

DATABASE DESIGN FOR APARTMENT RENTALS

Team 12

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PROBLEM STATEMENT:

To create a data model to design and develop a functional apartment rental management platform. To reduce the overhead for Apartment owners and buyers in maintaining and managing their properties by maintaining a centralized repository/database to store this information.

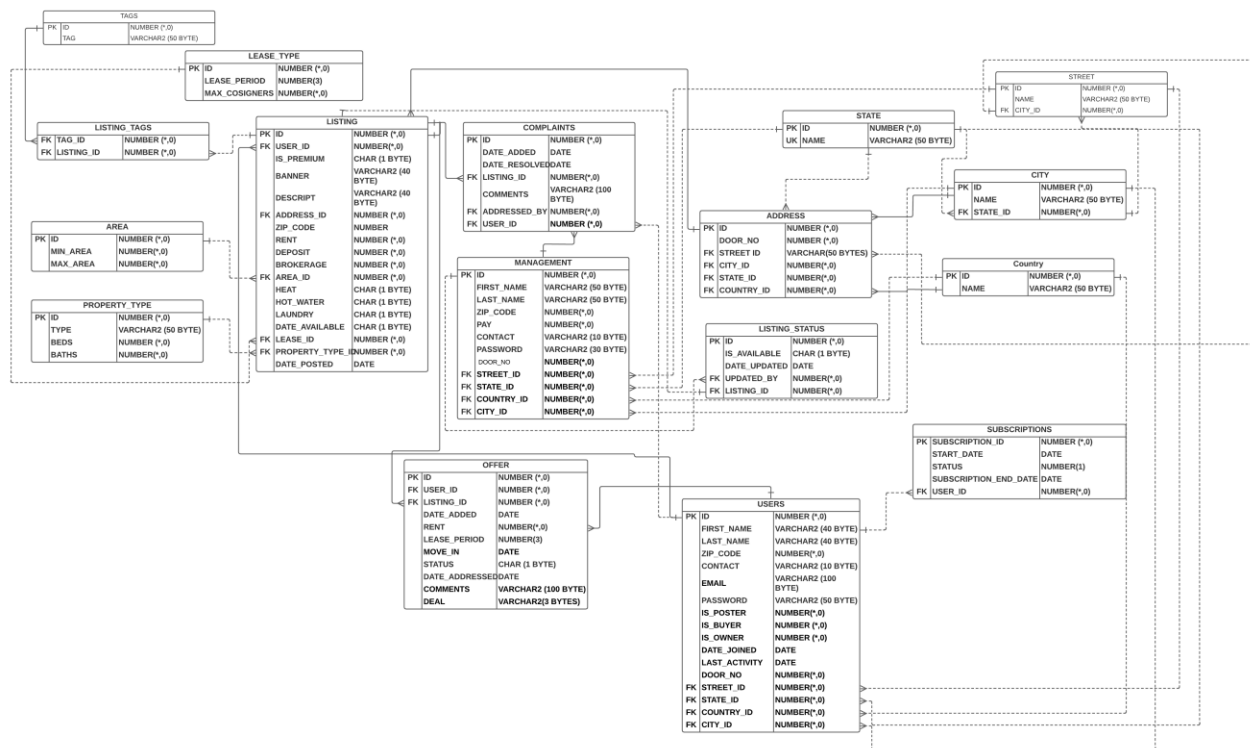
OBJECTIVES:

To Design a Database for Apartment Rental Services which supports following features:

- Users are allowed to upload their listings as well as view new and existing listings. They can update any details unit owners provide about their properties.
- User may switch the account from normal to premium and vice-versa, which will be difficult to track manually. Premium account holders will have zero brokerage fee and be alerted of upcoming deals before the rest of the users.
- Users can narrow down search results by using filters to find a suitable property based on location, number of rooms, type of furnishing and amenities, public transport accessibility, etc.
- Renting/Leasing details must be stored, Users must be able to access the details.
- Users must register and login with details like Email, Username, Password, Phone Number.

PROPOSED SOLUTIONS:

- Specific listings are marked as premium, which would mean that customers with a subscription ID are allowed access to those listings. At the end of the subscription period, their accounts would revert automatically to normal status.
- The database design will help to link the Users and Listings with the help of a FOREIGN KEY in this case which will be the ID in OFFER table which will act as a bridge table and connect users to listings and a smooth data flow and consistency.
- All the users will be provided with a USER-ID, where ID being the primary key hence giving every user a unique number. The customer will be provided with a key in the customer table upon registration.
- In the design there is a separate table for the tags where the users can change the tags as well as rent according to their need and change to their convenience.



ER Diagram Description:

- **USERS:** to maintain user details. This is connected to offer and listing tables to list the properties by user. Users can be buyers/sellers.
- **Listing:** Contains all the listing details of the property listed by the customer. This is connected to various tables like address, offers etc. to maintain detailed information regarding the property details maintained in this table.
- **Offer:** This table contains the offers made by the customers. This connects customers and listings table with ID.
- **Tags:** This table is used to maintain features/tags for the property.
- **Listing tags:** This table links the tags and listing table. One listing can be linked to multiple of tags.
- **Listing status:** To maintain the listing status – if available or not
- **Subscriptions:** To maintain subscription details of the customer. If the customer is a premium user and when the subscription ends.
- **Address:** This table is used to maintain address details of the customer, listings, poster as well as management. This is further linked to tables like city, state, street with their id's.
- **Country:** To maintain country details for address
- **City:** To maintain city details for the address
- **State:** To maintain state details for the address.
- **Street:** To maintain street details for the address.
- **Complaint:** Complaints related to the listings and management which addressed them are linked here.

- **Management:** This contains the data of the management which is responsible for leasing and addresses/ad
- dressed complaints.
- **Area:** To maintains the details about the area (sqft) of the house
- **Lease type:** To maintain the lease details like period of lease and number of residents.
- **Property type:** maintain property type details like number of bathrooms and bedrooms for the listing.

BUSINESS RULES:

- USERS can create one or more LISTINGS.
- Multiple users can provide offers to more than one listing.
- A LISTING is created by only one USER.
- A LISTING can have its pricing as RENTAL_BASIS per month.
- Rents can be changed using the tags table.
- Every LISTING has a USER_ADDRESS associated with it. It cannot be NULL.
- A USER interested in a LISTING can make an offer on that LISTING as a counteroffer with the USER's specific preferences.
- A user can make an offer to more than 1 listing.
- A USER can submit single offer on a LISTING.
- Premium buyers will be shown brokerage fee as 0 on the listing.
- An offer can have only one USER as owner.
- Buyer can withdraw an offer.
- Buyer can withdraw a listing.
- The LISTING's owner should approve only one offer and when an offer is approved, all other remaining offers submitted for that LISTING should be automatically inactive and listing status should be inactive.
- Every listing should have a related address, property type, area, address details. They cannot be Null.
- An ADDRESS_STATE can have one or more ADDRESS_CITYs where the rental platform is available
- An ADDRESS_CITY can be located only in one ADDRESS_STATE
- An ADDRESS_COUNTRY can have one or more ADDRESS_STATES where the rental platform is available.
- An ADDRESS_STATE can be located only in one ADDRESS_COUNTRY
- The platform can be listed for the USA.
- Multiple listings can't have the same address.
- A Buyer should be able to raise a query to know about the property details.
- Any user can raise a complaint on listing.
- Management details responsible for addressing the complaints should be provided.
- If a complaint is addressed by management, the ADRESSED_BY field will be updated else the fields will be null.

- USER_ID cannot be null in COMPLAINTs.
- Management can update a listing status.
- Management can update the subscriptions of the customers.
- Premium buyers have the advantage of viewing the offers before the normal buyers.
- PROPERTY_TYPE gives the information about LISTING's structure like number of beds and bath
- Booking price depends upon the Lease period.
- LISTING_STATUS_ID tells us whether the LISTING is available or not when a USER during the time of booking.
- A listing can be tagged to multiple tags.

VIEWS:

vw_Query: This is to raise a query by user and further get information related to the listing

| Column | Data Type | References |
|---------------|-------------------|------------|
| Listing_ID | Number(*,0) | Listing |
| User_ID | Number(*,0) | User |
| Date_Added | Date | |
| Date_Answered | Date | |
| Query | Varchar(100 Byte) | |
| Reply | Varchar(100 Byte) | |

vw_ListingsSummary:

| Column | Data Type | References |
|---------------------------|-------------------|---------------|
| Listing ID | Number(*,0) | Listing |
| Is_Premium | Char(1 Byte) | Listing |
| Address Id | Number(*,0) | Listing |
| City | Varchar2(50 Byte) | Address |
| State | Varchar2(50 Byte) | Address |
| Country | Varchar2(50 Byte) | Address |
| #Complaints | Number(*,0) | Complaints |
| Concatenated list of Tags | Varchar2(50 Byte) | Listing_Tags |
| Min_Area | Number(*,0) | Area |
| Max_Area | Number (*,0) | Area |
| Heat | Char(1 Byte) | Listing |
| Hot Water | Char(1 Byte) | Listing |
| Laundry | Char(1 Byte) | Listing |
| Property Type | Varchar2(50 Byte) | Property_Type |
| Beds | Number(*,0) | Property_Type |

| | | |
|--------------|--------------|----------------|
| Baths | Number(*,0) | Property_Type |
| #Offers | Number(*,0) | Offer |
| Is_Available | Char(1 Byte) | Listing_Status |

vw_ListingUserDealOffering:

| Column | Data Type | References |
|--------------------------|-------------------|---------------|
| Listing ID | Number(*,0) | Offer |
| Listing_City | Varchar2(50 Byte) | Address |
| Listing_State | Varchar2(50 Byte) | Address |
| Listing_Country | Varchar2(50 Byte) | Address |
| Offer_Id | Number(*,0) | Offer |
| User Id | Number(*,0) | Offer |
| User_Name | Varchar2(50 Byte) | User |
| User_City | Varchar2(50 Byte) | Address |
| User_State | Varchar2(50 Byte) | Address |
| User_Country | Varchar2(50 Byte) | Address |
| User_Is_Poster | Char(1 Byte) | User |
| User_Is_Buyer | Char(1 Byte) | User |
| User_Subscription_Status | Number(1) | Subscriptions |
| Offer_Deal | Varchar2(3 Byte) | Offer |
| Offer_Date_Added | Date | Offer |
| Offer_Status | Char(1 Byte) | Offer |
| Offer_Rent | Number(*,0) | Offer |
| Offer_Lease_Pended | Varchar2(50 Byte) | Offer |

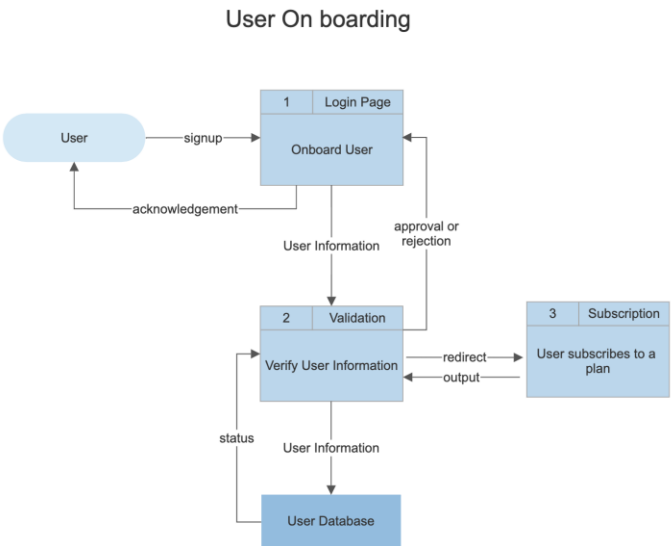
vw_UserDetails:

| Column | Data Type | References |
|--------------------------|-------------------|---------------|
| User_ID | Number(*,0) | User |
| User_Name | Varchar2(50 Byte) | User |
| User_City | Varchar2(50 Byte) | Address |
| User_State | Varchar2(50 Byte) | Address |
| User_Country | Varchar2(50 Byte) | Address |
| User_Is_Poster | Char(1 Byte) | User |
| User_Is_Buyer | Char(1 Byte) | User |
| User_Date_Joined | Date | User |
| User_Last_Activity | Date | User |
| User_Subscription_Status | Number(1) | Subscriptions |
| #Offers | Number(*,0) | Offer |
| #Deals | Number(*,0) | Offer |

| | | |
|-----------------------|-------------|------------|
| #Listings | Number(*,0) | Offer |
| #Complaints_Raised | Number(*,0) | Complaints |
| #Complaints_Addressed | Number(*,0) | Complaints |

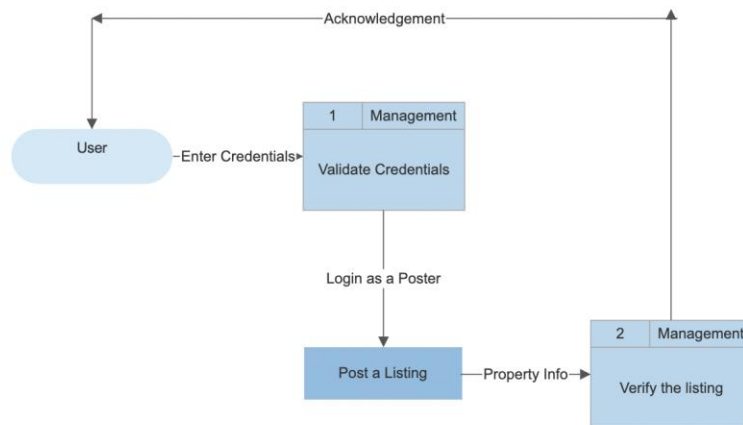
Data Flow Diagrams:

User onboarding:



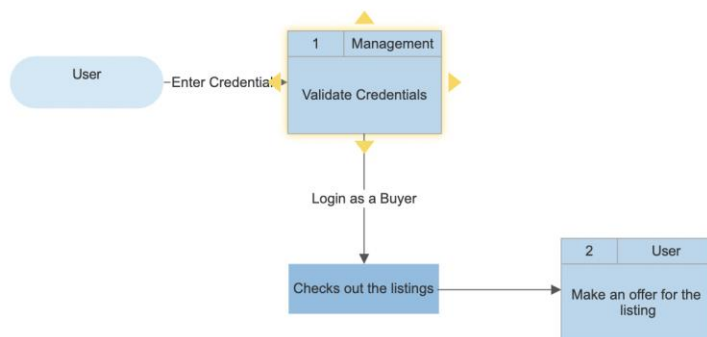
User posting a listing:

Posting a listing



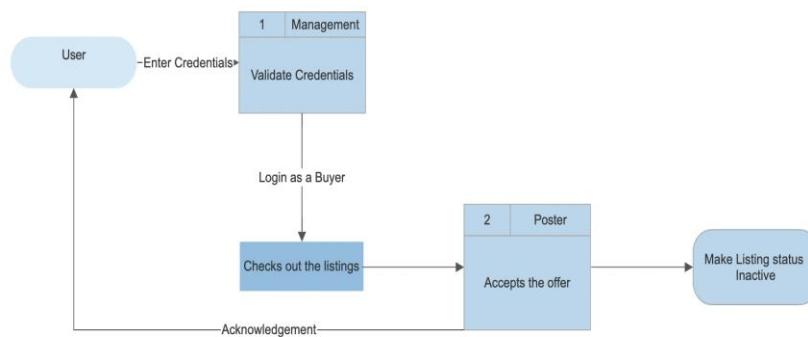
User making an offer for listing:

Making an offer for a listing



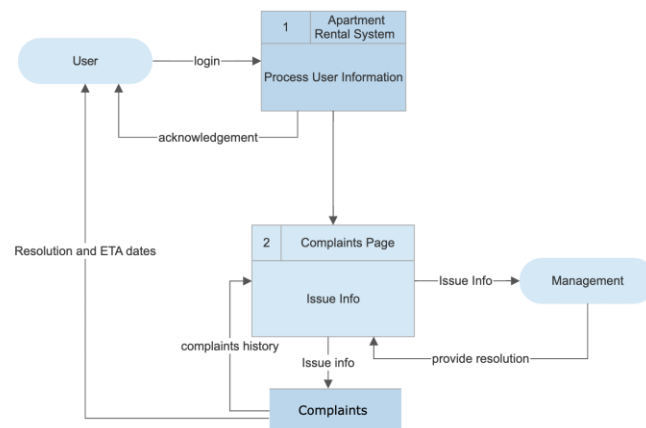
USER finalizing an offer:

Finalizing an offer



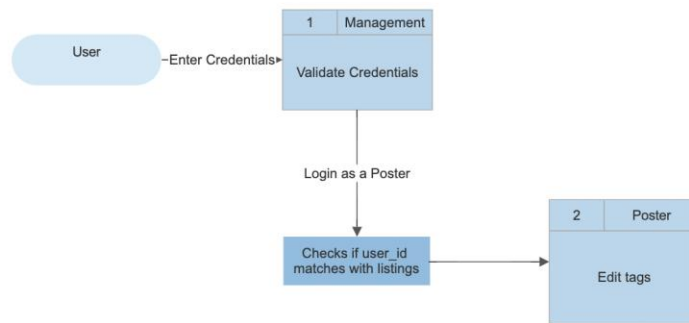
Addressing a complaint:

Addressing Complaint



Listing Tags:

Listing tags



SECURITY (User level access, permissions):

Roles: Management, Buyer, Seller

| Table | Management | Buyer | Seller |
|---------------------------------|------------|------------|------------|
| SUBSCRIPTIONS | READ/WRITE | READ | |
| STREET | READ/WRITE | READ | READ |
| STATE | READ/WRITE | READ | READ |
| PROPERTY_TYPE | READ/WRITE | READ | READ |
| OFFER | READ/WRITE | READ/WRITE | READ |
| MANAGEMENT | READ/WRITE | | |
| TAGS | READ/WRITE | READ | READ |
| LISTING_TAGS | READ/WRITE | READ | READ/WRITE |
| LISTING_STATUS | READ/WRITE | READ | READ/WRITE |
| LISTING | READ/WRITE | READ | READ/WRITE |
| LEASE_TYPE | READ/WRITE | READ | READ/WRITE |
| USERS (BUYER/POSTER) | READ/WRITE | | |
| COMPLAINTS | READ/WRITE | READ/WRITE | READ/WRITE |
| CITY | READ/WRITE | READ | READ |
| AREA | READ/WRITE | READ | READ |

| | | | |
|----------------|------------|------------|------------|
| COUNTRY | READ/WRITE | READ | READ |
| ADDRESS | READ/WRITE | READ/WRITE | READ/WRITE |