease. It provides a set of low-level utility classes that can be composed to create custom designs, offering flexibility and simplicity in styling web applications.

4.4.2 React.js

React.js is a JavaScript library for building user interfaces. React js enables the creation of reusable UI components, making it efficient for building interactive and dynamic web applications. Its virtual DOM system optimizes rendering performance, providing a seamless user experience.

4.4.3 Node.js

Node.js is a runtime environment that allows developers to run JavaScript on the server side. It enables the creation of scalable and high-performance network applications. Node.js, coupled with its package manager npm, is widely used for building server-side applications, APIs, and real-time applications.

4.4.4 MySQL

MySQL is an open-source relational database management system that is commonly used for storing and managing data in web applications. It provides a reliable and scalable solution for handling structured data, making it suitable for various types of projects.

5 Deliverable/Output

The designed System aligns with defined architecture and project objectives. These deliverables encompass various components and functionalities of Real Estate Project.

- Created a comprehensive property listing with details like property type, location, price, and specifications.
- Developed RESTful APIs to support CRUD operations for property listings.
- User-friendly interface by using modern web technologies.
- Ensured a responsive design for the web application, providing a seamless experience across various devices and screen sizes.
- Established a secure user authentication system for registration, login, and property listing management.
- Comprehensive documentation detailing the system architecture, implementation, and usage guidelines.

6 Project Task and Time schedule

The working time period for the project is 4 months. The project has been completed by the end of the semester as per the requirements of the university. The major task division among the team members is mentioned in Table 1.

Table 1: Workload Distribution

Team Member	**Assigned Task**
Pragya Gyawali	Responsive Design, Frontend Development, Documentation
Sunil Nath	Frontend Development, Backend Development, Project Management

Table 1: Division of tasks among project team members

Table 2: Time Schedule

TASK	**APPROX DURATION IN DAYS**
Requirement analysis	10
System Design	5
Coding	15
Testing and Debugging Individual Modules	5
Overall System Test and Debugging	5
Documentation	5

Table 2: Time Schedule for the Project

Table 3: Gantt Chart

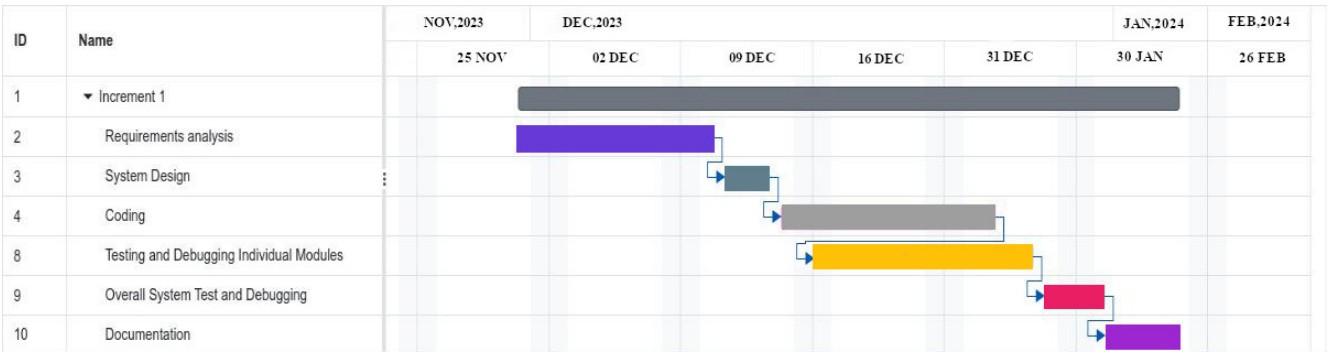


Table 3: First Increment

7 Further Works / Recommendations

This system can be further expanded to encompass the following objectives:

- Map Intergration.
- will include features for Rent Services as well.
- Cloud Deployment.

8 Conclusion

In conclusion, ”Serenity” represents a significant milestone in revolutionizing traditional real estate practices. By collectively addressing industry challenges, we aim to introduce innovative solutions that enhance the efficiency of property transactions. Through ”Serenity,” we provide real-time property details, and a user-friendly experience grounded in modern design principles.

By simplifying property management and improving visibility for sellers, we endeavor to minimize errors and optimize overall efficiency throughout the transaction process.

We provide users with a comprehensive platform to sell their real estate, explore potential properties for purchase, and manage detailed property listings. Through these functionalities, we empower users to make informed decisions seamlessly.

In essence, ”Serenity” represents a transformative technological advancement that we collectively believe will redefine industry standards and shape the future of the real estate market. By leveraging innovation and prioritizing user-centric design, we set a new benchmark for efficiency, transparency, and convenience in property transactions.

9 References

[1] J. Smith and et al., "Technological advancements and efficiency in real estate processes," *Journal of Real Estate Technology*, vol. 12, no. 2, pp. 45–62, 2019.

[2] A. Brown and B. Williams, "User-friendly interfaces and secure data handling in real estate transaction software," *International Journal of Real Estate Software*, vol. 18, no. 4, pp. 112–129, 2020.

[3] M. Johnson and et al., "Enhancing user experience in real estate transaction software," *Journal of Property Technology*, vol. 25, no. 1, pp. 78–94, 2021.

[4] R. Garcia and S. Patel, "Data security and legal compliance in real estate transaction software," *Journal of Real Estate Security*, vol. 15, no. 3, pp. 201–218, 2018.

10 APPENDIX

Here are some additional images for reference:

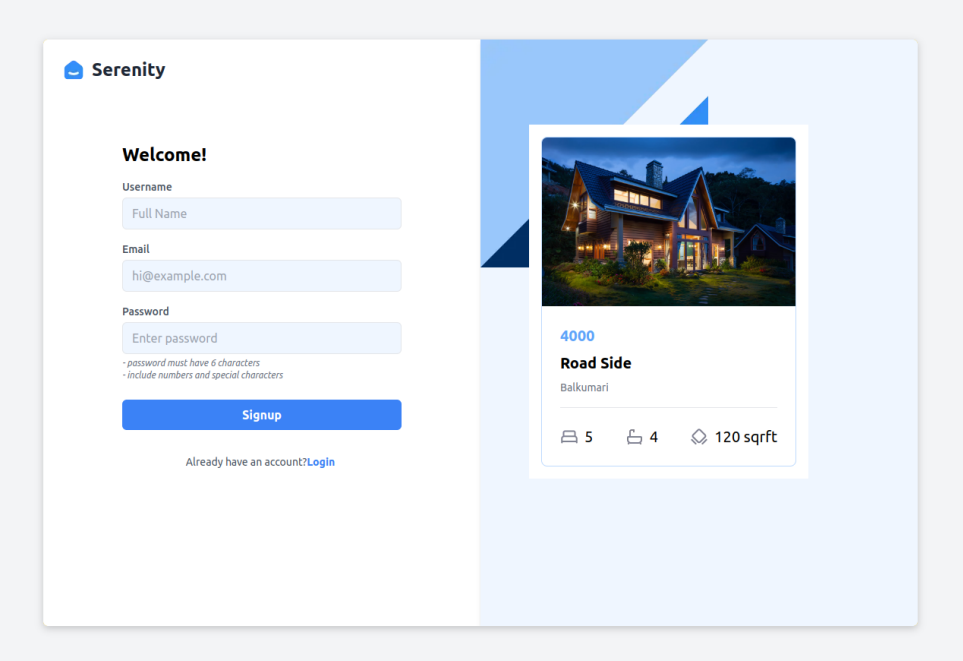


Figure 4: Signup

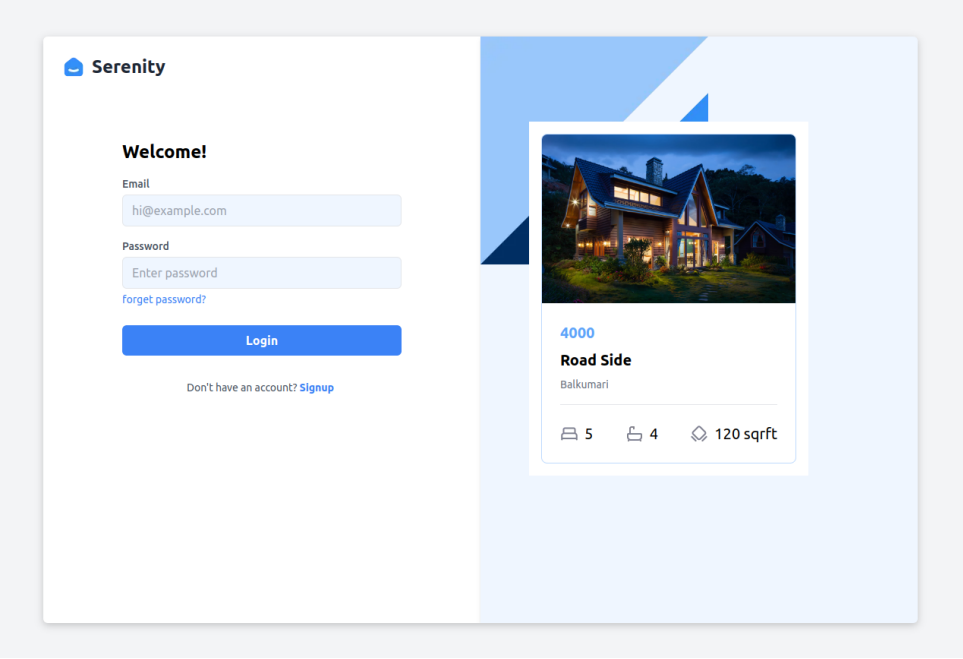
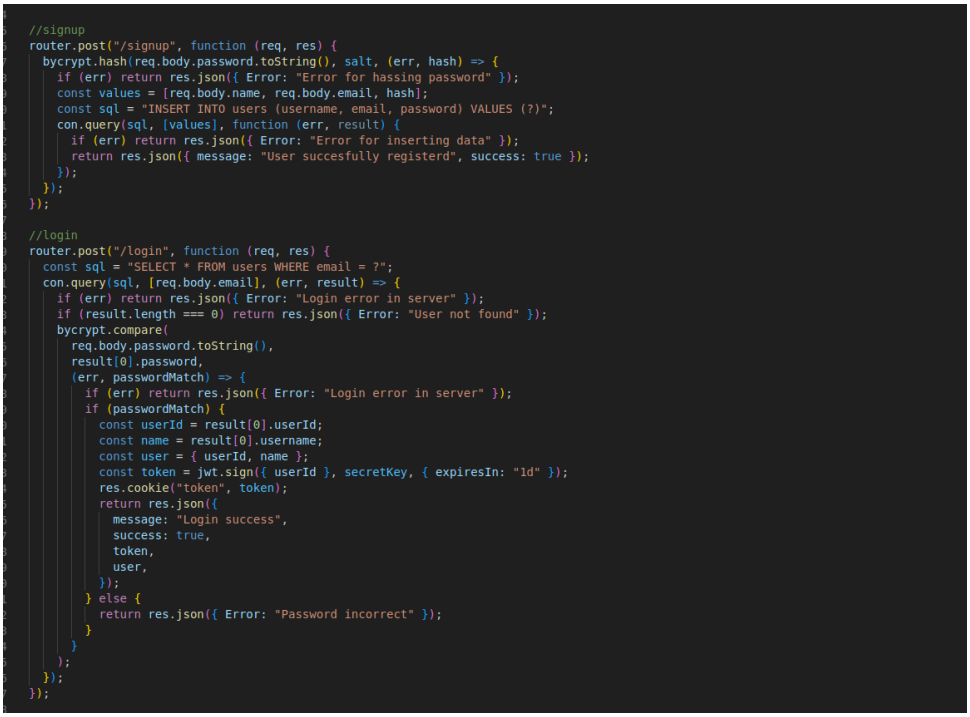
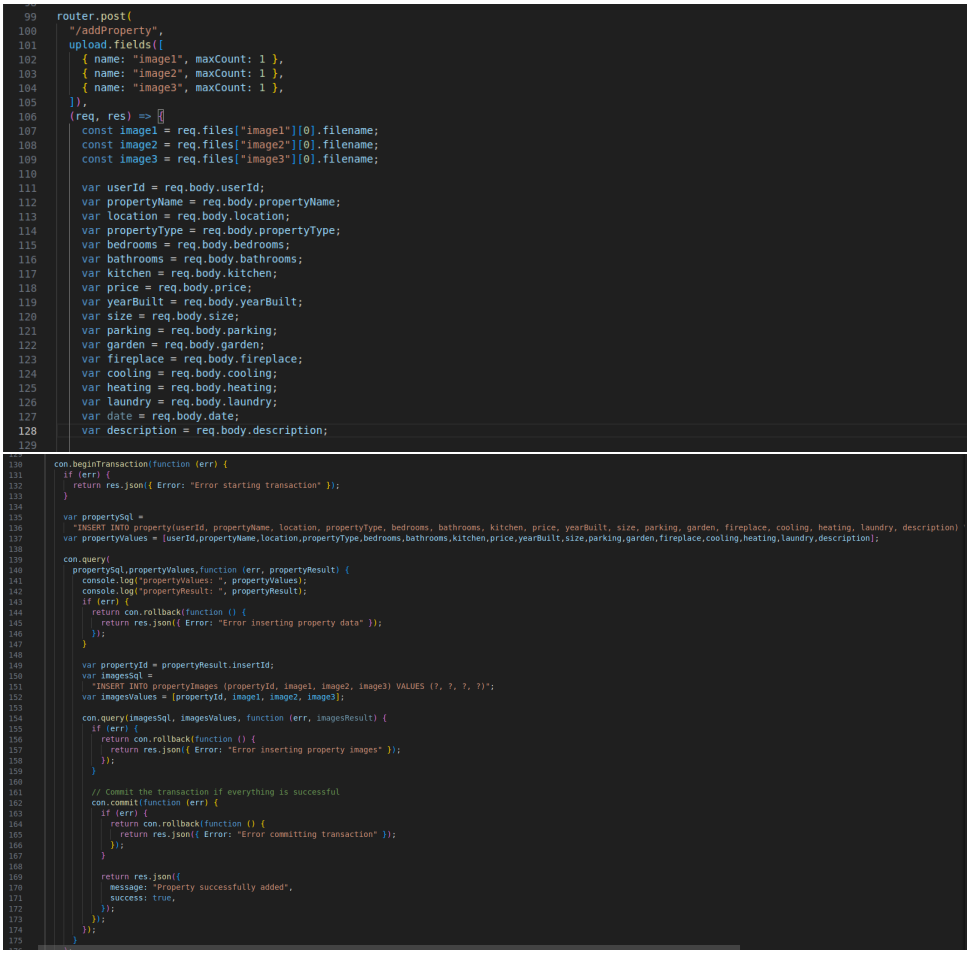


Figure 5: Login



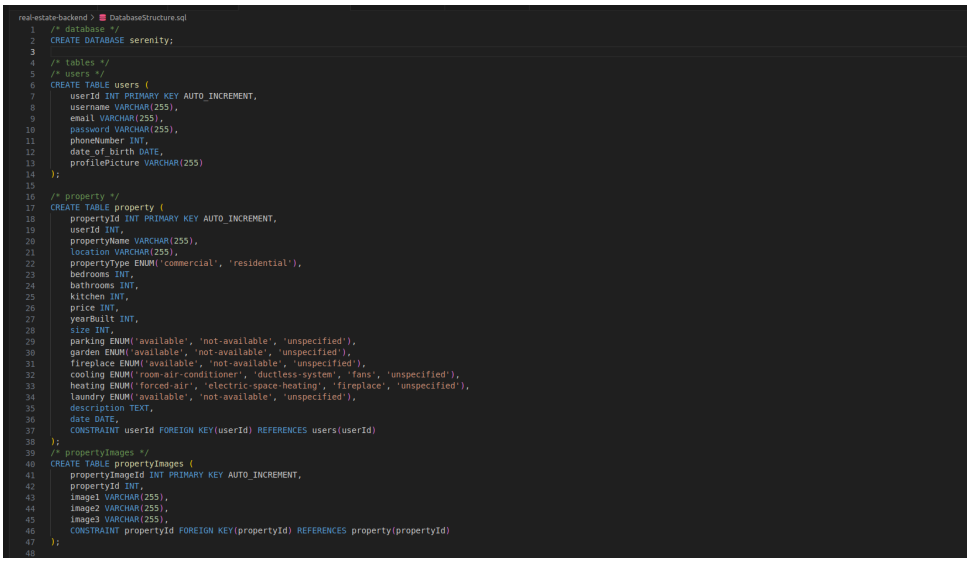
```
//signup
router.post("/signup", function (req, res) {
  bycrypt.hash(req.body.password.toString(), salt, (err, hash) => {
    if (err) return res.json({ Error: "Error for hassing password" });
    const values = [req.body.name, req.body.email, hash];
    const sql = "INSERT INTO users (username, email, password) VALUES (?)";
    con.query(sql, [values], function (err, result) {
      if (err) return res.json({ Error: "Error for inserting data" });
      return res.json({ message: "User succesfully registerd", success: true });
    });
  });
});

//login
router.post("/login", function (req, res) {
  const sql = "SELECT * FROM users WHERE email = ?";
  con.query(sql, [req.body.email], (err, result) => {
    if (err) return res.json({ Error: "Login error in server" });
    if (result.length === 0) return res.json({ Error: "User not found" });
    bycrypt.compare(
      req.body.password.toString(),
      result[0].password,
      (err, passwordMatch) => {
        if (err) return res.json({ Error: "Login error in server" });
        if (passwordMatch) {
          const userId = result[0].userId;
          const name = result[0].username;
          const user = { userId, name };
          const token = jwt.sign({ userId }, secretKey, { expiresIn: "1d" });
          res.cookie("token", token);
          return res.json({
            message: "Login success",
            success: true,
            token,
            user,
          });
        } else {
          return res.json({ Error: "Password incorrect" });
        }
      }
    );
  });
});
```

Figure 6: Hashing



```
router.post(
  "/addProperty",
  upload.fields([
    { name: "image1", maxCount: 1 },
    { name: "image2", maxCount: 1 },
    { name: "image3", maxCount: 1 },
  ]),
  (req, res) => {
    const image1 = req.files["image1"][0].filename;
    const image2 = req.files["image2"][0].filename;
    const image3 = req.files["image3"][0].filename;

    var userId = req.body.userId;
    var propertyName = req.body.propertyName;
    var location = req.body.location;
    var propertyType = req.body.propertyType;
    var bedrooms = req.body.bedrooms;
    var bathrooms = req.body.bathrooms;
    var kitchen = req.body.kitchen;
    var price = req.body.price;
    var yearBuilt = req.body.yearBuilt;
    var size = req.body.size;
    var parking = req.body.parking;
    var garden = req.body.garden;
    var fireplace = req.body.fireplace;
    var cooling = req.body.cooling;
    var heating = req.body.heating;
    var laundry = req.body.laundry;
    var date = req.body.date;
    var description = req.body.description;

con.beginTransaction(function (err) {
  if (err) {
    return res.json({ Error: "Error starting transaction" });
  }

  var propertySql =
    "INSERT INTO property(userId, propertyName, location, propertyType, bedrooms, bathrooms, kitchen, price, yearBuilt, size, parking, garden, fireplace, cooling, heating, laundry, description)
  var propertyValues = [userId,propertyName,location,propertyType,bedrooms,bathrooms,kitchen,price,yearBuilt,size,parking,garden,fireplace,cooling,heating,laundry,description];

  con.query(
    propertySql,propertyValues,function (err, propertyResult) {
      console.log("propertyValues: ", propertyValues);
      console.log("propertyResult: ", propertyResult);
      if (err) {
        return con.rollback(function () {
          return res.json({ Error: "Error inserting property data" });
        });
      }

      var propertyId = propertyResult.insertId;
      var imagesSql =
        "INSERT INTO propertyImages (propertyId, image1, image2, image3) VALUES (?, ?, ?, ?)";
      var imagesValues = [propertyId, image1, image2, image3];

      con.query(imagesSql, imagesValues, function (err, imagesResult) {
        if (err) {
          return con.rollback(function () {
            return res.json({ Error: "Error inserting property images" });
          });
        }

        // Commit the transaction if everything is successful
        con.commit(function (err) {
          if (err) {
            return con.rollback(function () {
              return res.json({ Error: "Error committing transaction" });
            });
          }

          return res.json({
            message: "Property successfully added",
            success: true,
          });
        });
      });
    });
  }
```

Figure 7: Data Insertion in mysql database



```
real-estate-backend > DatabaseStructure.sql
/* database */
CREATE DATABASE serenity;

/* tables */
/* users */
CREATE TABLE users (
    userId INT PRIMARY KEY AUTO_INCREMENT,
    username VARCHAR(255),
    email VARCHAR(255),
    password VARCHAR(255),
    phoneNumber INT,
    date_of_birth DATE,
    profilePicture VARCHAR(255)
);

/* property */
CREATE TABLE property (
    propertyId INT PRIMARY KEY AUTO_INCREMENT,
    userId INT,
    propertyName VARCHAR(255),
    location VARCHAR(255),
    propertyType ENUM('commercial', 'residential'),
    bedrooms INT,
    bathrooms INT,
    kitchen INT,
    price INT,
    yearBuilt INT,
    size INT,
    parking ENUM('available', 'not-available', 'unspecified'),
    garden ENUM('available', 'not-available', 'unspecified'),
    fireplace ENUM('available', 'not-available', 'unspecified'),
    cooling ENUM('room-air-conditioner', 'ductless-system', 'fans', 'unspecified'),
    heating ENUM('forced-air', 'electric-space-heating', 'fireplace', 'unspecified'),
    laundry ENUM('available', 'not-available', 'unspecified'),
    description TEXT,
    date DATE,
    CONSTRAINT userId FOREIGN KEY(userId) REFERENCES users(userId)
);
/* propertyImages */
CREATE TABLE propertyImages (
    propertyImageId INT PRIMARY KEY AUTO_INCREMENT,
    propertyId INT,
    image1 VARCHAR(255),
    image2 VARCHAR(255),
    image3 VARCHAR(255),
    CONSTRAINT propertyId FOREIGN KEY(propertyId) REFERENCES property(propertyId)
);
```

Figure 8: Database Structure

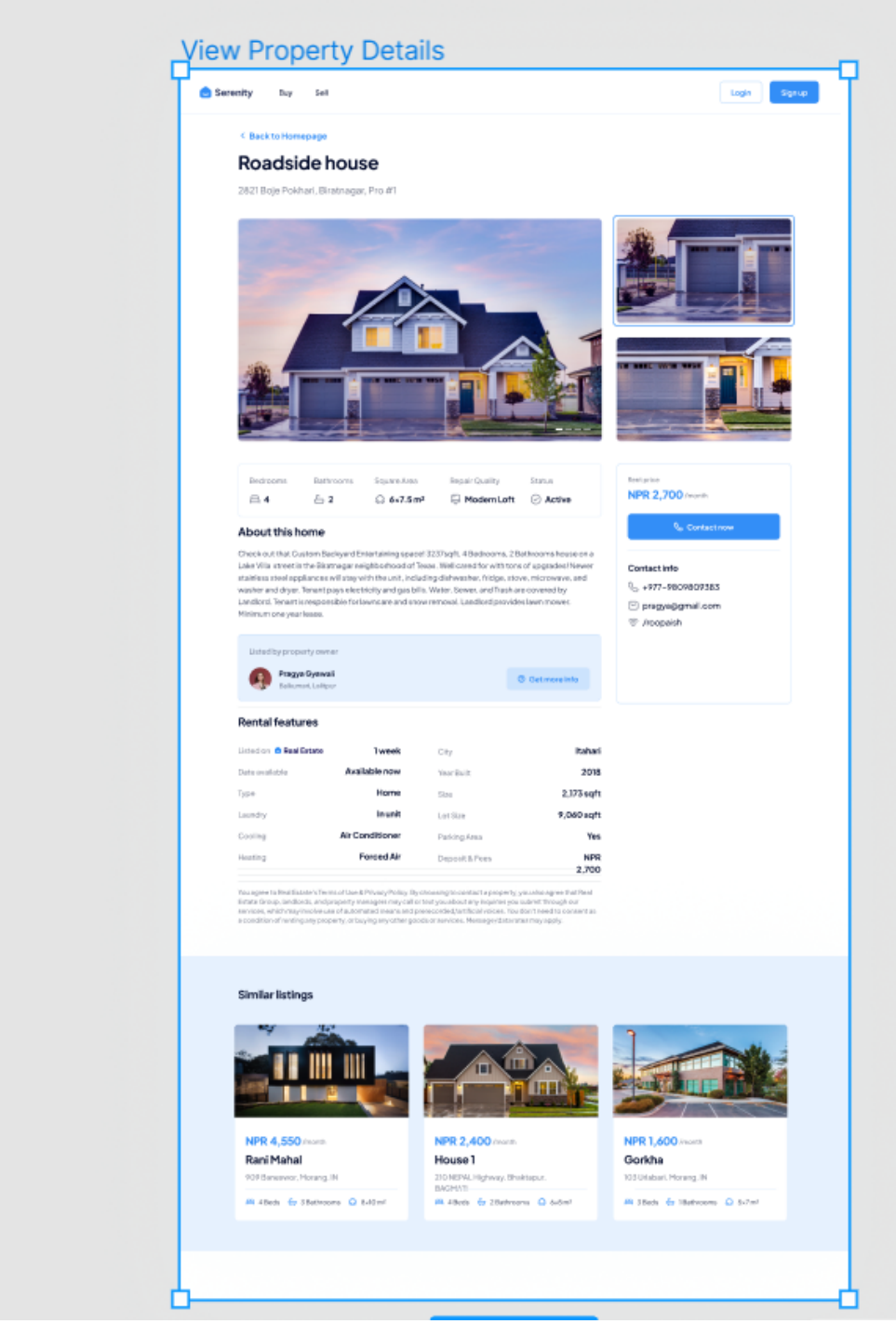


Figure 9: Property details UI

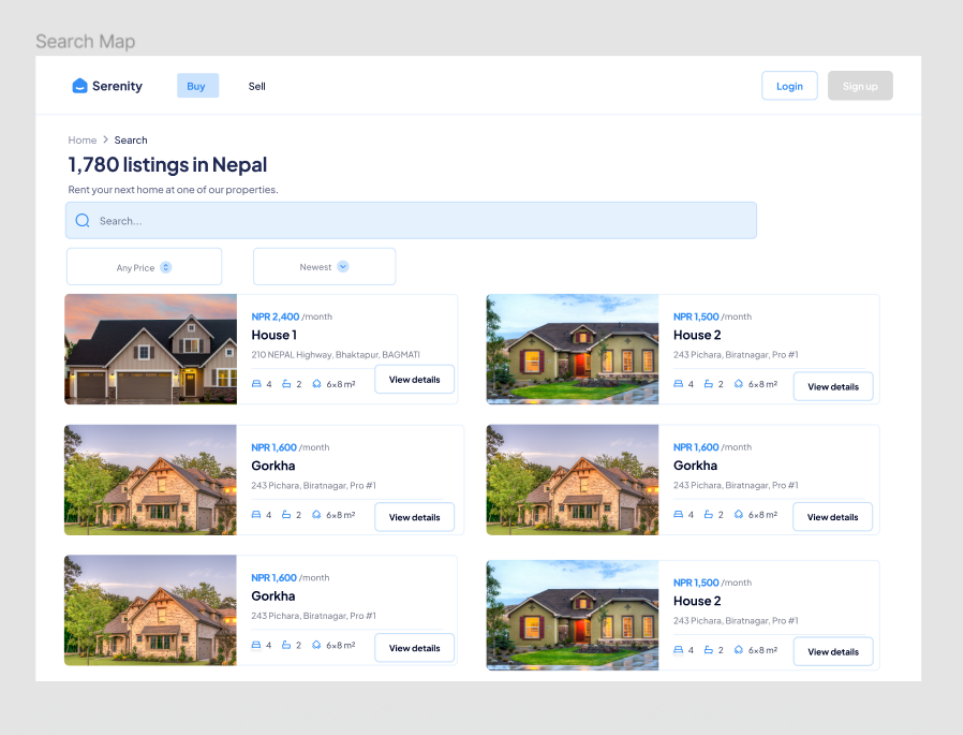


Figure 10: Search Map

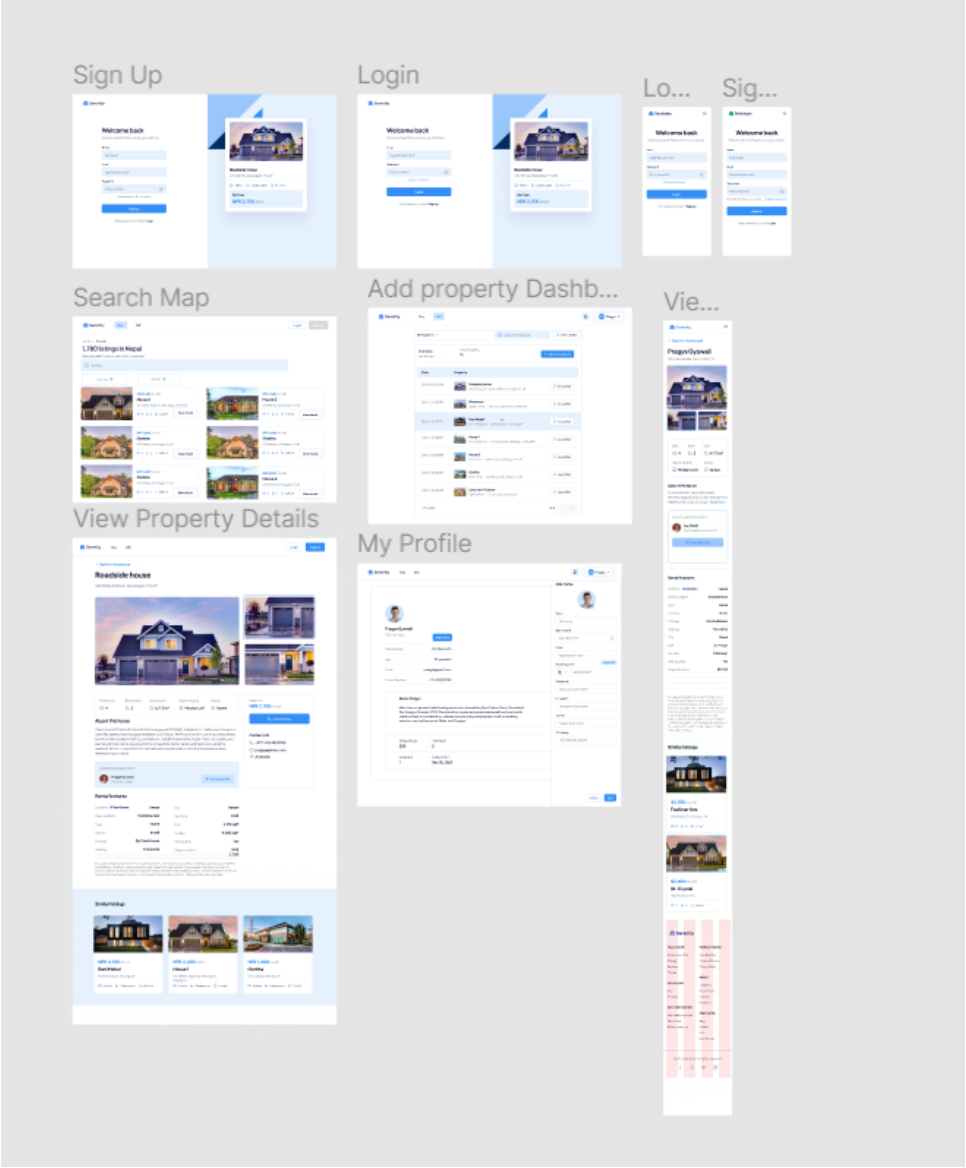


Figure 11: Figma Design