



Software Product Release **< Bunyan >**

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1 Chapter 1: Introduction

In today's dynamic real estate market, the demand for efficient property transactions has increased due to the growing need for accessible and transparent solutions for buyers, sellers, and investors. However, navigating the process of buying, selling, or renting properties remains a challenge, as individuals often face difficulties in finding suitable options, dealing with high costs, and overcoming inefficient communication channels. These barriers contribute to delays, missed opportunities, and overall market inefficiencies.

In Riyadh, the demand for residential and commercial properties is rising rapidly. However, the local real estate market continues to face traditional hurdles, including high costs, lack of transparency, and reliance on intermediaries. A study by PwC found that 60% of real estate transactions in Saudi Arabia still rely on manual processes, slowing things down and creating inefficiencies [2]. These challenges make it difficult for people and businesses to navigate the market smoothly. Saudi Arabia's Vision 2030 has accelerated real estate development, with initiatives aiming to increase homeownership to 70% by 2030 and enhance the private sector's role in the housing market [1]. Despite these efforts, individuals seeking to navigate the market often experience frustration and inefficiency.

Introducing "Bunyan", a digital platform designed to address these challenges by streamlining the real estate transaction process. By connecting buyers, sellers, and investors directly, "Bunyan" offers an efficient solution for property listings, searching, and investment.

Users can effortlessly list, search, and invest in properties, making the real estate experience more efficient and seamless. Importantly, "Bunyan" empowers individuals by reducing reliance on intermediaries, providing real-time market insights, and enabling more informed decision-making. The platform not only saves time and effort but also enhances access to investment opportunities in Riyadh's booming real estate market.

In this document, we will present a significant real-world challenge in the real estate industry and introduce "Bunyan", as the solution. We will provide an overview of its features and user experience, discuss its impact on the market, and highlight its role in fostering a more efficient and accessible property ecosystem. Additionally, we will outline our product vision, roadmap, and project objectives, while defining the project scope and introduce the Scrum Team involved, including the Product Owner, Developers, Scrum Master, and Stakeholders. Finally, we will include references for further reading.

In the next section, we will define the problem by examining the obstacles buyers, sellers, agents, and investors face in property transactions, uncovering key pain points, and emphasizing the need for an innovative platform like "Bunyan".

1.1 The Problem

In this section, we will outline our problem, which demonstrates the obstacles the users are faced with, and which we aim to solve.

Although with a big purchase comes the need for exploration, buyers may find that searching for a home that meets specific criteria whether it's the right neighbourhood, budget, or property size can be a time-consuming and frustrating process.

Sellers may encounter their own set of challenges. For instance, the need to navigate through multiple platforms to reach potential buyers is a complication that comes with listing a property. Additionally, some sellers may wish to reduce their dependency on third-party agents.

Real estate agents need to connect with clients in this increasingly competitive market which is why failure in advertising may result in many missed opportunities.

There's a growing interest in real estate investment, but barriers like high upfront costs make it difficult for many to participate. This limited accessibility of investing prevents individuals with smaller budgets from engaging in the market.

In the next section, we will magnify how "Bunyan" aims to evolve the market.

1.2 The Solution

In this section, we will propose the solution to the previously discussed problem. Our solution is a website named "Bunyan".

Bunyan simplifies home hunting by offering a seamless search experience with real-time property updates and advanced filtering tools, helping buyers find homes faster and with less frustration. For sellers, Bunyan provides a dual approach—allowing them to list properties independently or work with agents—while also centralizing the listing process so they no longer need to navigate multiple platforms. Real estate agents can easily showcase their listings with Bunyan's, helping them stand out and connect with more clients in a crowded market. For those looking to invest, Bunyan makes it simple—letting people fund real estate projects without having to buy an entire property. This means even those with smaller budgets can get in on the action and start building wealth. By solving these challenges, "Bunyan" creates a smooth, transparent, and accessible real estate experience for everyone.

1.3 The Product

Product Vision

In this section, we will define the product vision of "Bunyan", which is what we want to achieve by developing and deploying the website.

For all individuals who are interested in real estate, whether they are homebuyers, home sellers, renters, real estate agents and even investors "Bunyan" is a website that enables the users to access or add to the many real estate offers in a convenient way. Ensuring that all exploratory processes go smoothly and efficiently." Unlike "Aqar" and other real estate websites, our website enables users to effortlessly invest in real estate projects while efficiently managing their properties.

In the next section, we will present the Product Roadmap for "Bunyan" that outlines the key milestones and timeline for the development and deployment of the website.

Product Roadmap

In this section, we will present the roadmap for the "Bunyan" website, outlining the timeline and stages of development, from initial planning to final delivery, as illustrated in Figure 1-1.

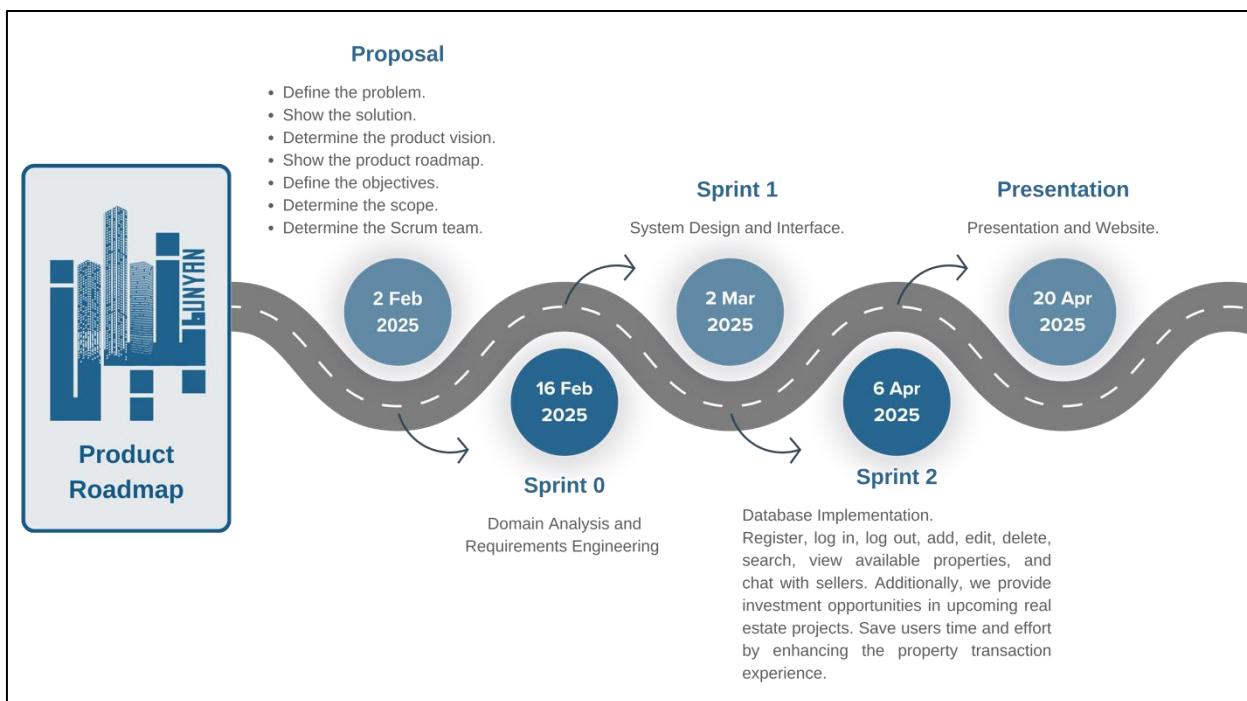


Figure 1-1-1: Product Roadmap.

In the next section, we will define the set of objectives for the "Bunyan" website, outlining the key requirements we aim to achieve throughout the development process.

Objectives

Product Objectives (customer focus-value):

These objectives aim to meet the needs of users and enhance their experience by providing valuable features and solutions. The key benefits are:

- Buyers can easily find properties for sale or rent.
- Buyers can access all property-related information on a single platform, saving time and effort.
- Buyers can explore detailed property listings and filter their search based on specific preferences.
- Sellers can conveniently list their property
- Real estate agents can actively grow their business.
- Users can invest with low upfront rates in upcoming projects.
- Users can register, log in, and log out securely, ensuring convenience and security.
- Users can communicate directly with each other (buyers and sellers) for inquiries or discussions.
- Users can manage property listings, adding, updating, or removing properties as needed.
- Users can sort listings according to various criteria, customizing the search experience to their needs.

Project Objectives (solution focus-plan):

These objectives are related to the stages of developing the “Bunyan” platform and what will be achieved by the end of the project. They are as follows:

- Conduct interviews and surveys with potential users (buyers, sellers, and investors) to gather insights and needs.
 - Collect and analyze data about the real estate market and user needs (domain analysis).
- 1 Identify functional and technical requirements for users through requirements elicitation techniques.
 - 2 Design user interfaces that provide a smooth and intuitive experience.
 - 3 Build a database that supports the platform’s core functionalities.
 - 4 Develop the platform and implement all features that meet user needs.
 - 5 Test the platform to ensure quality and performance.

Learning Objectives (student focus):

These objectives aim to equip the team with the skills and knowledge they plan to achieve through this project, including:

1. Learn to use new tools such as Jira for project management and task tracking.
2. Learn and apply Agile methodology in web development while working within a Scrum team framework.
3. Develop and improve skills in data analysis, user research, and web testing.
4. Understand how user data is stored and managed within web platforms through databases.
5. Learn to use XML in web development.
6. Enhance the use of JavaScript and other web development languages to create interactive and dynamic web features.

By achieving these objectives, our "Bunyan" platform will enhance the real estate market by providing a seamless digital experience for buyers, sellers, and investors. Additionally, this project will help our team develop essential skills in web development, data analysis, and Agile project management.

In the next section, we will define the scope of "Bunyan" and explore the specific functionalities and features it will offer to users.

Scope

In this section, we will specify the limitations of our website and highlight areas that fall outside the scope, reserving them for future work.

"Bunyan" is a platform that simplifies property transactions, enabling sales, rentals, and investments in Riyadh.

The platform will be developed using web development languages and will support the English language. It will provide users with the ability to explore available properties for sale or rent in Riyadh, as well as add listings, with the option to delete or edit them when necessary. Additionally, users will be able to search for properties, filter options based on their preferences, view detailed property information, and explore investment opportunities in upcoming real estate projects within Riyadh. The platform will also provide a chat feature to facilitate direct communication between buyers and sellers for inquiries.

On the other hand, the "Bunyan" platform will not include features that allow negotiating property prices directly; users will not be able to negotiate property prices directly through the platform. Additionally, the system will not include the option for users to leave comments on listings, nor will it support any languages other than English. Any other features will not be supported by the end of this project but may be considered for future development.

1.4 The Scrum Team

Table 1-1-1: Define the Scrum Team Members.

Scrum Team	
Product Owner	Aljwharah AlHowidy
	Aljwharah AlHowidy
Developers	Nouf AlMansour
	Sara AlOqiel
	Shahad AlMutairi
Scrum Master (SM)	I. Reem AlQifari
Stakeholders	I. Reem AlQifari

At the end of this chapter, we will transition into the next chapter, where we will discuss the methodology used to develop “Bunyan”, including the design and implementation process, the tools and technologies employed, and the overall approach to building a user-friendly and efficient platform.

2 Chapter 2: Domain Analysis

In this chapter, we are going to outline the challenges faced by users in the real estate market and introduce “Bunyan” as a solution in the Background section. We will also review relevant literature that explores existing research and solutions related to property transactions and digital platforms, providing a foundation for the development of “Bunyan”.

2.1 Background

In this section, we highlight the challenges users face in the real estate market and present “Bunyan” as a solution to overcome these obstacles and streamline property transactions. These obstacles, streamline property transactions, and improve overall market accessibility.

The real estate market in Saudi Arabia has seen significant changes in recent years, primarily driven by the government's Vision 2030 initiative. This vision aims to diversify the economy and increase homeownership rates, encouraging the digital transformation of various sectors, including real estate. Despite the advancement of technology in many areas, the real estate market still faces several inefficiencies that hinder the property transaction process. These challenges, particularly in Riyadh, present opportunities for innovation and the development of more efficient solutions.

Problem Domain

The real estate market, especially in fast-growing urban centers like Riyadh, faces several key challenges that slow down the efficiency of property transactions:

- **High Costs:** Traditional real estate transactions often involve significant fees, including commissions for agents, administrative charges, and other costs that make the process expensive for buyers and sellers alike.
- **Lack of Transparency:** Buyers, sellers, and investors often face difficulties in accessing accurate, up to date information about properties. This lack of transparency can lead to delays, missed opportunities, and increased uncertainty in the market.
- **Reliance on Intermediaries:** For some people, the reliance on intermediaries such as brokers and agents can create inefficiencies, increase costs, and complicate the transaction process.
- **Limited Accessibility for Investors:** Although real estate is a popular investment choice, the high upfront costs often make it difficult for small investors to enter the market. The rise of electronic investment (الاستثمار الإلكتروني) has made it easier for individuals to participate in real estate projects, yet the need for more accessible platforms remains.[3]

These problems create a need for digital solutions that streamline the property transaction process, offer real time market insights, and reduce reliance on intermediaries. “Bunyan”, a digital platform aimed at addressing these challenges, provides a promising solution by simplifying property transactions, enhancing transparency, and increasing accessibility for all market participants.

Solution Domain

The solution to the challenges faced by the real estate market lies in the creation of a digital platform like “Bunyan”, which seeks to eliminate inefficiencies and create a more transparent and efficient property transaction ecosystem. “Bunyan” leverages web development technologies to create an easy-to-use, user-friendly interface that connects buyers, sellers, and investors directly. Key features of the platform include:

- **Property Listings:** Users can list, search for, and view detailed property information.
- **Advanced Filtering:** The platform allows buyers to filter properties based on specific criteria such as location, price, and size, making it easier for them to find the ideal property.
- **Investment Opportunities:** By enabling users to invest in real estate projects with lower upfront costs, “Bunyan” opens the door to a wider range of investors, including those who might not have been able to participate traditionally.
- **Location-based Services:** Integration with external APIs like Google Maps allows users to view properties based on location, offering proximity analysis and location-based recommendations.

By addressing these core needs, “Bunyan” aims to reduce the reliance on intermediaries, lower transaction costs, and offer a more transparent, efficient, and accessible real estate ecosystem.

Domain Knowledge

To successfully design and develop “Bunyan”, it is important to understand the broader context of the real estate market and the technological landscape in Saudi Arabia. Key domain knowledge areas include:

- **Real Estate Market Trends in Saudi Arabia:** The real estate sector in Saudi Arabia has experienced rapid growth, driven by factors such as urbanization, a rising population, and an increasing demand for residential, commercial properties, particularly in Riyadh. Vision 2030 is focusing on boosting homeownership rates and facilitating market access through

digital transformation. This shift toward digitalization presents opportunities for platforms like “Bunyan”, which cater to the needs of tech-savvy buyers, sellers, and investors.

- **Buyer and Seller Behavior:** The Saudi real estate market is influenced by the behavior and preferences of its participants. Buyers look for properties that meet their specific criteria, such as price, location, and amenities, while sellers aim to list their properties on the most effective platforms without incurring high costs. Both buyers and sellers also face a lack of transparency, as access to accurate property information can be limited.
- **Legal and Regulatory Landscape:** The real estate sector in Saudi Arabia is governed by a range of laws and regulations. These include property ownership laws, land use policies, and real estate financing regulations that guide transactions, including investments by foreign entities. Bunyan must comply with these regulations, particularly the ones concerning property listings, investments, and financing options.
- **Cultural and Social Factors:** The real estate market is also influenced by local culture, such as the preference for family-owned properties. Understanding these cultural nuances is important for designing a platform that resonates with the needs of the local market.
- **Technological Trends in Real Estate:** Digital transformation is rapidly changing how properties are bought, sold, and managed. The increasing popularity of online property listings, mobile applications, and location-based services is reshaping the industry. The platform must be built using modern web technologies to ensure a seamless, mobile-friendly user experience, including responsive design and fast load times.
- **Investment in Real Estate:** The rise of electronic investment (الاستثمار الإلكتروني) has lowered the barriers to entry for real estate investments. Bunyan will incorporate features that allow smaller investors to participate in real estate projects, making it easier for them to access opportunities that were previously only available to larger investors with substantial capital.

Theoretical Background

To develop an effective platform like Bunyan, the following theoretical concepts and technologies are fundamental:

- **Web Development Technologies:** The platform will utilize web development technologies such as HTML, CSS, and JavaScript for frontend development, ensuring that the platform is interactive, responsive, and accessible on both desktop and mobile devices. For backend development, PHP, Python or Node.js will handle server-side logic and database interactions, ensuring that the platform runs smoothly and efficiently.

- **Relational Database Management:** A relational database management system (RDBMS), such as MySQL or PostgreSQL, will be used to store and manage data related to users, properties, and transactions.
- **APIs and Location-based Services:** Integrating external APIs, like Google Maps API, will provide users with advanced location-based features such as property location visualization.
- **Recommendation Algorithms:** The platform will incorporate recommender systems to personalize the user experience. Algorithms like content-based filtering and collaborative filtering will suggest properties to users based on their preferences and behaviors, improving the likelihood of a successful transaction.
- **Agile Methodologies:** The project will follow Agile practices and the Scrum framework, enabling iterative development and collaboration within the team. **Jira** will be used for project management to track progress, assign tasks, and manage sprints.

In the next section, we will review existing literature and research related to property transactions and digital platforms, providing a deeper understanding of the current solutions and how they inform the development of "Bunyan".

2.2 Literature Review

In this section, we will conduct a competitive product analysis to better understand the features offered by existing real estate platforms in Saudi Arabia. This will help us identify what works well, what doesn't, and how we can improve these ideas in our platform, "Bunyan."

By comparing three popular real estate platforms—Aqar [4], Bayut [5], and Property Finder [6]—we will highlight their strengths and weaknesses. Then, we will conclude with a comparison table to showcase how "Bunyan" stands out against these competitors.

Our goal is to integrate the best features from these platforms while addressing their shortcomings, ultimately creating a more comprehensive and user-friendly real estate

experience.

1. Competitor 1: Aqar [4]

Brief Description:

A real estate platform focused on property listings, rentals, and sales in the Middle East.

Strengths:

1. Extensive Property Database: Aqar offers a large selection of residential and commercial listings.
2. Real Estate Blog & Tips: Offers a blog with useful insights and tips on the real estate market.
3. Bilingual Support: Available in both Arabic and English, making it accessible to a wider audience.
4. Mobile App Available: Aqar has a mobile app for easy access and on-the-go browsing.

Weaknesses:

1. No investment options – Aqar doesn't offer any way to invest in real estate projects, which limits its appeal to investors.
2. No Direct Communication: Buyers and sellers can't chat directly on the platform, which can slow things down.
3. No Real-Time Updates: Listings aren't updated in real-time, so users might see outdated information.

2. Competitor 2: Bayut [5]

Brief Description:

Bayut is a major player in the Middle East real estate market, offering tons of property listings for buying, selling, and renting. It's known for its extensive database and advanced search tools.

Strengths:

1. Comprehensive Listings: Bayut has a wide variety of properties, ranging from residential to luxury and commercial.
2. Advanced Filters: Users can narrow down their search using filters like price range, location, and amenities.
3. Real-Time Updates: Listings are updated in real-time, ensuring users have access to the latest information.
4. Multi-Language Support: The platform supports multiple languages, making it accessible to a broader audience.

Weaknesses:

1. Reliance on Agents: Bayut depends heavily on real estate agents, which can drive up costs for users.
2. No Investment Features: Like Aqar, Bayut doesn't offer any investment opportunities.
3. Complex Interface: With so many features, the platform can feel overwhelming for some users.
4. Limited Direct Communication: Buyers and sellers can't communicate directly, which can slow down transactions.

3. Competitor 3: Property Finder [6]

Brief Description:

Property Finder is a leading real estate platform in the Middle East, offering property listings for buying, selling, and renting.

Strengths:

1. High-Quality Listings: Property Finder provides detailed property listings with high-quality images and videos.
2. Advanced Search Filters: Users can filter properties by location, price, property type, and more.
3. Market Insights: The platform offers market insights and trends, helping users make informed decisions.
4. Mobile App: Property Finder has a mobile app for easy access on the go.

Weaknesses:

1. No Investment Options: Property Finder doesn't offer any investment opportunities for users.
2. Limited Direct Communication: Buyers and sellers can't communicate directly through the platform.
3. High Dependency on Agents: The platform relies heavily on real estate agents, which can increase costs for users.

Table 2-1: Comparison of Competitor Software Features with Bunyan

Feature	Aqar	Bayut	Property Finder	Bunyan (Proposed)
Property Listings	✓	✓	✓	✓
Advanced Search Filters	✓	✓	✓	✓
Real-Time Updates		✓		✓
Investment Opportunities				✓

Direct Communication				✓
Multi-Language Support	✓	✓	✓	
User-Friendly Interface	✓		✓	✓
No Dependence on Agents				✓
Mobile App Availability	✓		✓	
Market Insights			✓	
Blog & Real estate tips	✓			

"Bunyan" stands out by offering low-cost investment options, direct communication (chat), and real-time market insights, reducing reliance on agents. With a user-friendly interface and actionable tips, it provides a more transparent and efficient platform for Saudi real estate.

In the next chapter, we shift focus to Requirements Engineering, where we will detail the methods and processes involved in eliciting and analyzing the requirements for Bunyan. This chapter includes a thorough examination of user interviews, questionnaires, and other sources of information that guided the development of functional and non-functional requirements. We will also explore system users, present a use case diagram, and provide a product backlog, setting the foundation for the system's design and implementation.

3 Chapter Three: Requirements Engineering

3.1 Requirements Elicitation and Analysis

In this section, we will describe the methods used to gather and analyze the requirements for Bunyan, including user interviews, questionnaires, and other sources of information. The results and findings from these processes will be detailed, providing insight into the users' needs and expectations.

To ensure a comprehensive understanding of user needs and expectations, we employed a combination of user interviews, questionnaires, and analysis of existing systems for requirements elicitation. These methods were carefully chosen to gather both in-depth insights and broader perspectives from a diverse group of stakeholders. By combining these approaches, we were able to identify key pain points, preferences, and expectations that will shape the development of the

real estate platform. Below, we outline the methods used, the results obtained, and the findings that emerged from this process. For detailed transcripts of the interviews and complete questionnaire responses, please refer to Appendix A and Appendix B for further insight.

3.1.1 Interviews

Here, we will focus on the interviews conducted with target users to gather qualitative data. We will present the interview questions, summarize the participants' information, and analyze the results to understand their requirements and preferences for the platform.

We conducted 4 interviews with individuals who have significant experience in Riyadh's real estate market. These interviews were designed to provide detailed insights into the real estate transaction process, the challenges faced by users, and the features they desire in a real estate platform. The interviewees included real estate investors, buyers, and agents, each bringing a unique perspective based on their years of experience in the industry. A summary of the participants' information can be found in Appendix A.

The key findings from these interviews revealed that residential transactions typically take 1-4 months, while commercial transactions can take up to a year due to approvals and due diligence. Most interviewees relied on online platforms like Aqar, Property Finder, and developer websites for property searches, supplemented by personal networks and industry contacts. A recurring challenge was the lack of transparency in pricing and valuation, as well as the fragmented nature of information across multiple platforms, which made the search process time-consuming. Delays in documentation and legal verification were also frequently cited as frustrating.

Interviewees expressed a strong desire for accurate and verified listings with high-quality photos, videos, and detailed descriptions. They also emphasized the importance of advanced search filters for location, price, size, and amenities, as well as market analysis tools to provide insights into pricing trends and ROI. Features like virtual tours and augmented reality were suggested to enhance property visualization. Additionally, integration with government systems for seamless legal verification was seen as a critical feature. All interviewees expressed interest in investing in new projects but stressed the need for clear financial data, developer credibility, and financing options.

Overall, the interviews highlighted the importance of digital platforms in simplifying real estate transactions. There is a strong demand for centralized platforms that offer real-time updates, verified data, and user-friendly interfaces. Transparency and efficiency were recurring themes, with many suggesting that a well-designed platform could address these issues. For the full interview transcripts, please refer to Appendix A.

3.1.2 Questionnaire

Here, we will analyze the responses from a questionnaire distributed to a larger sample of users. We will present the results in graphical form, offering insights into user preferences and needs, which will be key to defining the system's functionality.

To complement the insights gathered from interviews, we distributed a questionnaire to 13

participants to gain a broader understanding of user preferences and challenges in the real estate market. This approach allowed us to collect quantitative data and identify common trends among a larger group of potential users. The questionnaire included 10 questions covering topics such as preferred search methods, challenges faced, and desired platform features. The complete questionnaire and responses are available in Appendix B.

The results showed that 53.8% of respondents were interested in buying properties, while 38.5% were interested in investing and 30.8% in selling. In terms of transaction frequency, 46.2% engage in transactions frequently (more than once a year), while 30.8% were considering entering the market for the first time. The preferred method for searching for properties was online platforms/websites, chosen by 46.2% of respondents, followed by real estate agents and word of mouth. When it comes to property search criteria, location and price were the most important factors, with 30.8% and 23.1% of respondents prioritizing them, respectively. Additionally, 53.8% of participants considered end-to-end encrypted chats very important for real estate platforms, highlighting the need for secure communication.

Challenges faced by respondents included lack of options (38.5%), outdated listings (23.1%), and poor filtering tools (38.5%). Despite these challenges, 76.9% of respondents expressed willingness to try a new real estate platform that simplifies property transactions. Suggestions for improvement included implementing notification systems for new listings, providing virtual tours, and offering detailed information about neighborhoods, such as schools and transportation. For a detailed breakdown of the questionnaire results, including graphs and charts, please refer to Appendix B.

3.2 System Users

This section outlines the general characteristics of Bunyan platform users, including experience, technical proficiency, and preferences.

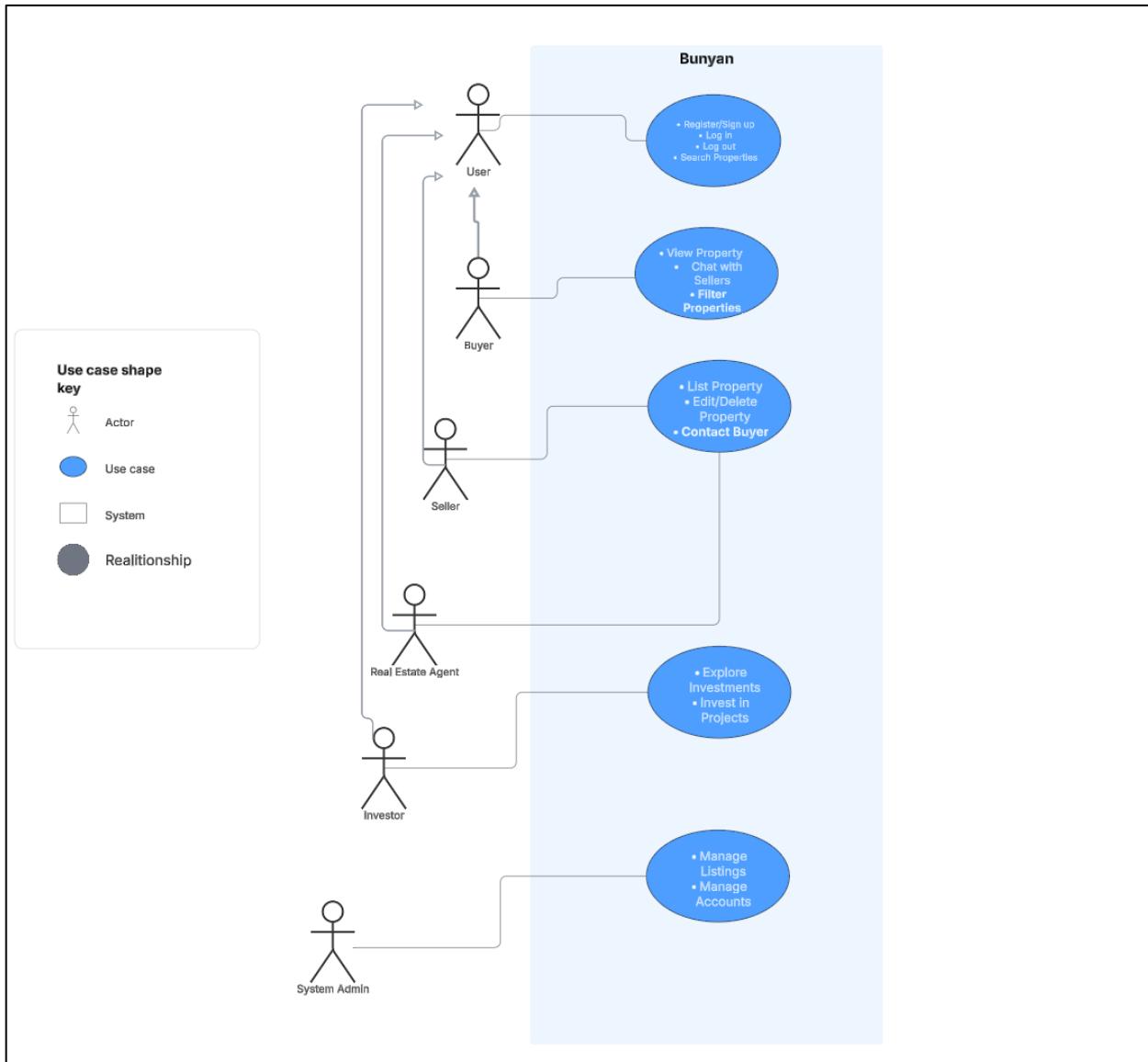
4. All users can access the platform and utilize its features for property searches and transactions.
5. There are no specific educational requirements as long as users are adults and capable of making responsible decisions.
6. Users should have minimal technical knowledge to navigate and use the platform effectively.
7. Users are expected to have basic familiarity with similar digital platforms.
8. Users are interested in buying, selling, or renting properties, as well as exploring investment opportunities.
9. Users must be 18 years or older.
10. The platform is available to all users without restrictions based on nationality.
11. The platform supports English only, though many users may be bilingual.

Bunyan is designed to be user-friendly, ensuring a seamless experience for all users.

3.3 Use Case Diagram

In this section, we will present the use case diagram, illustrating how “Bunyan” interacts with various actors. This will help visualize the system's functionalities and how different user roles interact with the platform.

Figure 3-1: Use Case Diagram of Bunyan



3.4 Product Backlog

In this section, we will list the functional and non-functional requirements in the form of user stories, alongside their estimates and acceptance criteria. The product backlog will serve as a roadmap for the system's development.

Table 3-1: Product Backlog of Bunyan

PBI	Size	Type	Acceptance Criteria
As a buyer , I want to be able to search for properties using filters (like location, price, size) so I can find properties that match my preferences.	8	Feature	<ul style="list-style-type: none"> Filters should include location, price range, property size, and amenities. Search results should update in real-time as filters are applied. Results should display relevant property details (e.g., price, location, images).
As a seller , I want to be able to list my property on the platform so that I can reach potential buyers.	5	Feature	<ul style="list-style-type: none"> Sellers should be able to upload property details (e.g., price, location, description, images). Listings should be reviewed and approved before going live. Sellers should receive a confirmation email once the listing is live.
As a user , I want to be able to register and log in securely so that I can access	8	Feature	<ul style="list-style-type: none"> Users should be able to register

my account and manage my listings or searches.			<ul style="list-style-type: none"> using email and password. <ul style="list-style-type: none"> • Passwords should be encrypted. • Users should receive a confirmation email upon registration.
As a buyer , I want to be able to chat directly with sellers so that I can ask questions about the property.	13	Feature	<ul style="list-style-type: none"> • The chat feature should support real-time messaging. • Messages should be end-to-end encrypted. • Chat history should be saved for future reference.
As an investor , I want to be able to explore investment opportunities in real estate projects so that I can invest with low upfront costs.	13	Feature	<ul style="list-style-type: none"> • Investment opportunities should display key details (e.g., project location, expected ROI, developer credibility). • Users should be able to invest directly through the platform. • Users should receive a confirmation of their investment.
As a user , I want to receive notifications about new listings or updates so that I don't miss out on opportunities.	8	Feature	<ul style="list-style-type: none"> • Notifications should be sent via email or in-app alerts. • Users should be able to customize notification preferences. • Notifications should be triggered in real-time.

As a user , I want the platform to be secure so that my personal and financial information is protected.	13	Technical Work	<ul style="list-style-type: none"> • All user data should be encrypted. • The platform should comply with GDPR or equivalent data protection regulations. • Regular security audits should be conducted.
As a user , I want the website to be available 99% of the time so that I can access it whenever I need to.	13	Technical Work	<ul style="list-style-type: none"> • Website uptime should be monitored and maintained at 99% or higher. • Downtime should not exceed 1% in any given month.
As a user , I want the website to load within 3 seconds so that I don't get frustrated and leave the site.	8	Technical Work	<ul style="list-style-type: none"> • The website should load all critical elements (e.g., homepage, search results) within 3 seconds. • Performance should be tested under high traffic conditions.

4 Chapter 4: System Design

In this section, we present the key components that define the system's overall architecture. It consists of five main parts. First, we define the **System Architecture** and illustrate it with a diagram. Second, we present a **Class Diagram** to outline the system's structure. Third, we describe **Data Design**, including the ER Diagram, Database Schema, and Data Dictionary. Fourth, we provide **Component Design**, featuring pseudocode and explaining the logic.

behind key functions such as adding, editing, and deleting property transactions. Finally, we include **Effort Estimation**, where we assess the development effort required to implement the system's main functionalities. These components define the architecture of **Bunyan**, covering system structure, data management, core functionalities, and development effort, ensuring an efficient and well-organized system.

4.1 System Architecture

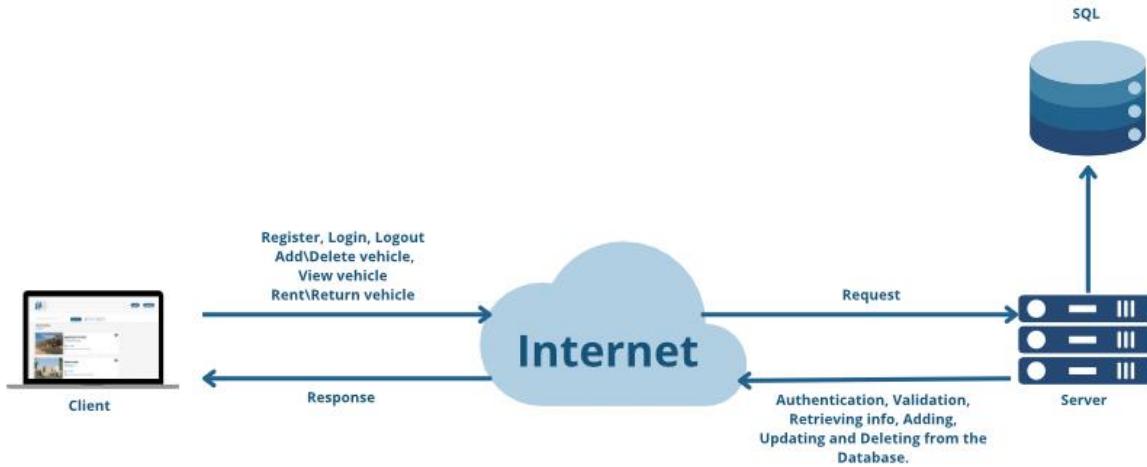
The server-side component plays a vital role in the system design, acting as a central repository for storing important data related to users, properties, and investments. It also manages the business logic of the application. The server is responsible for handling user requests, performing the necessary operations, retrieving and updating data from the database, and ensuring that users have access to accurate and up-to-date information. This will be implemented using a **Client-Server** architecture to ensure efficient performance and real-time data updates.

We opted for the **Client-Server Architecture** for several important reasons. First, this architecture clearly separates the user interface (client-side) from the business logic and data handling (server-side). This separation improves the application's organization and makes it easier to maintain and develop, as individual components can be updated or modified without affecting the entire system. Another key advantage of the **Client-Server Architecture** is its scalability, which allows multiple users to connect to the server concurrently, enabling efficient processing of large amounts of data and high request traffic. Moreover, this architecture enhances security by centralizing data and business logic on the server, making it easier to implement security measures such as authentication and access control, ensuring that sensitive data remains protected and accessible only to authorized users.

After evaluating several architectural options for the “**Bunyan**” application, we chose the **Client-Server Architecture** as the most suitable for the system’s nature. We did not select the **MVC (Model-View-Controller) Architecture** because it is designed for complex user interfaces and multiple views, which would introduce unnecessary complexity to the relatively simple interface of “**Bunyan**.” Similarly, the **Layered Architecture** was not suitable because its multiple levels of abstraction could affect system performance, and it is better suited for complex systems managed by multiple development teams. We also avoided the **Repository Architecture** because it is designed to manage data access and storage in complex systems, whereas “**Bunyan**” does not require this level of complexity, which could add unnecessary overhead. The “**Bunyan**” application relies heavily on direct interaction between users and the system, such as the **chat feature** that allows real-time communication between buyers and sellers—something that the **Client-Server Architecture** efficiently supports.

In conclusion, after a comprehensive evaluation of the “Binyan” platform’s requirements, we determined that the Client-Server Architecture is the most suitable for implementing the platform. This structure ensures clear task separation, offers scalability, and provides a high level of security, contributing to optimal platform performance in various environments.

Figure 4-1: System Architecture of “Bunyan”

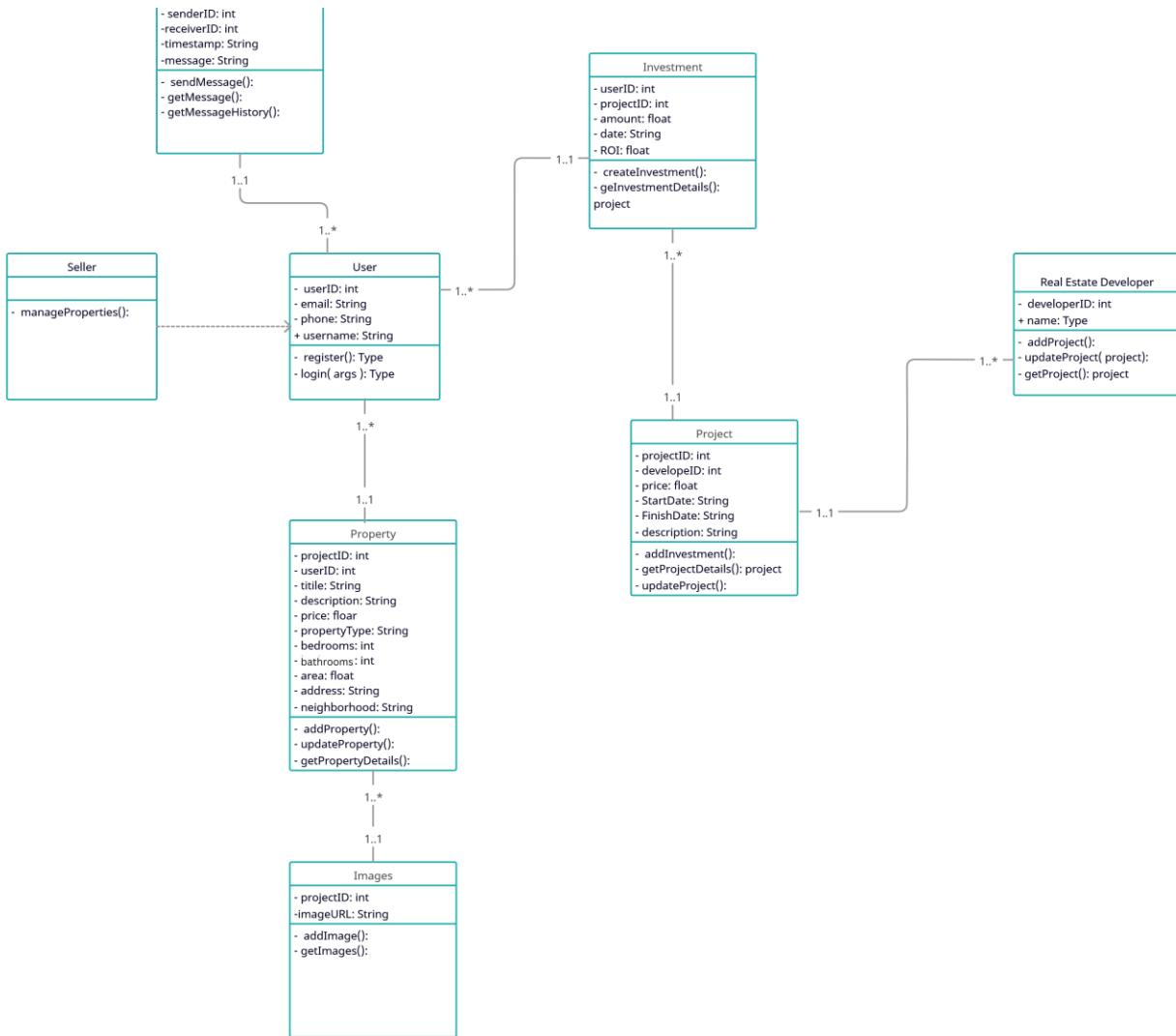


4.2 Class Diagram

In this section, we will present the class diagram of the "Bunyan" app. It provides a comprehensive depiction of the classes within our system, outlining their attributes, methods, and relationships. The class diagram functions as a visual blueprint, illustrating the structure and

organization of the code developed during the implementation of the object-oriented design for "Bunyan."

Figure 4-2: Class Diagram of "Bunyan"



- **User:** This class has attributes like userID, email, phone, and username. Methods include register() and login(). The User class can be a Seller, which has an additional method manageProperties().
- **Seller:** Inherits from User, specifically for users who are selling properties. It includes the method manageProperties(), allowing the seller to manage their listed properties.
- **Message:** This class is used for communication between users. It includes attributes like senderID, receiverID, timestamp, and message. Methods include sendMessage(), getMessage(), and getMessageHistory().
- **Investment:** Represents investments made by users in specific projects. It contains attributes like userID, projectID, amount, date, and ROI. Methods include createInvestment() and getInvestmentDetails().
- **Real Estate Developer:** This class represents the developers of the projects. It includes developerID, name, and methods to manage projects, such as addProject(), updateProject(), and getProject().

- **Project:** Represents a real estate project with attributes like projectID, attribute, and price. It has methods like addInvestment(), getProjectDetails(), and updateProject() to manage and update project details.
- **Property:** Linked to both User and Project, this class represents individual properties. It includes details like projectID, title, price, and address. Methods include addProperty(), updateProperty(), and getPropertyDetails().
- **Images:** Represents images for properties. It has a projectID and imageURL attribute, and methods like addImage() and getImages() to manage property images.

4.3 Data Design

In our website “Bunyan”, we used relational database design because it offers several key benefits:

- **Structured Data:** The system requires clear relationships between entities like users, properties, and investments. Relational databases efficiently handle this by organizing data into tables with well-defined attributes and relationships.
- **Data Integrity:** By using primary and foreign keys, we ensure data consistency and avoid redundancy. For example, a user's information is stored once in the **User** table, and properties reference the **userID** as a foreign key.
- **Efficient Querying:** SQL allows us to retrieve related data quickly. For instance, finding all properties in a specific neighborhood.

Figure 4-3: ER Diagram of "Bunyan"



- **Schema**

User (UserID, Email, Phone, Username, Password)

Primary Key: UserID

Property (PropertyID, UserID, Title, Description, Price, PropertyType, Bedrooms, Area, Address, Neighborhood)

Primary Key: PropertyID

Foreign Key: UserID **References** User(UserID)

Image (, PropertyID, ImageURL)

Foreign Key: PropertyID **References** Property(PropertyID)

Message (, SenderID, ReceiverID, Timestamp, Message)

Foreign Key: SenderID **References** User(UserID)

Foreign Key: ReceiverID **References** User(UserID)

Investment (InvestmentID, UserID, ProjectID, Amount, Date, ROI)

Primary Key: InvestmentID

Foreign Key: UserID **References** User(UserID), ProjectID **References** Project(ProjectID),

Primary Key: ProjectID **References** Project(ProjectID)

Project (ProjectID, Title, name, description, startdate, completiondate, value)

Primary Key: ProjectID

- **Data Dictionary for Class Diagram**

Entity Name	Relationship	Entity Name	Multiplicity
User	Issues	Property	0..*
User	Makes	Investment	0..*
Seller	Manages	Property	0..*
Investment	Relates to	Project	1..1
Property	Contains	Images	1..*
Real Estate Developer	Issues	Project	0..*

- **Class Diagram Attribute Data Dictionary**

Table 4-1: Data Dictionary of “Bunyan”

Class Diagram Attribute Data Dictionary

Entity Name	Attribute	Description	Data Type	Length	Nuls	Multi - Valued	Default Value	Range	P K
User	userID	User's Id	Integer	255	N	N	N		Y
	userName	User's name	String	30	N	N	N		N
	email	User's email	String	255	N	N	N		N
	password	User's password	String	100	N	N	N	6-255	N
	phone	User's phone	Integer	30	N	N	N		N
Property	propertyID	Property's Id	Integer	255	N	N	N		Y
	userID	User's Id	Integer	255	N	N	N		N
	title	Property's title	String	100	N	N	N		N
	description	Property's description	String	255	N	N	N		N
	price	Property's price	Double	100	N	N	N		N
	propertyType	Property's type	String	100	N	N	N		N

Properties	bedrooms	Property's bedrooms	Integer	100	N	N	N		N
	area	Property's area	Double	100	N	N	N		N
	address	Property's address	String	255	N	N	N		N
	neighbourhood	Property's neighbours	String	100	N	N	N		N
Investment	userID	Investment's Id	Integer	255	N	N	N		N
	projectID	Project id	Integer	255	N	N	N		N
	amount	Investment's amount	Double	100	N	N	N		N
	date	Invest date	timeDate	100	N	N	N		N
	ROI		double	100	N	N	N		N
Project	projectID	Project's Id	String	255	N	N	N		Y
	Attribute	Project's type	String	100	N	N	N		N
RealEstateDeveloper	developerID	Developer's Id	Integer	255	N	N	N		Y
	name	Developer's type	String	100	N	N	N		N
Images	projectID	Project's id	Integer	255	N	N	N		N
	imageURL	Image's URL	String	255	N	N	N		N
Messages	senderID	Sender id	Integer	255	N	N	N		N
	receiverID	Receive id	Integer	255	N	N	N		N
	timestamp	Message time	String	255	N	N	N		N
	message	Messge content	String	255	N	N	N		N

4.4 Components Design

This section outlines our system's component design, focusing on adding, editing, and deleting property listings, searching and filtering properties, and investment participation. It includes design specifications, pseudocode, and execution logic for each function, along with time and effort estimates to provide a clear understanding of the implementation process.

1. Property Listing Management

- **Classification:** Function
- **Definition:** The seller should be able to add, update, and delete property listings.
- **Construction:**
 - **Inputs:** Property details (Title, Price, Location, Description, Status).
 - **Precondition:** The seller must be signed in.
 - **Postcondition:** The property is added, updated, or deleted in the database.

- **Pseudocode:**

BEGIN

IF seller selects "Add Property" **THEN**

DISPLAY form to enter property details (title, price, location, description)

IF seller submits the form **THEN**

SAVE property details in the database

DISPLAY confirmation message

ENDIF

ENDIF

IF seller selects "Update Property" **THEN**

DISPLAY list of seller's properties

IF seller chooses a property **THEN**

DISPLAY form to edit property details

IF seller submits updated details **THEN**

UPDATE property in the database

DISPLAY confirmation message

ENDIF

ENDIF

ENDIF

IF seller selects "Delete Property" **THEN**

DISPLAY list of seller's properties

IF seller chooses a property **THEN**

CONFIRM deletion

IF confirmed **THEN**

DELETE property from database

DISPLAY confirmation message

ENDIF

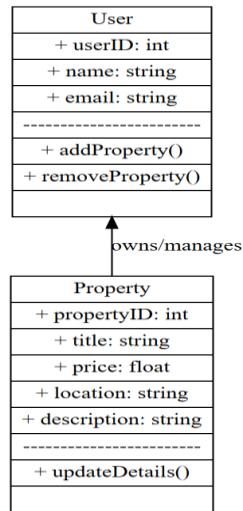
ENDIF

ENDIF

END

- **UML Class Diagram:**

Figure 4-4: Property Listing Management UML Class Diagram



2. Search & Filter Properties

- **Classification:** Function
- **Definition:** The buyer should be able to search and filter properties based on their preferences.
- **Construction:**
 - **Inputs:** Search keyword, price range, location.
 - **Precondition:** The user must be logged in.
 - **Postcondition:** A list of filtered properties is displayed.
- **Pseudocode:**

BEGIN

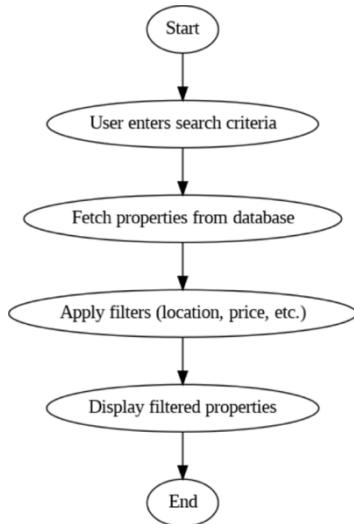
DISPLAY search bar and filter options (price range, location, etc.)

IF user enters a search keyword **THEN**

FETCH properties matching the keyword from the database
ENDIF
IF user selects filters **THEN**
 APPLY selected filters to the property listings
 ENDIF
DISPLAY the filtered list of properties
END

- **Flowchart:**

Figure 4-5: Search & Filter Properties Flowchart



3. Investment Participation

- **Classification:** Function
- **Definition:** Users should be able to invest in real estate projects.
- **Construction:**
 - **Inputs:** Investment amount, selected property
 - **Precondition:** The user must be signed in and have sufficient balance.
 - **Postcondition:** The investment is added to the database and reflected in the user's portfolio.

- **Pseudocode:**

```
BEGIN  
    DISPLAY available investment properties  
    BEGIN  
        IF user selects a property THEN  
            DISPLAY investment form (enter amount)  
            IF user submits the form THEN  
                CHECK if user has sufficient balance  
                IF balance is sufficient THEN  
                    DEDUCT amount from user balance  
                    ADD investment record to database  
                    DISPLAY confirmation message  
                ELSE  
                    DISPLAY error message (insufficient funds)
```

ENDIF

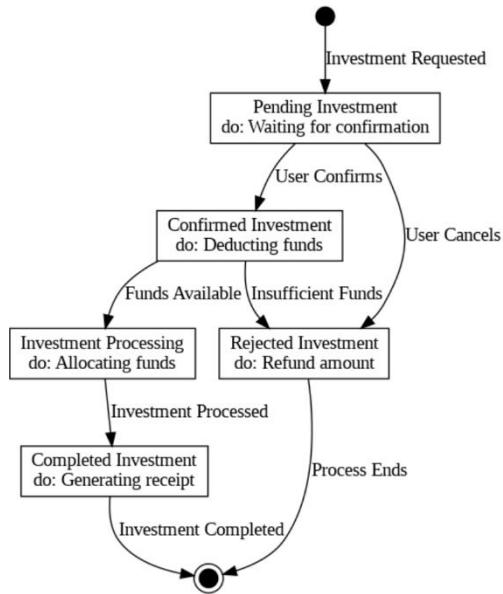
ENDIF

ENDIF

END

- **State Diagram:**

Figure 4-6:Investment Participation State Diagram

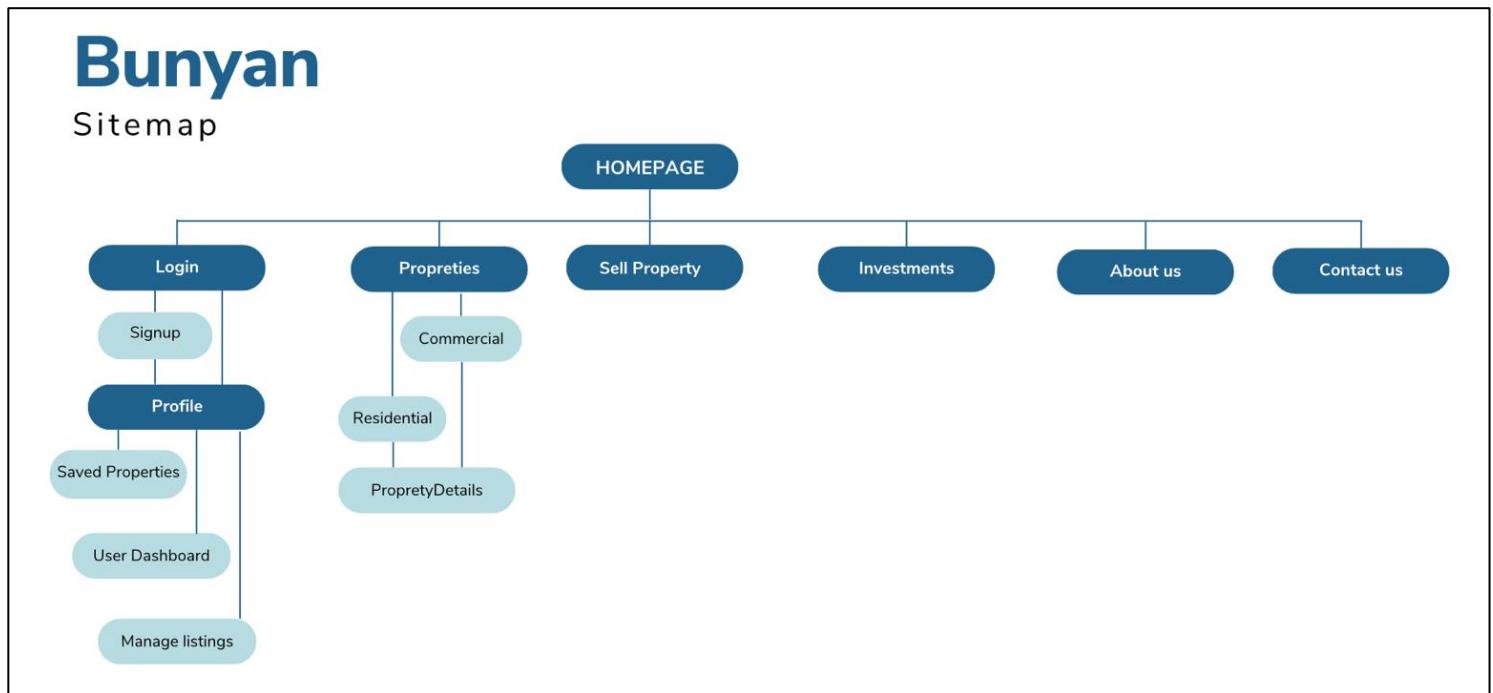


4.5 Interface Design

This section will focus on our system's Interface Design. We will outline the website structure using a sitemap. Additionally, we will highlight our dedication to a user-centered approach by presenting five key UX standards that were integrated into the design process of our website.

12. Application Structure:

Figure 4-7: "Bunyan" Sitemap



13. Incorporated UX Guidelines:

4. Consistent Design Aesthetic

Our platform ensures a consistent user experience across various sections by maintaining a uniform design style. This includes a coherent color scheme, consistent typography, and layout across pages, which facilitates a comfortable and predictable environment for users.

5. Clarity and Simplicity

We prioritize a clear and simple design to enhance usability. The interface employs clean typography and ample whitespace to minimize visual clutter, making information easy to read and the interface intuitive to navigate.

6. Responsive Design

The design adapts effectively across different devices, showcasing a responsive layout that includes a hamburger menu for mobile views. This ensures that the platform is accessible and functional, regardless of the device being used.

7. Accessibility

Icons are used alongside text for communication options like email, phone, and physical address, enhancing the accessibility of the site. This helps users quickly understand available communication methods without needing to parse through text alone.

8. Feedback and Interaction

Our platform acknowledges user interactions with immediate visual feedback. Interactive elements such as form fields and buttons react to user inputs with effects like hover states, indicating that the system has recognized the action.

By integrating these UX principles, we aim to deliver a seamless and efficient experience on our real estate platform, ensuring that it is user-friendly and meets the needs of our diverse user base.

5 References

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6 Appendix

6.1 Appendix A: Interviews

This appendix contains all supporting materials related to the interviews, including the questions asked and the full transcriptions.

- Interview Questions

1. What experience do you have in real estate?
2. Approximately, how long did the process take?
3. How did you search for the real estate listings?
4. Is there anything you wish had been different in your experience, if so specify?
5. What specific features do you believe are most important in real estate platforms?
6. Are you interested in investing in upcoming real estate projects if so, what information do you need?

- Interview Data and Transcripts

The following includes outcomes of the interviews have been recorded including details such names, dates, transcript and more. Not only does this thorough approach helps us ensure that the website we're building truly aligns with what users want, but it can be a reference to operate as potential users of the platform.

Table 6-1: Interview 1

Interview (1)	
Interviewee: Zaid Alshareef	Interviewer: Aljwharah Alhowidy
Location/Medium: Online Meeting via Zoom	Appointment Date: February 16, 2025 Start Time: 6:00 PM End Time: 6:30 PM
Objectives: <ul style="list-style-type: none"> Gather insights on real estate investment strategies. Understand key challenges and opportunities in the market. Identify important features for real estate platforms. 	Reminders: <ul style="list-style-type: none"> Interviewee has 10 years of experience in real estate investment. Focus on residential and commercial properties. Interested in upcoming real estate projects.
Agenda : Introduction Background on Project Overview of Interview <ul style="list-style-type: none"> Topics to Be Covered Permission to Record Topic 1: Investment Experience <ul style="list-style-type: none"> Q1 Q2 Topic 2: Real Estate Search Methods <ul style="list-style-type: none"> Q3 Q4 Topic 3: Market Challenges & Suggestions <ul style="list-style-type: none"> Q5 – 4 minutes Q6 – 3 minutes Summary of Major Points Questions from Interviewee Closing	Approximate Time: 1 minute 2 minutes 1 minute 5 minutes 7 minutes 7 minutes 2 minutes 5 minutes

1 minutes

General Observations:

Zaid appeared experienced and provided detailed insights. He emphasized the importance of digital platforms in real estate and the need for more transparency in pricing and valuations.

Unresolved Issues/Topics:

He mentioned the need for more transparency in property pricing and valuation but did not suggest a concrete solution.

Questions	Answers	Observation
Q1: What experience do you have in real estate?	I have 10 years of experience in residential and commercial real estate investments.	Focuses on high-demand areas.
Q2: Approximately how long did the process take?	The buying/selling process usually takes 1-2 months, but development projects take longer.	Time depends on location and demand.
Q3: How did you search for the real estate listings?	I search for real estate listings mainly through online platforms like "Aqaar"	Digital platforms are essential for investors.
Q4: Is there anything you wish had been different in your experience? If so, specify.	I wish there was more transparency in property pricing and valuation.	Lack of clear ROI data is a concern.
Q5: What specific features do you believe are most important in real estate platforms?	The most important features in real estate platforms are advanced filters, market analysis, legal verification, and ROI calculations.	Suggests adding more investor tools.
Q6: Are you interested in investing in upcoming real estate projects? If so, what information do you need?	Yes, I am interested in investing in new projects, but I need clear financial data, developer credibility, and financing options.	Financing options and location details are priorities.

Table 6-2: Interview 2

Interview (2)	
Interviewee: Meshal Aloqiel	Interviewer: Sara Aloqiel
Location/Medium: Online Meeting	Appointment Date: February 16, 2025 Start Time: 7:00 PM End Time: 7:20 PM
Objectives: <ul style="list-style-type: none"> Gather insights buyers/ renter's experiences, and what they look for. Understand key challenges and opportunities in the market. Identify important features for real estate platforms. 	Reminders: <ul style="list-style-type: none"> Interviewee had recently purchased a home Interviewee is interested in real estate investments.
Agenda : Introduction Background on Project Overview of Interview <ul style="list-style-type: none"> Topics to Be Covered Permission to Record Topic 1: Investment Experience <ul style="list-style-type: none"> Q1 Q2 Topic 2: Real Estate Search Methods <ul style="list-style-type: none"> Q3 Q4 Topic 3: Market Challenges & Suggestions <ul style="list-style-type: none"> Q5 – 4 minutes Q6 – 3 minutes Summary of Major Points Questions from Interviewee Closing	Approximate Time: 1 minute 2 minutes 1 minute 5 minutes <ul style="list-style-type: none"> 3 minutes 2 minutes 4 minutes <ul style="list-style-type: none"> 2 minutes 2 minutes 7 minute <ul style="list-style-type: none"> 4 minutes 3 minutes 0 minutes 0 minutes 1 minutes
General Observations:	

Meshal was a great example for the public, or general users. He expressed the importance of digital platforms in his real estate purchase.

Unresolved Issues/Topics:

He suggested the implementation of an augmented or virtual reality to get a realistic glimpse of the property.

Questions	Answers	Observation
Q1: What experience do you have in real estate?	I have only experienced buying and renting a property.	
Q2: Approximately how long did the process take?	It took approximately five months to search and complete the purchase	
Q3: How did you search for the real estate listings?	I have used mobile applications “Aqaar” “Wahadat”, and i’ve searched for real estate developer’s projects.	Digital platforms are essential for searching.
Q4: Is there anything you wish had been different in your experience? If so, specify.	I had hoped for a simpler way in accessing many real estate developer’s projects instead of accessing each website.	
Q5: What specific features do you believe are most important in real estate platforms?	Generally, the website should be user-friendly and clear, I personally prioritize viewing the price, location, area and all information relative to the property such as street width. I would also hope for augmented, virtual reality feature.	Suggests there are rooms for improvement.
Q6: Are you interested in investing in upcoming real estate projects? If so, what information do you need?	Yes, I am interested in investing in new projects. I would want to know the real estate developer, their past projects, the contractor.	Transparency and details are priorities.

Table 6-3: Interview 3

Interview (3)	
Interviewee: Abdulrahman	Interviewer: Nouf AlMansour
Location/Medium: Abdulrahman's House	Appointment Date: February 16, 2025 Start Time: 3:00 PM End Time: 3:30 PM
Objectives: <ul style="list-style-type: none"> Gain insights into the real estate transaction process and industry best practices. Understand the main difficulties buyers, sellers, and investors face in the market. Identify key factors that influence property pricing and investment decisions. 	Reminders: <ul style="list-style-type: none"> Interviewee has over 20 years of experience in real estate in Riyadh. Specialized in both residential and commercial property markets. Knowledgeable about market trends and regulatory changes.
Agenda: Introduction Background on Project Overview of Interview <ul style="list-style-type: none"> Topics to Be Covered Permission to Record Topic 1: Investment Experience <ul style="list-style-type: none"> Q1 Q2 Topic 2: Real Estate Search Methods <ul style="list-style-type: none"> Q3 Q4 Topic 3: Market Challenges & Suggestions <ul style="list-style-type: none"> Q5 – 4 minutes Q6 – 3 minutes Summary of Major Points Questions from Interviewee Closing	Approximate Time: 1 minute 2 minutes 1 minute 5 minutes <ul style="list-style-type: none"> 3 minutes 2 minutes 7 minutes <ul style="list-style-type: none"> 4 minutes 3 minutes 7 minutes <ul style="list-style-type: none"> 4 minutes 3 minutes 2 minutes 5 minutes 1 minutes
General Observations:	

The interviewee has extensive experience in Riyadh's real estate market and uses a mix of online platforms, personal networks, and industry contacts to find properties. They also acknowledge the need for more reliable data platforms.

Unresolved Issues/Topics:

Investment strategies and challenges weren't fully explored, and more details on the impact of market fluctuations on pricing and valuations would be helpful.

Questions	Answers	Observation
Q1: What experience do you have in real estate?	I have over 20 years of experience in Riyadh's real estate market. I've handled sales, leasing and valuations.	When discussing their experience in Riyadh's real estate market, the interviewee appeared confident and knowledgeable, highlighting their expertise in real estate.
Q2: Approximately how long did the process take?	The process typically takes 1-2 months for residential properties and 2-3 months for commercial properties. However, it can be faster or slower depending on the circumstances and market conditions at the time.	The interviewee provided a detailed explanation of transaction timelines, showing a solid understanding of both residential (1-2 months) and commercial properties (2-3 months), while also acknowledging how market conditions can influence the speed.
Q3: How did you search for the real estate listings?	I primarily use online property portals (such as "Aqr"), personal networks, and industry contacts to search for listings. I also stay updated through direct relationships with property developers and other real estate agents, as well as by attending market events and conferences.	The interviewee demonstrated his approach to property search, relying on a mix of online portals like "Aqr", personal networks and direct relationships with owners and agents. He also stays proactive by attending market events and conferences.
Q4: Is there anything you wish had been different in your experience? If so, specify.	Looking back, I wish there had been a centralized, reliable platform with verified data and real time updates for listings, pricing, and documentation earlier in my career.	The interviewee reflected on their career, expressing a desire for a centralized, reliable platform with verified data and real-time updates for listings, pricing, and documentation, highlighting a potential improvement in the industry over time.

Q5: What specific features do you believe are most important in real estate platforms?	The most important features in real estate platforms are accurate and up-to-date listings, search filters, and detailed property information (such as photos, floor plans, and neighborhood data).	The interviewee emphasized the importance of accurate, up-to-date listings and detailed property information, including photos, floor plans, and neighborhood data, as key features for real estate platforms.
Q6: Are you interested in investing in upcoming real estate projects? If so, what information do you need?	Yes, I'm interested in investing. I'd need details on location, expected return on investment, market demand, financing options, and expected timelines for project completion.	The interviewee expressed interest in investing, specifying that they would need detailed information on location, expected ROI, market demand, financing options, and project timelines before deciding.

Table 6-4: Interview 4

Interview (4)

Interviewee: Musaad Almutairi	Interviewer: Shahad Almutairi
Location/Medium: Online Meeting via Face time	Appointment Date: February 15, 2025 Start Time: 8:30 PM End Time: 9:07 PM
Objectives: <ul style="list-style-type: none"> Gain insights into the challenges faced by buyers, sellers, and investors in Riyadh's real estate market. Understand the main difficulties buyers, sellers, and investors face in the market. Identify key factors that influence property pricing and investment decisions. 	Reminders: <ul style="list-style-type: none"> Interviewee has 8 years of experience in real estate in Riyadh. Prioritizes strategic locations and flexible financing when considering investment opportunities.
Agenda : Introduction Background on Project Overview of Interview <ul style="list-style-type: none"> Topics to Be Covered Permission to Record Topic 1: Investment Experience <ul style="list-style-type: none"> Q1 Q2 Topic 2: Real Estate Search Methods <ul style="list-style-type: none"> Q3 Q4 Topic 3: Market Challenges & Suggestions <ul style="list-style-type: none"> Q5 Q6 Summary of Major Points Questions from Interviewee Closing	Approximate Time: 2 minutes 2 minutes 2 minutes 7 minutes <ul style="list-style-type: none"> 4 minutes 3 minutes 9 minutes <ul style="list-style-type: none"> 4 minutes 5 minutes 7 minute <ul style="list-style-type: none"> 4 minutes 3 minutes 2 minutes 5 minutes 1 minutes
General Observations: The interviewer is a real estate investor with solid understanding of Riyadh's market. His strategic approach and long-term vision insure steady growth and effective property management.	

Unresolved Issues/Topics:		
He mentioned that lengthy approvals for commercial properties slow transaction and deter investors. Faster processing could attract more investment.		
Questions	Answers	Observation
Q1: What experience do you have in real estate?	I have 8 years experience in real estate, with a focus on Riyadh's high-growth areas.	Specializes in Riyadh's market and has a diverse portfolio.
Q2: Approximately how long did the process take?	1-4 months for residential, up to a year for commercial properties.	Highlights the importance of patience and dealing with approvals.
Q3: How did you search for the real estate listings?	Online platforms and personal connections in Riyadh.	Relies on both technology and face-to-face relationships for the best deals.
Q4: Is there anything you wish had been different in your experience? If so, specify.	I wish there was more transparency in property pricing and valuation.	Lack of clear ROI data is a concern.
Q5: What specific features do you believe are most important in real estate platforms?	Accurate pricing, high-quality photos, market analysis tools, virtual tours.	Emphasizes the need for user-friendly and tech-driven features.
Q6: Are you interested in investing in upcoming real estate projects? If so, what information do you need?	Yes, but only with strategic locations, and flexible financing.	main priorities are financing options and location details

6.2 Appendix B: Questionnaire

This appendix contains all supporting materials related to the questionnaires, including the questions and related charts showcasing the responses.

- Questionnaire Questions:

1. What type of real estate services are you interested in?

- Buying
- Selling
- Investing

2. How often do you engage in real estate transactions?

- Frequently (more than once a year)
- Occasionally (once every 1-2 years)
- Rarely (less than once every 2 years)
- Never (I am considering entering the market)

3. What is your age group?

- Under 20
- 20-29
- 30-39
- 40 and above

4. What is your preferred method for searching for properties?

- Online platforms/websites
- Real estate agents
- Social media
- Word of mouth
- Other (please specify)

5. Have you ever bought or rented a property online?

- Yes
- No

6. What criteria are most important to you when searching for a property?

- location
- price
- size
- amenities

7. What type of user interface do you prefer in a real estate platform?

- simple
- modern
- interactive

8. How important is it for the platform to have end-to-end encrypted chats?

- 1 not important
- 2
- 3
- 4
- very important

9. What challenges do you face when searching for properties?

- lack of options
- outdated listings
- poor filtering tools

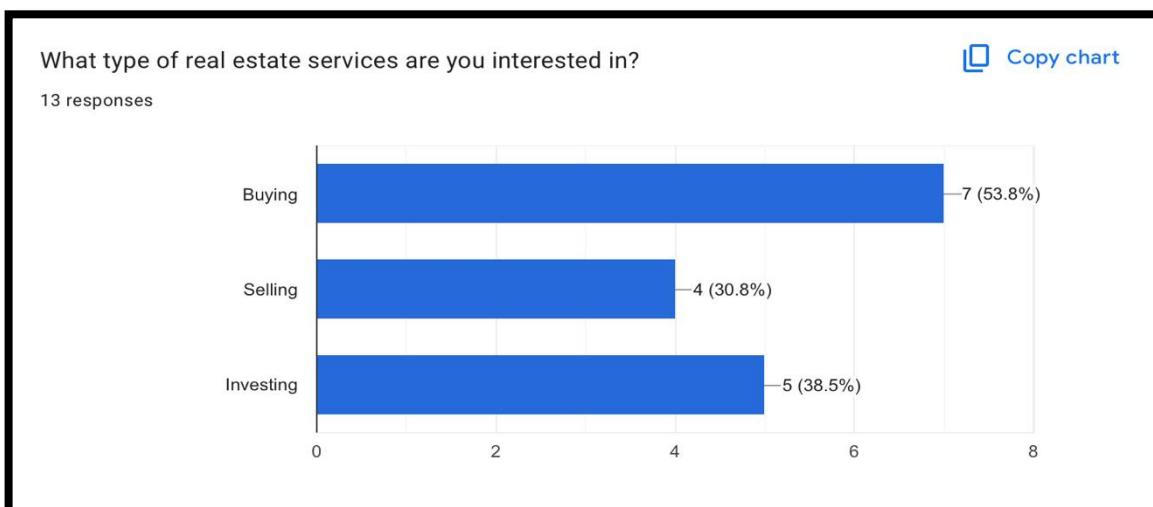
10. Would you be willing to try a new real estate platform that simplifies property transactions?

- Yes
- No
- Maybe

11. Do you have any additional comments or suggestions for improving real estate platforms?

(Open-ended question)

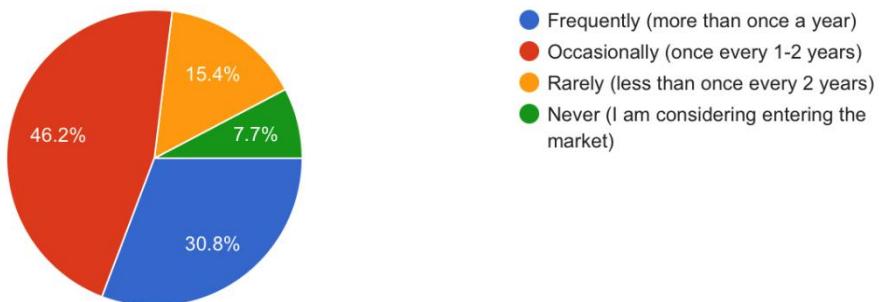
Figure 3-2: Q1.



How often do you engage in real estate transactions?

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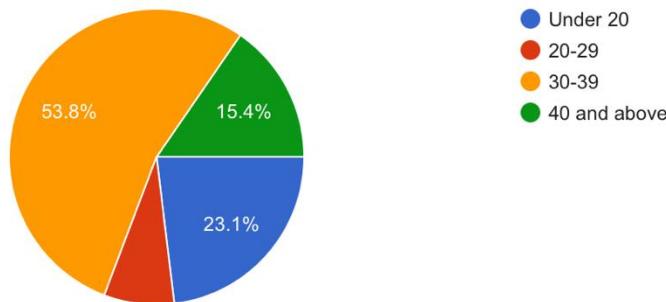
13 responses



What is your age group?

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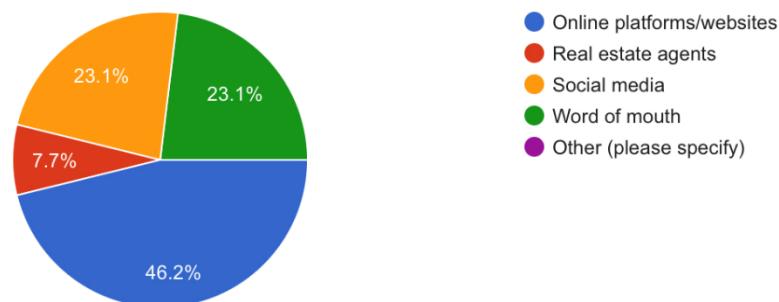
13 responses



What is your preferred method for searching for properties?

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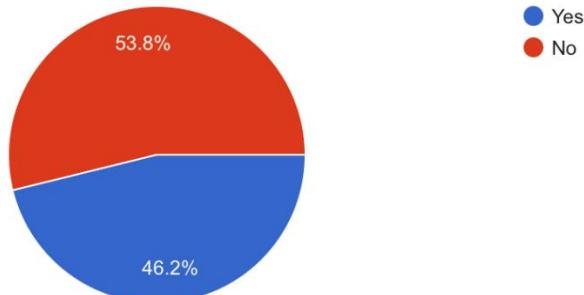
13 responses



Have you ever bought or rented a property online?

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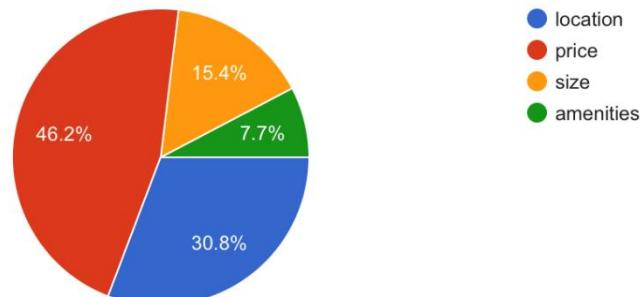
13 responses



What criteria are most important to you when searching for a property?

 Copy chart

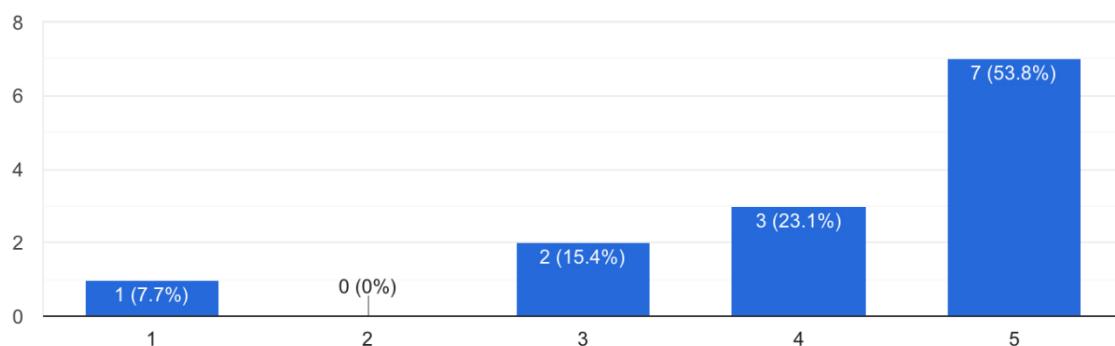
13 responses



How important is it for the platform to have end-to-end encrypted chats?

 Copy chart

13 responses

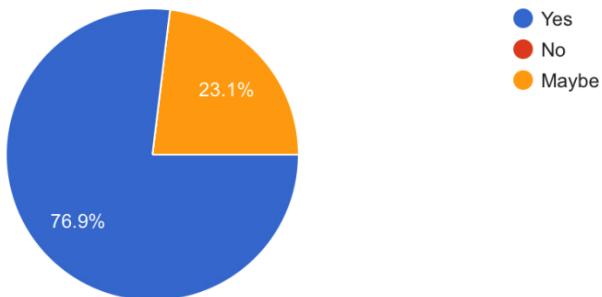


Would you be willing to try a new real estate platform that simplifies property transactions?

13 responses



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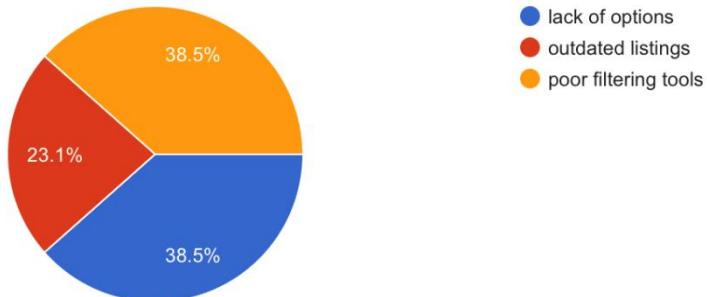


What challenges do you face when searching for properties?

13 responses



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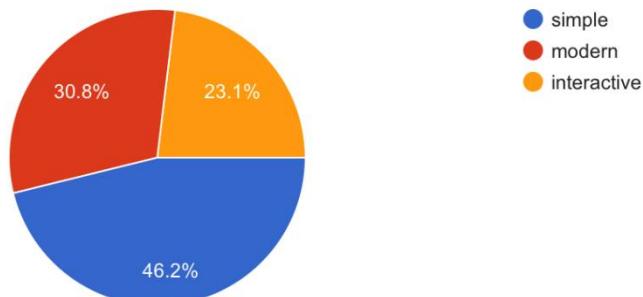


What type of user interface do you prefer in a real estate platform?

13 responses



Copy chart



Do you have any additional comments or suggestions for improving real estate platforms?

5 responses

Implement a notification system to inform users about newly listed properties that meet their preferences.

Provide virtual tours of properties instead of relying only on photos

Add information about the neighborhood, such as schools, transportation, and nearby facilities.

Provide tools to calculate the total costs, including taxes and potential maintenance fees.

Allow users to save their favorite properties and create custom comparison lists.

6.3 Appendix C: Jira Backlog

The image displays two screenshots of the Jira software interface, showing the backlog for two different projects: "2025-Bunyan" and "Bunyan sprint1".

Project 1: 2025-Bunyan

Type	Key	Summary	Assignee	Reporter
Story	MR002025-9	As a user, I want the website to load within 3 seconds so that I don't get frustrated and leave the site.	Unassigned	Aljwahrah Ali
Story	MR002025-8	As a user, I want the website to be available 99% of the time so that I can access it whenever I need to.	Unassigned	Aljwahrah Ali
Story	MR002025-7	As a user, I want the platform to be secure so that my personal and financial information is protected.	Unassigned	Aljwahrah Ali
Story	MR002025-6	As a user, I want to receive notifications about new listings or updates on the platform so that I can stay informed.	Unassigned	Aljwahrah Ali
Story	MR002025-5	As an investor, I want to be able to explore investment opportunities in real estate projects so that I can invest with... As a buyer, I want to be able to chat directly with sellers so that I can ask questions about the property.	Unassigned	Aljwahrah Ali
Story	MR002025-4	As a buyer, I want to be able to register and log in securely so that I can access my account and manage my listings or...	Unassigned	Aljwahrah Ali
Story	MR002025-3	As a user, I want to be able to list my property on the platform so that I can reach potential buyers.	Unassigned	Aljwahrah Ali
Story	MR002025-2	As a buyer, I want to be able to search for properties using filters like location, price, size so I can find properties that...	Unassigned	Aljwahrah Ali
Story	MR002025-1	As a buyer, I want to be able to search for properties using filters (like location, price, size) so I can find properties that...	Unassigned	Aljwahrah Ali

Project 2: Bunyan sprint1

Type	Key	Summary	Assignee	Reporter
Story	SCRUNT-5	As a buyer, I want to be able to search for properties using filters (like location, price, size) so I can find properties that...	Unassigned	Aljwahrah Ali
Story	SCRUNT-6	As a user, I want to be able to register and log in securely so that I can access my account and manage my listings or...	Unassigned	Aljwahrah Ali
Story	SCRUNT-6	As a seller, I want to be able to list my property on the platform so that I can reach potential buyers.	Unassigned	Aljwahrah Ali
Story	SCRUNT-7	As a buyer, I want to be able to chat directly with sellers so that I can ask questions about the property.	Unassigned	Aljwahrah Ali
Story	SCRUNT-8	As an investor, I want to be able to explore investment opportunities in real estate projects so that I can invest with...	Unassigned	Aljwahrah Ali
Story	SCRUNT-9	As a user, I want to receive notifications about new listings or updates so that I don't miss out on opportunities.	Unassigned	Aljwahrah Ali
Story	SCRUNT-10	As a user, I want the website to be available 99% of the time so that I can access it whenever I need to.	Unassigned	Aljwahrah Ali
Story	SCRUNT-11	As a user, I want the website to load within 3 seconds so that I don't get frustrated and leave the site.	Unassigned	Aljwahrah Ali

