DATABASE MANAGEMENT SYSTEMS PROJECT

Report 1

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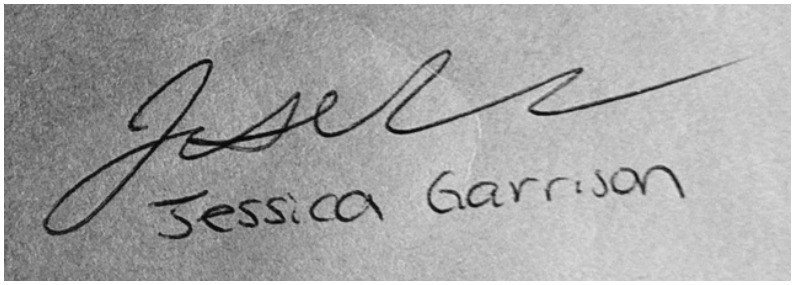
Signature of Interviewee



Executive Summary

Keller-Williams Realty is a leading real estate organization that empowers individual agents with innovative tools and data-driven insights. In today's competitive market, the need for real-time information on property listings, client engagements, and transaction details is critical.

This project proposes the design and implementation of a robust database system that centralizes the management of agent profiles, property inventories, and client interactions. By automating data collection and reporting, the new system will replace error-prone manual processes (such as spreadsheets), streamline workflows, and enable better strategic decision making for both agents and management.

Introduction to the Keller-Williams Realty Profile

Keller-Williams Realty is a renowned national real estate brand, noted for its extensive network of independently operating real estate agents. The company is committed to leveraging technology to enhance agent productivity and customer service.

With a diverse portfolio of property types ranging from residential to commercial, Keller-Williams Realty not only supports the day-to-day operations of its agents but also drives innovation in the real estate market through cutting-edge digital solutions.

The proposed database system is designed to support these core functions by offering an integrated platform for tracking listings, managing client relationships, and reporting on performance metrics.

Problem Statement

Despite its strong market presence, Keller-Williams Realty currently relies on disparate systems and manual record-keeping methods that hinder timely access to critical data.
Agents and managers often use multiple spreadsheets and legacy applications, leading to data redundancy, inconsistency, and delayed reporting. Inaccurate or outdated information may cause missed opportunities, inefficient scheduling of property showings, and poor client follow-up.
Moreover, without a unified system, it is challenging for management to analyze market trends, evaluate agent performance, or swiftly adapt to changing market dynamics. This project aims to address these challenges by developing a centralized, scalable database system that delivers real-time data insights, ensures data integrity, and supports dynamic reporting requirements.

User Requriements

a) Process Modeling Requirements

Agent Workflow Management:

- Listing Properties via “Listings” tab
  - Agents can Add, Edit, View, and Remove property listings using the Listings tab and the Add/Manage Listing forms .
  - Each listing record includes: Property ID, Address, Type, Listing Date, Features, Price, Status (Active / Pending / Sold / Withdrawn), and Description .
- Multi-Step Listing Process
  - Status updates occur directly on the listing (e.g. change from Active → Pending → Sold).
  - The My Listings dashboard shows milestones (date listed, date sold) and allows filtering by status and date .

Client Interaction Logging:

- Appointment Management via “Appointments” tab
  - Agents can Add, View, Edit, and Delete appointments (showings, open houses, follow-ups) through the Appointments tab and calendar view .
  - Each appointment captures: Client, Property, Date/Time, Type (Showing/Open House/Call), and Notes.
- Client CRUD via “Clients” tab
  - Agents can Add, View, Edit, and Remove client profiles.
  - Client records include: First Name, Last Name, Email, Phone, and any custom notes .

Reporting and Analytics

- Dashboard Snapshots
  - Homepage icons show real-time counts of Total Listings, Upcoming Appointments, and Active Clients .

b) Data Model Requirements

- **Entity Representation:**

The database should include entities such as Agents, Clients, Properties, Listings, and Appointments. Each entity will have attributes tailored to its function; for example, Agent profiles will include name, contact information, region, and performance metrics, while Properties will include address, type, listing price, status, and features.

- **Relationship Mapping:**

Clear relationships must be defined between entities. For example, an Agent can handle multiple Listings and each Listing can be associated with one or more Clients. A relational schema will ensure referential integrity, enabling accurate joins across tables.

- **Access Control and Roles:**

The data model must support role-based access. While individual agents can view and update their own records, administrators need privileges to modify system-wide settings, manage user roles, and update critical data such as pricing guidelines or commission structures.

- **Scalability and Integration:**

Given the high volume of transactions and listings, the schema should be normalized to reduce redundancy, yet allow for efficient query performance. The model should also be designed for future integration with external systems (e.g., marketing platforms, CRM systems) to provide a seamless user experience.

c) Expected Database Queries

Agent Performance Summary

On the Reports screen, choose the Agent Performance report and specify your date range. The system will calculate and display, per agent:

- Total Listings Created
- Closed Transactions (Properties Sold)
- Average Sale Price
- Client Satisfaction Rating

Active Listings Inventory

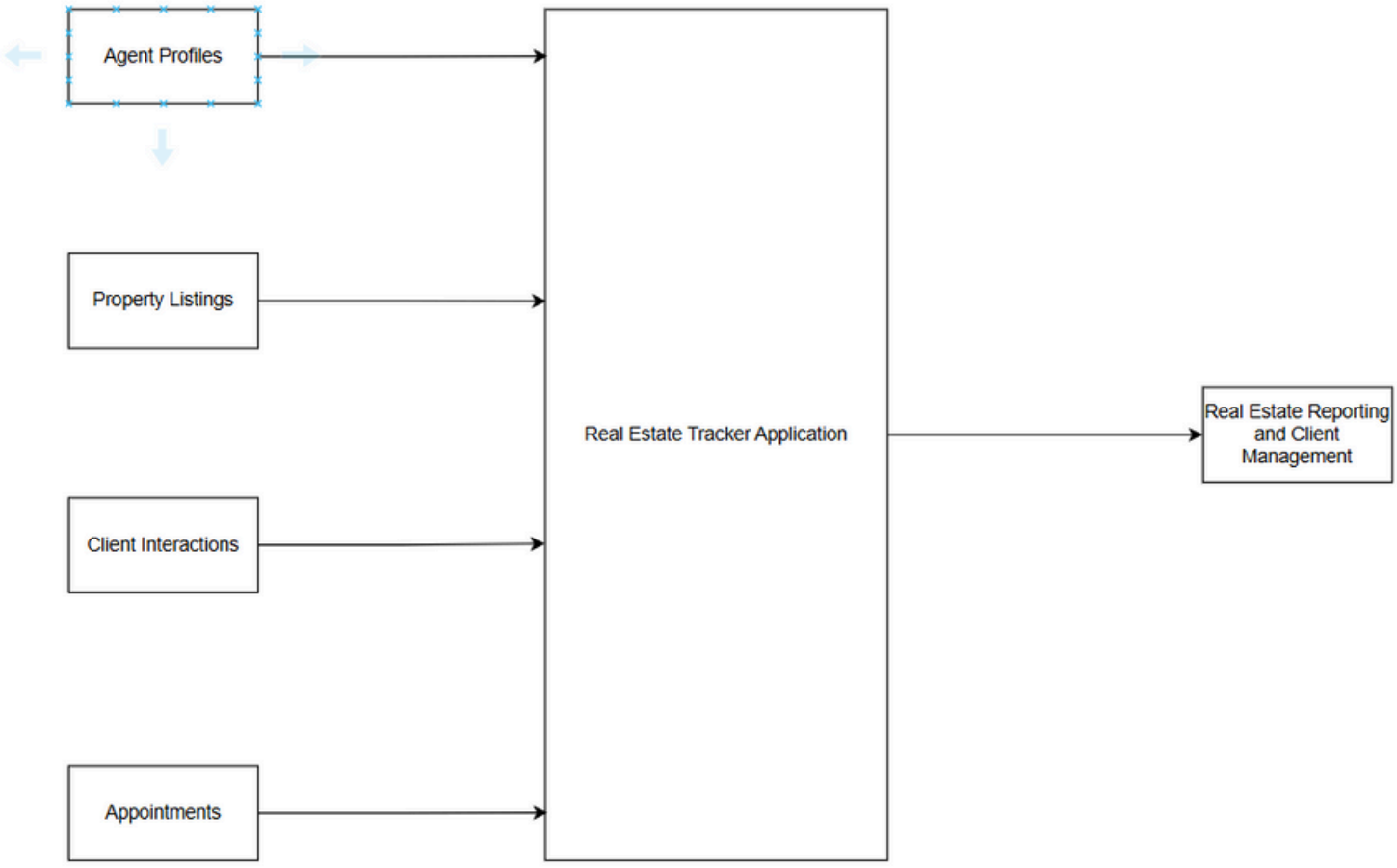
Via the Listing Inventory dashboard, apply filters for Status (Active / Pending / Sold) and Region to instantly view current listing counts and details, giving agents and managers a snapshot of market availability .

Upcoming Engagements Schedule

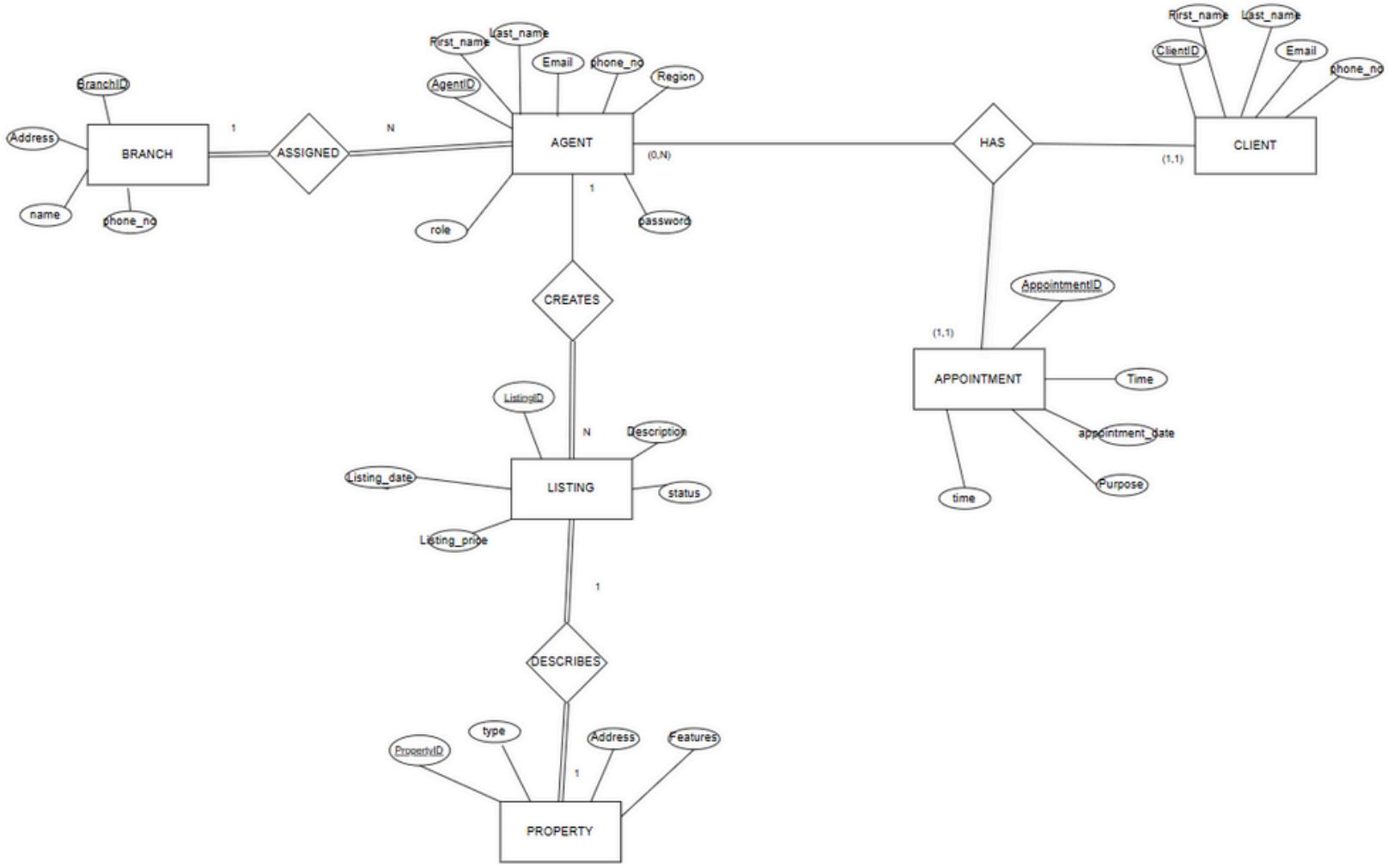
In the Appointments module, switch to Upcoming Events to retrieve all future Showings and Open Houses. Results are sorted by date and property location so agents can see their full client-engagement calendar at a glance

Input- Output Diagram

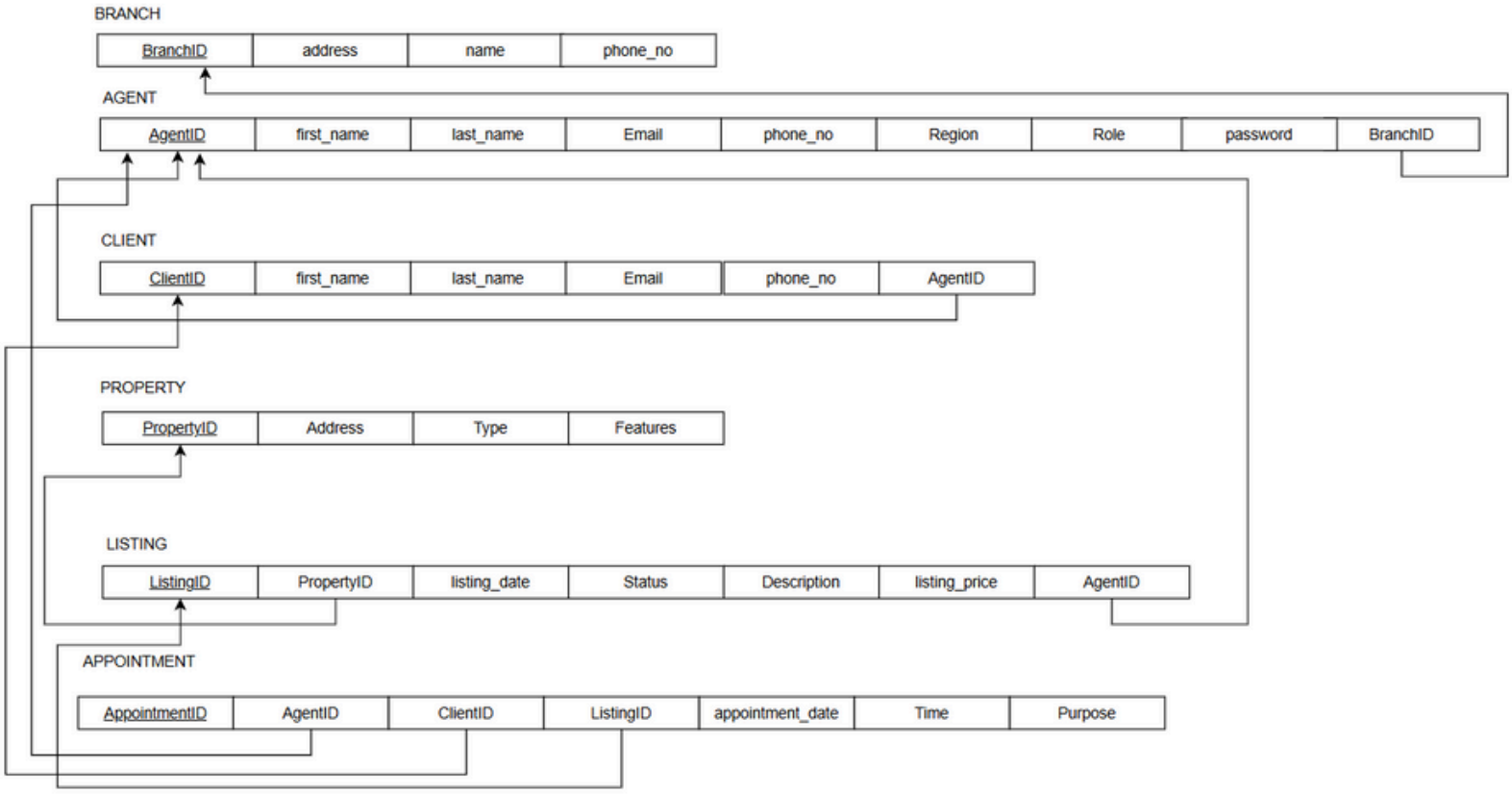
RealEstate Tracker Application



Entity- relationship Diagram



Schema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name
phone_no
AGENT
AgentID
first_name
last_name
Email
phone_no
Region
Role
password
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CLIENT
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AgentID
PROPERTY
PropertyID
Address
Type
Features
LISTING
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PropertyID
listing_date
Status
Description
listing_price
AgentID
APPOINTMENT
AppointmentID
AgentID
ClientID
ListingID
appointment_date
Time
Purpose

Team Meeting Log

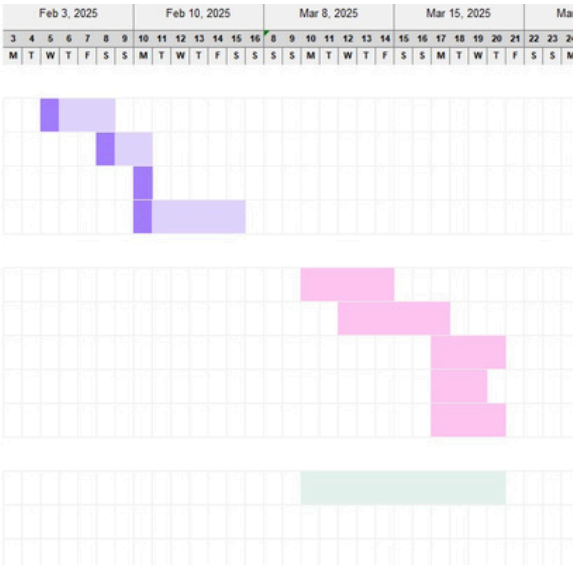
Date	Attendants	Topic	Agenda	Decision/ contribution
3/6/2025	Group	Brainstorming Meeting	Decide on a business for the project or come up with a new one	We all assigned eachother to find a business nearby
3/13/2025	Group	Finalizing Project Topic	Finalizing the project we'll be working on based on our findings	Decision was made to focus on Keller Williams RealEstate . Joseph has a family member that works at the company and was able to gather all neccessary information.
3/20/2025	Group	Create/ Assign Task	Create/ distribute tasks among eachother	
3/27/2025	Group	ERD and Schema reveiew	Revise and refine the ERD and Schema as a group	
3/28/2025	Group	Gant chart division	Work on dividing the entire project	Tasks were distributed
3/29/2025	Group	Final document review	Skim through the document for any final changes	

Gantt Chart

Task #	Task Name	Start Date	End Date	Assigned to	% Complete	Predecessors
1	Brainstorm possible real estate system use cases	3/6/2026	3/6/2026	Group	100%	
2	Decide on core business processes to model (e.g., listings, transactions)	3/6/2026	3/9/2026	Group	100%	1
3	Conduct Agent & Admin Interviews	3/9/2026	3/13/2026	Joseph	100%	2
4	Draft Process Flow Diagrams	3/13/2026	3/16/2026	Group	100%	3
5	Executive summary preparation	3/21/2026	3/13/2026	Brendan	100%	2,3
6	Write a problem statement	3/25/2026	3/14/2026	Hermela	100%	3
7	List Strategic Queries for KW Operations	3/29/2026	3/16/2026	Tristan	100%	1,2,3,4,5,6
8	Create an ERD to model the database design	3/17/2026	3/20/2026	Group	100%	2,3
9	Prepare Project Report #1	3/26/2025	3/30/2026	Group	100%	1,2,3,4,5,6,7
10	Submit Project Report #1	3/31/2026	3/31/2026	Joseph	100%	1,2,3,4,5,6,7,8
11	Decide on tech stack (e.g., PostgreSQL, Flask, Power BI, etc.)	3/30/2026	3/31/2026	Group	100%	
12	Determine Database Management System (DBMS)	4/30/2026	3/31/2026	Brendan	100%	
13	Create the relational database schema	4/2/2026	4/6/2026	Brendan	100%	8
14	Construct and populate the database	4/6/2026	4/8/2026	Brendan	100%	8,13
15	Design Listing Management Interface	4/13/2026	4/16/2026	Hermela	100%	3
16	Design interface between front and back end	4/16/2026	4/23/2026	Group	100%	15
17	Implement Client & Appointment Dashboard	4/24/2026	4/26/2026	Joseph	100%	3,15,8
18	Test Listing & Transaction Workflows	4/27/2026	5/1/2026	Group	100%	
19	Build Documentation: KW Agent Quick Guide	5/4/2026	5/6/2026	Hermela	100%	
20	Build Reference Manual for Admins	5/5/2026	5/7/2026	Group	100%	
21	Build System Tutorial (Demo Walkthrough)	5/6/2026	5/8/2026	Group	100%	
22	Draft Final Project Report	5/7/2026	5/9/2026	Group	100%	11,12,13,14,15,16,17,18,19,20
23	Submit Final Project Package	5/8/2026	5/10/2026	Group	100%	11,12,13,14,15,16,17,18,19,20

Gantt Chart:

TASK	ASSIGNED TO	PROGRESS	START	END
Planning				
Decide on Business & Assign Roles	Group	100%	2/5/25	2/8/25
Conduct Interviewew	Joseph Frishkorn	100%	2/8/25	2/10/25
Obtain Signature	Joseph Frishkorn	100%	2/10/25	2/10/25
Determine Business Requirements	Group	100%	2/10/25	2/15/25
Design				
Create Executive Summary	Brendan Lauterborn	100%	3/10/25	3/14/25
Create Problem Statement	Hermela Abraham	100%	3/12/25	3/17/25
Decide/Create Queries for Database	Tristan Weekes	100%	3/17/25	3/20/25
Create ERD/EERD that models user requirements	Group	100%	3/17/25	3/19/25
Create Database Schema	Group	100%	3/17/25	3/20/25
Finalization				
Begin the Construction of Report 1	Group	100%	3/10/25	3/20/25
Finalize Report 1	Group	100%	3/25/25	3/29/25
Finish/Submit Report 1	Group	100%	3/30/25	3/31/25



Appendix

Dictionary of Terms

- **Agent:**

A licensed real estate professional working under Keller-Williams Realty. Agents are responsible for managing property listings, engaging with clients, and facilitating transactions.

- **Client:**

An individual or entity interested in buying, selling, or renting properties. Clients provide requirements and preferences, which are used to match them with appropriate property listings.

- **Property:**

A real estate asset available for sale or rent. Attributes include address, type (e.g., residential, commercial), listing price, and status. Properties form the core inventory of the system.

- **Listing:**

A record that details a property available on the market. Listings include information on property features, listing dates, status (active, under contract, sold), and are managed by agents.

- **Appointment:**

A scheduled meeting or viewing between an agent and a client, potentially linked to a specific listing. Appointments ensure proper coordination for property showings and consultations.

- **CRM (Customer Relationship Management):**

The integrated system or module designed to manage interactions and relationships with clients, ensuring timely follow-up and effective communication throughout the transaction lifecycle.

- **User Interface (UI):**

The front-end part of the application that enables agents, clients, and administrators to interact with the database system. It includes forms for data entry, dashboards for reporting, and navigation elements.

Appendix

- Schema:

The overall structure of the database, including the tables, relationships, and constraints. The schema defines how data is organized and accessed in the system.

- Data Model:

A conceptual representation of data objects and the relationships between them. The data model serves as the blueprint for the database design.

- ERD (Entity-Relationship Diagram):

A visual diagram that depicts the entities in the database (such as Agent, Client, and Property) and the relationships among them. The ERD is used to design and communicate the database structure.