Web-Based Rental Management and Property Advertising Application

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Declaration and Approval

We hereby declare that the content of this project has not been previously submitted for a degree or any other qualification at this or any other institution.

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All sources and references have been explicitly cited and acknowledged within the project itself.

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Abstract

In a fast-growing economy the real-estate sector is growing rapidly here in Kenya. Therefore, the need for efficient rental management systems is becoming increasingly evident. This been said, the landlords and tenants, require a platform that streamlines the management of the property and the search for property as well.

This project seeks to develop a user-friendly rental management system with advanced search features tailored especially for the Kenyan property market. By providing the landlords with a centralized platform to manage their properties, prospective tenants with an intuitive interface to search for rentals the system seeks to improve the efficiency and accessibility in the rental market.

The project will involve requirement gathering through surveys and intense research as we try to establish and understand their needs and preferences. The system will be designed using appropriate technologies and frameworks like Laravel PHP, ensuring scalability and usability. It will also be a web-based application to maximize on reachability such that anyone connected to the internet can access the system. Rigorous testing will be conducted to identify and resolve any issues before deployment.

The findings of this project will be a fully functional rental management system with advanced search capabilities. It is expected to boost the efficiency of property management for landlords and enhance the user experience for tenants searching for rental properties especially in Kenya.

Keywords: Tenant, Landlord/Landlady, Rental Management System, Kenyan Market, Advanced Search Features.

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List Of Abbreviations

API – **Application Programming Interface.**

CSS – Cascading Style Sheets

HTML – Hyper Text Markup Language

IDE – Integrated Development Environment

OOP – Object Oriented Programming

PHP – Hypertext Preprocessor

SQL – Structured Query Language

UI – User Interface

XAMPP – Cross-Platform Apache MySQL PHP Perl

Chapter 1: Introduction

1.1 Background Information

In recent years, the real estate market here in Kenya has seen significant growth especially in the urban areas due to myriad of factors including and not limited to population growth and rising demand for rental properties according to (Mwaita, n.d.). And in light to these patterns of growth, there is need for an efficient rental management system to streamline property management practices to improve the overall experience and encourage growth in the sector. According to Kenya National Bureau of Statistics, the rental market accounts for a significant portion of real estate sector of the economy with demand driven by factors like employment opportunities, migration and lifestyle preferences.

Traditionally, property management was through record-keeping and paper-based processes of which that is becoming outdated in today's digital age. The evolution of this information system has changed their way of data handling from manual filing to spreadsheets and clanky desktop software. Now there are a few cloud-based applications on rental management clearly depicting the growth in the economic sector.

However, despite the technological advancements, rental property management still faces some challenges especially here in Kenya. Property managers, Landlords and tenants struggle with inefficient communication channels as depicted by tenants not been made aware of their rent raises and also communication breakdown between the repair works team and the tenants as expressed by our preliminary survey .Likewise, there is a lack of transparency in the rental market especially on the important things like payment of rent where according to our preliminary survey statistics around 51% of the people that took part in our survey claimed to not have receipting system casting doubt on the proof of payment especially if the method to proof is 'M-PESA text massages' that may be falsified. According to (Mahmud et al., 2022), the challenge of house hunting has become prevalent today. Some people have different choices in the type of house they want to live in ranging from shared spaces, studio rooms to homes that are in the locations that we are comfortable to live in. But it proves to be difficult to find a house of your preference without bribing the guards and eventually getting frustrated after you still miss out in the house.

However, by trying to address these gaps in pre-existing system, we will enhance the efficiency of the property management processes, allowing landlords to save their time and resources or probably redirect these resources to more important matters that may further increase rental income. Also, by bridging theses gaps, prospective tenants and tenants themselves get to experience an improved rental experience, one with fluid communication channels and proof of communication. As well, they will enjoy their 'house-hunting' after their process is eased to inputting a set of combinations of their preferences and can even try an image and get the next best alternative. And finally, it would contribute to the streamlining of the real estate sector here in Kenya as this platform would offer friendly competition to the rental property owners.

The thought is, we develop this a rental management system specifically targeting the Kenyan market, integrating advanced search features to address the previously mentioned gaps and challenges. The hypothesis is that, by providing landlords and tenants with a user-friendly and comprehensive platform, the system will improve efficiency, transparency and satisfaction in the rental market.

1.2 Problem Statement

Ideally, the landlords and tenants should have efficient communication channels, streamlines property management tasks and simplified property search. However, the current situation falls short of this ideal reality. Existing rental management systems may have inadequate advanced search features, resulting in difficulty for the tenants to find their suitable rental apartments resulting in the problems in house hunting according to (Mahmud et al., 2022) . Also, currently the rental management systems, may not be all encompassing resulting in inefficiency in the rental management.

As a result, there is pressing need to develop a rental management system tailored especially for the Kenya market. The system should integrate enhanced search capabilities, to some extent automate property management tasks like rent requests and provide a user-friendly interface for both landlords and tenants. Addressing these gaps, would guarantee a rise in efficiencies of rental management and transparency and most of all satisfaction in the rental market resulting in growth of the sector.

1.3 Objectives

1.3.1 General Objective

To develop a comprehensive rental management system tailored for the needs of landlords and tenants in Kenya, integrating advanced search features to enhance efficiency and accessibility.

1.3.2 Specific Objectives

i. To carry out research to understand their specific challenges and preferences in rental property management and search.
ii. To design and develop a user-friendly rental management system tailored to the Kenyan market, integrating advanced search features such as rent-range filtering and property amenities selection and try and get where the existing systems faulter.
iii. To implement the developed rental management system, ensuring scalability, security and usability across a myriad of devices especially as a web application.
iv. To evaluate the effectiveness and usability of rental management through user-testing, focusing on factors such as ease of use, efficiency in property management and satisfaction with search results.

1.4 Research Questions

i. What are the specific challenges been faced by landlords and tenants in rental property management and search in the Kenyan market?
ii. How can a rental system be designed and developed to meet the specific needs of landlords and tenants in the Kenyan market, particularly by integrating advanced search features such as rent filtering and property amenities selection?
iii. How effective is the developed rental management system addressing the identified challenges and preferences of landlords and tenants?
iv. What are the technical considerations for implementing the rental management system to ensure scalability, robustness and usability across various devices especially as a web application in the Kenyan context?

1.5 Justification

According to Kenya Bureau of Statistics a lot of the Kenyans especially in urban areas are tenants. And as such, there is need to advertise rental properties that are around to

ease the prospective tenants finding the apartments hence improving overall efficiency on that. That will help reduce the problems in house hunting as stated by (Mahmud et al., 2022). Also, there is need to streamline rental management processes to increase the efficiency of the business in general and streamline any communication breakdowns.

Our project aims to develop a web application for a rental house management and search system to address the challenges faced by property managers in manually handling rental properties and those who want to search for houses based on their preference. This web application will provide a simple way of communication between the relevant parties fostering relations and improving efficiency. The system will be able to lighten the tasks of the rental management and as well as automating certain tasks like reminding the tenants to pay their rent and as well facilitating communication of either their exit from the apartment or any issues they are facing.

1.6 Scope And Delimitation

This project's scope is to design and develop a rental management software specifically tailored for the Kenyan market. It includes advanced search features to enhance the house hunting experience for tenants and the rental management as well. As well, it will focus on the operations of a landlord or landlady, as it aims to streamline their processes. The project will focus on the implementation and development of the system as a web application, ensuring scalability, security and useability across various devices. Various testing mechanisms will be implemented to ensure that the system is effective and most of all usable.

However, the delimitations are the following, the project will not involve the integration of our rental system with existing real estate databases or systems. Additionally, the project shall not explore the regulatory frameworks or market dynamics of other regions apart from Kenya. Furthermore, the development is limited to the development and implementation of the rental management system as a web application and other platforms like mobile applications will not be considered. Finally, the study will not address the broader issues such as internet connectivity or user adoption rates beyond their impact on the system's performance within Kenya.

Chapter 2: Literature Review

2.1 Introduction

In this chapter we document the current state of the rental management practices with our focus here in Kenya. We examine the pre-existing systems and how they are trying to solve the tenant-side communication and apartment advertising and suggestions based on tenant preferences and how our system can try and help solve that gap.

2.2 Current State of Rental Property Management

The rental space has been growing steadily as Kenya develops in terms of its economy. It is a sector majorly concerned with the housing of people and at the end of the month they are supposed to pay their dues to the owner of the rental apartment. As it grows, it has become visibly noticeable that it forms a major part of the real estate sector here in Kenya. The aspect of rental property management is wide ranging from property listing, tenant screening, lease management, rent collection and maintenance tracking. That been said, we want to explore the various methodologies and practices in rental management as well as rental property management systems.

Rental property management involves the administration and oversight of commercial or residential rental properties by property managers or landlords. It may include tasks like advertising vacancies, collecting rent, collecting rent, handling repairs among others.

The current situation in the rental property management systems comprises several software solutions designed to streamline property management tasks. They vary in their clientele, the features they offer and functionalities. However, the underlying problem would be that its only used by the rental property managers only, majorly, leaving out the input of the tenants. Therefore, as this happens it works by streamlining the property management tasks however the tenants may not have the platform to air out their complains. As well, a lack of a platform for tenants to house hunt with making that small subsection of rental management very challenged (Mahmud et al., 2022).

Likewise, rental property management practices involved manual processes like paper-based record-keeping and in-person interactions with tenants. However, that has its pitfalls especially with communication breakdowns and loss of critical information. However, at the advent of digital age, the information storage mechanisms are all digital

or are transitioning to digital forms. And as such we should also, move the rental management practices to digital means.

While rental management systems have improved efficiency in many aspects of property management, there are still some shortcomings.

2.2.1 Challenges Facing the Rental Property Systems

Despite system advancements, some landlords find them expensive and complex to operate. Additionally, in areas with limited technology, paper-based recording remains prevalent, especially among small properties. These challenges hinder widespread adoption of digital systems in certain regions.

2.3 Related Works

2.3.1 BomaHut: A Property Management Software in Kenya.

BomaHut, a property management software tailored for landlords and property managers in Kenya, is a web application designed to streamline property management tasks. It facilitates rental invoicing, collection, and tenant record maintenance, while also enabling direct communication with tenants through announcements and rent-related notifications (Features - Property Management System in Kenya, 2024). Additionally, it offers convenient rent payment options via popular platforms like 'M-PESA' or bank transactions, with automated reconciliation and SMS notifications for transactions. The system boasts digitized tenant records and account balances for easy access and dispute resolution, along with customizable report generation for landlords' needs.

However, despite its functionality, BomaHut's communication feature is one-way, limiting tenant feedback recording and potentially leading to communication breakdowns. Furthermore, it lacks a tenant-oriented property search avenue, which could hinder tenant satisfaction and property discovery (Features - Property Management System in Kenya, 2024).

2.3.2 Baraza Property Management System

Baraza Property is a web application designed to aid landlords and agents in managing rental properties, encompassing rent collection, property accounts, maintenance schedules, and tenant management. While it enhances productivity and profitability through automated processes (Nachuch, 2021), it lacks a marketing module for public

visibility and a comprehensive search function for tenants' preferences. Furthermore, customer complaints are not addressed, hindering tenant satisfaction and feedback utilization, crucial for improving services and building loyalty (Nachuch, 2021).

Despite its benefits in streamlining property management tasks, Baraza Property lacks essential features like a marketing module and a customer complaint system. These omissions limit its effectiveness in attracting tenants and addressing their needs promptly, highlighting areas for improvement in enhancing customer satisfaction and business performance (Nachuch, 2021).

2.3.3 Kodisher Property Management Software

Kodisher, a property management software designed for both landlords and agencies (Nachuch, 2021), facilitates the management of rental properties by storing tenant information, tracking rent payments, managing financial transactions, and aiding in tax filing (Nachuch, 2021). However, it lacks a decision-making module involving landlords, managers, and tenants, hindering collaborative planning and organization. Moreover, customer feedback and testimonials are absent, limiting potential tenants' insight into past experiences. Additionally, there's a deficiency in property advertisement, restricting exposure to the public (Nachuch, 2021).

2.3.4 EazzyRent

Onsite Property Manager is a web-based property management software accessible with internet-connected devices (Property Management Software in Kenya, 2022). It offers bulk SMS and email integration for tenant and property manager communication and enables landladies to monitor tenant debt levels and accounts. Integrated pay bill and bank account systems streamline rent payments and reconciliation, while vacant unit marketing is facilitated through the website. Additionally, it provides visual reports on crucial rental statistics for on-the-go decision-making (Property Management Software in Kenya, 2022).

2.4 Gaps In Related Works

From the related works, gaps have emerged in existing property management systems, reflecting broader deficiencies in the field. Many systems feature one-directional communication channels from landlords to tenants, highlighting the need for dual-channel communication to enhance tenant-management interaction. Additionally, some

systems lack options for landlords to advertise vacancies or filter rental properties based on preferences and budgets. Moreover, detailed real-time reports on rental property statistics are often unavailable to landlords, requiring them to sift through raw data for insights. Furthermore, systems predominantly focus on landlords, neglecting tenants' visibility and potentially leading to inaccuracies in data management.

2.5 Conceptual Framework

Our rental system comprises key components: a search module for tenants to find properties, a payment module for rent collection, an intuitive UI for user interaction, and a centralized database for data storage and integrity. Additionally, it integrates with third-party services like the 'M-PESA Daraja API' to enhance payment functionality. A tenant management module allows landlords to handle tenant information and communications, while built-in processes facilitate property search, tenant applications, and rent collection.

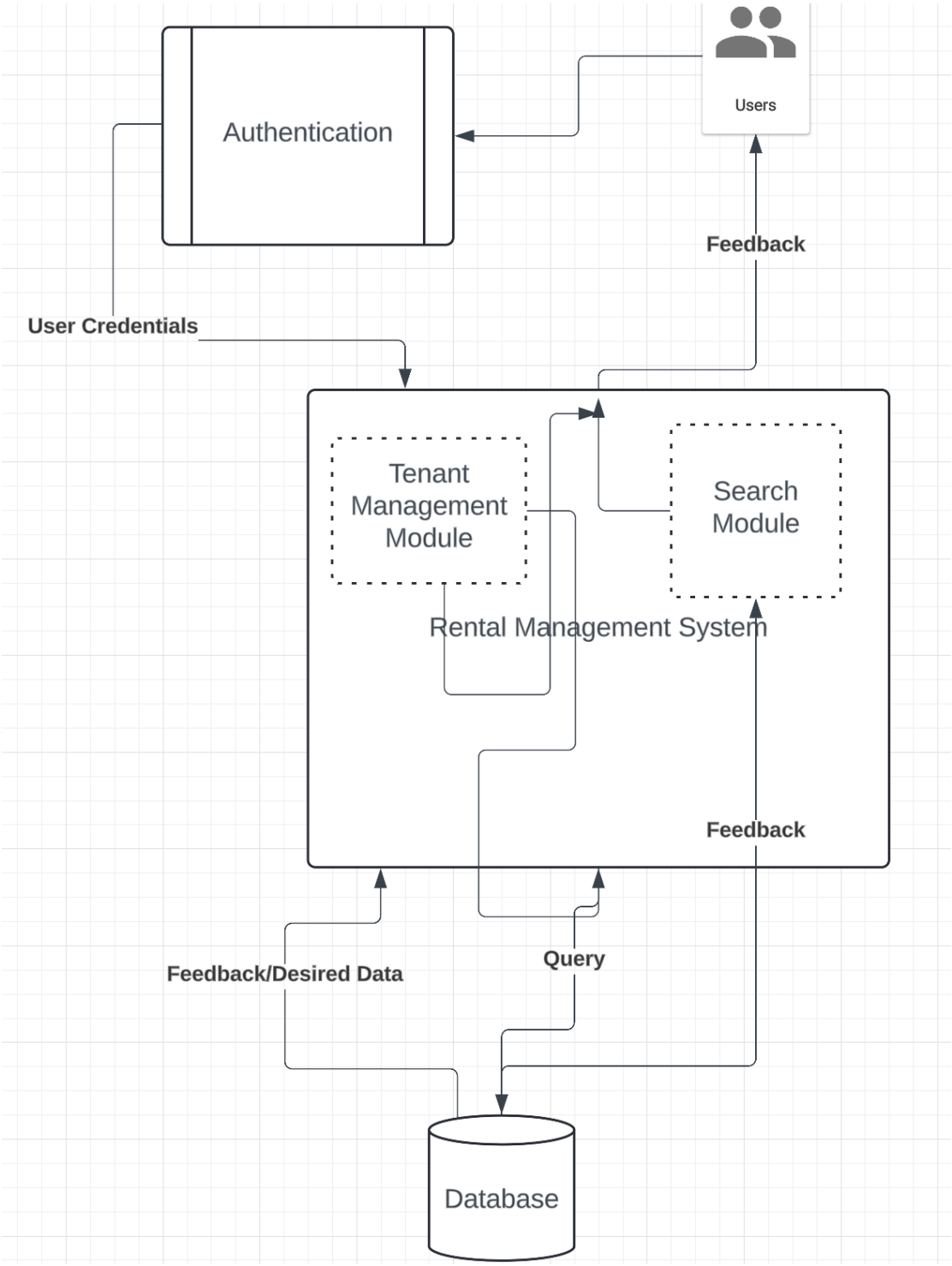

Figure 2:1 An Image of The Concept Diagram

Chapter 3: Methodology

3.1 Introduction

This chapter outlines our strategy for building the proposed system. It describes our chosen development methodology, justifies why we have opted for it, lists both the functional and non-functional requirements, and details the tools and techniques we'll employ. This approach will aid in elucidating and defining the system architecture, conducting analysis, designing, implementing, and testing. Additionally, we intend to adopt Object-Oriented Programming (OOP) as the core development methodology.

3.2 Software Development Methodology

System development methodology refers to the structure followed in the creation of a new system. The proposed system is planned to be developed using Rapid Application Development which is a software methodology that uses prototyping and iterative development.

3.2.1 Justification of Methodology

We're using Rapid Application Development (RAD) for our rental management system in Kenya, enabling us to address challenges iteratively. RAD involves stakeholders and users early on, enhancing alignment with their needs. However, we acknowledge potential limitations like user dependency and scope creep. To ensure reliability, we'll establish clear communication, conduct research, and rigorous testing. By mitigating limitations and leveraging RAD, we aim to deliver a user-friendly system meeting the needs of landlords and tenants in Kenya's real estate sector.

3.3 Methodology Diagram

(*RAD Models: Overview, Advantages & Disadvantages, Real Life Examples | upGrad Blog*, 2023) provides an overview of the RAD diagram as described in Figure 3:1.

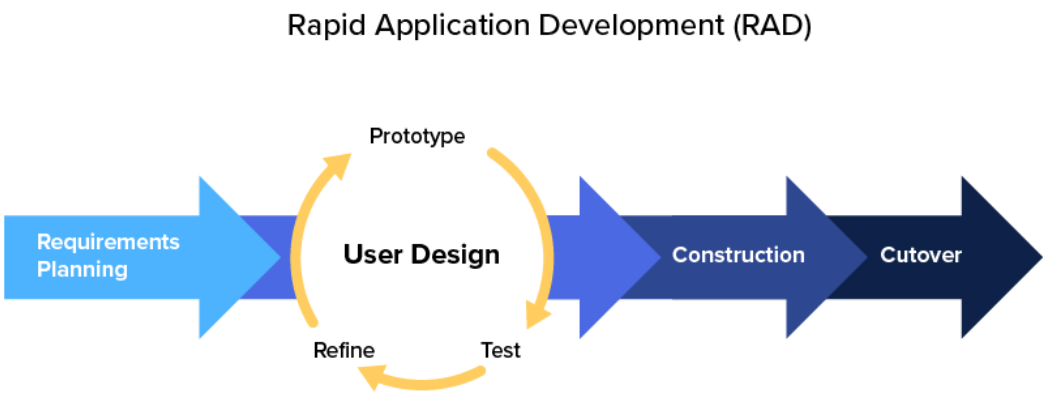

Figure 3:1 A Visual Representation of Rapid Application Development

3.3.1 Requirement Analysis

The requirement analysis for a house hunting and rental system involves identifying and documenting the needs of tenants, landlords, and caretakers. This includes gathering details about desired features like proximity to amenities and preferred communication channels. Understanding location importance ensures efficient property filtering, while considering communication preferences enhances user interactions. Thorough analysis tailors the system to diverse needs, optimizing the house hunting and rental experience in Kenya.

3.3.2 Quick Design

Designers use sketches, wireframes, or prototypes to visualize and share design ideas swiftly, involving stakeholders like tenants, landlords, and caretakers early on. Rapid iteration based on user feedback ensures the system aligns with user needs, improving its user-friendliness and effectiveness. Quick design within RAD methodology fosters collaboration among designers, developers, and stakeholders, advancing the development process and enhancing the rental system's quality.

3.3.3 Refining Prototype

(Nugraha et al., 2023), This stage refines the design based on stakeholder and user feedback, addressing usability issues, refining user flows, and improving visual design.

Iterative improvements ensure the system meets user needs, enhancing the overall experience. Prototyping within RAD methodology allows continuous refinement, resulting in a product tailored to the Kenyan housing market.

3.3.4 Implementation And Testing.

Functionalities like property listing management, search filters, booking systems, rent collection, and communication tools are essential components. Functional testing verifies that each feature performs as intended, including rigorous testing of search capability, property listing management, booking processes, rent payment systems, and communication tools. Through systematic implementation and thorough testing, the system can deliver a seamless house hunting and rental management experience for users in Kenya.

3.4 Deliverables

3.4.1 Rental Management System.

A fully functional rental management system tailored to the needs of landlords and property managers. This system enables efficient management of rental properties, including property listing management, tenant communication, rent collection, maintenance tracking, and financial reporting.

3.4.2 House Hunting Platform

A user-friendly house hunting platform that allows tenants and prospective renters to search for rental properties based on their preferences. The platform provides advanced search filters, property listings with detailed information and images, virtual tours, and communication tools for interacting with landlords or property managers.

3.4.3 Model and User Interface Design

Detailed model and user interface designs depicting the visual and functional aspects of the rental management system and house hunting platform. These designs include wireframes, mockups, and prototypes illustrating the layout, navigation, and interaction flow of the system.

3.4.4 Final System Documentation

Comprehensive documentation of the rental management system and house hunting platform, including system architecture, database schema, API documentation, and

administrative guides. This documentation serves as a reference for developers, administrators, and support personnel responsible for maintaining and operating the system.

3.4.5 Distributed System for Application Access

Deployment of a distributed system that enables users to access the rental management system and house hunting platform from various locations and devices. This ensures accessibility, scalability, and resilience of the application, allowing users to manage rental properties and search for rentals conveniently.

3.5 Software Development Tools and Techniques.

3.5.1 Markup Language.

3.5.1.1 HTML/CSS

HTML will be utilized to provide the basic structure and content of the web pages, defining elements such as headers, paragraphs, lists, and forms. CSS will then be employed to enhance the visual presentation of the user interface by specifying aspects such as colors, fonts, spacing, and alignment. Additionally, CSS will be used for layout management, allowing for the positioning of elements within the web page

3.5.2 Programming Languages

3.5.2.1 PHP

PHP is widely used for server-side scripting, making it suitable for building dynamic web applications with server-side processing capabilities.

3.5.2.2 JavaScript

The asynchronous nature of JavaScript enables the fetching of data from APIs like Safaricom API. JavaScript is essential for building interactive and dynamic user interfaces on the frontend of the application. It is widely supported by web browsers and allows for client-side scripting to enhance user experience.

3.5.3 SQL

It enables the interaction of relational databases where data such as tenant profiles, transaction records and policies are stored.

3.5.4 Code Hosting Platform.

A code hosting platform is an online service that provides a centralized repository for storing, managing, and collaborating on code files and software projects. We are to use git as the version control and GitHub as the code hosting platform.

3.5.5 Frameworks

3.5.5.1 Laravel

According to (STAUFFER, 2024), Laravel provides a powerful set of tools and features for building the backend of the application and with frontend technologies such as JavaScript frameworks for building dynamic and interactive user interfaces. We will define validation rules using Laravel's validation engine and easily validate incoming requests before processing them. Developers can define database models to represent entities such as users, properties, rental agreements.

3.5.5.2 Bootstrap

(Bin Uzayr, 2022) shows that bootstrap can be utilized to enhance the user interface and improve the overall user experience. Moreso it’s a popular front-end framework that provides a collection of pre-built HTML, CSS, and JavaScript components for building responsive and mobile-first web applications. E.g. it creates responsive interfaces that This ensures that the system's interface remains user-friendly. In addition, it has user interface components that can be easily customized and integrated into the system to provide consistent and visually appealing user interface elements.

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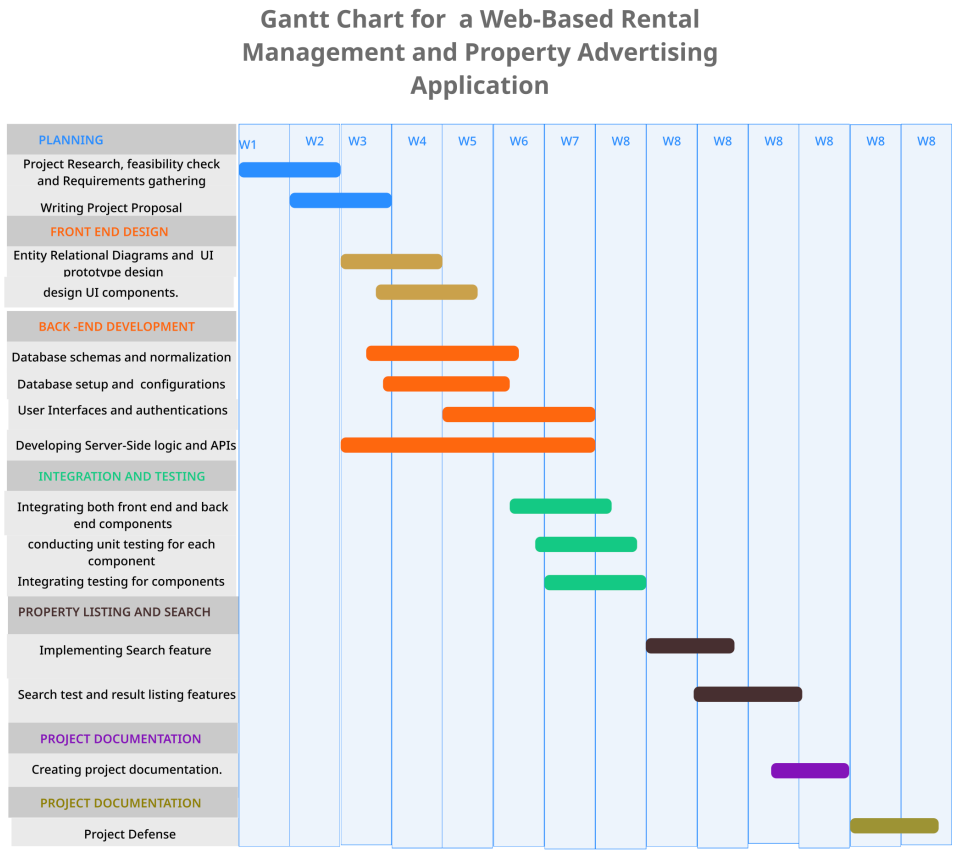
Our preliminary survey.

Appendix

Appendix 1: Gannt Chart



Appendix 2: Pie Charts from Our Preliminary Survey.