

RESIDENTIAL PROPERTY RENTAL SYSTEM

The Residential Property Rental System is a database system designed to manage rental properties, renters, owners, and booking details within the real estate domain. It serves as a centralized platform to facilitate the renting process for residential properties, ensuring smooth interactions between property owners and renters.

Relevance:

- **Simplifies Property Management:** Helps property owners efficiently manage their properties available for rent.
- **Facilitates Rental Process:** Streamlines the process for renters to find and book properties.
- **Ensures Data Accuracy:** Maintains accurate details of properties, owners, renters, and bookings, reducing errors and enhancing transparency.

ER DIAGRAM:

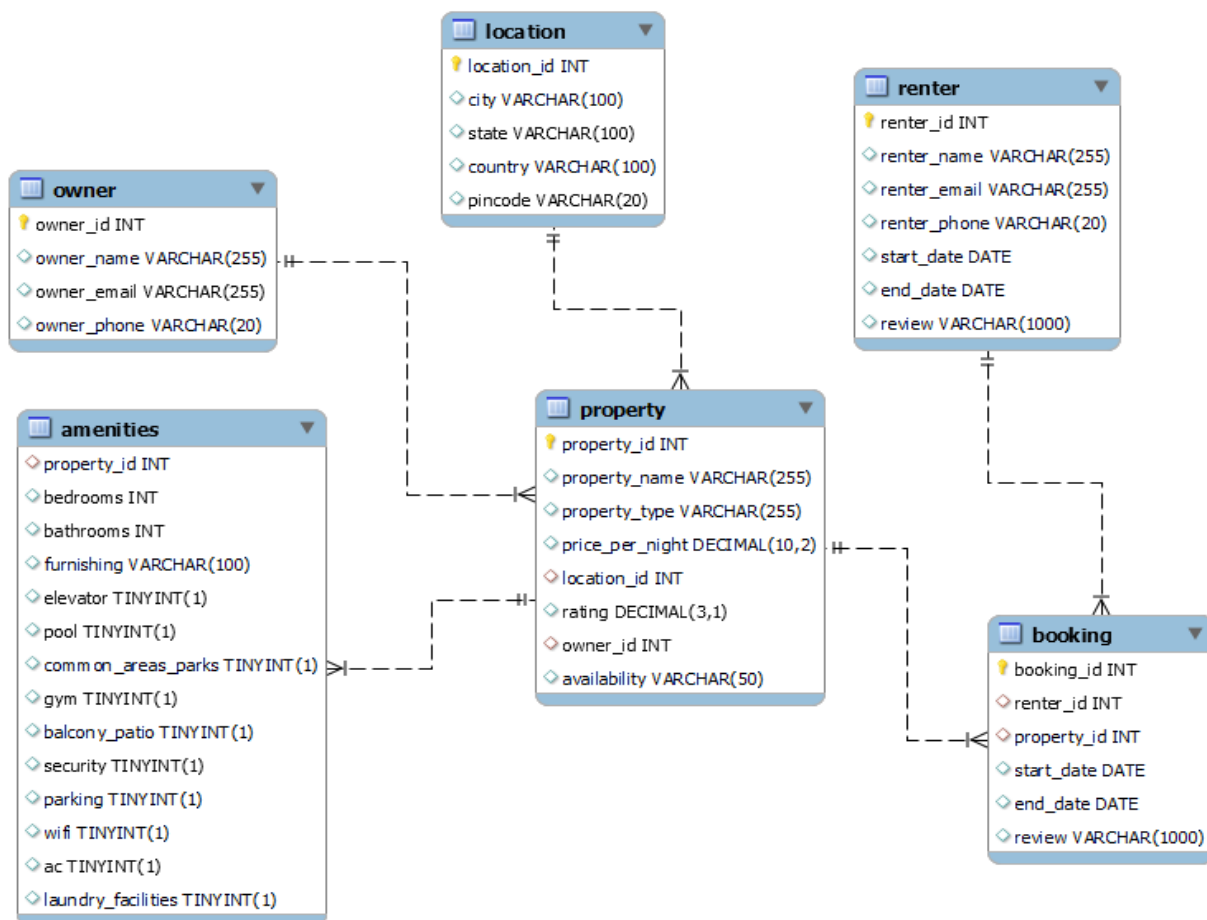


Table Attributes, Data Types, and Constraints:

Renter Table:

- **renter_id:** INT (Primary Key)
- **renter_name:** VARCHAR
- **renter_email:** VARCHAR
- **renter_phone:** VARCHAR

Property Table:

- **property_id:** INT (Primary Key)
- **property_name:** VARCHAR
- **property_type:** VARCHAR
- **price_per_night:** DECIMAL
- **location_id:** INT (Foreign Key - References Location Table)
- **rating:** DECIMAL
- **owner_id:** INT (Foreign Key - References Owner Table)
- **availability:** VARCHAR

Owner Table:

- **owner_id:** INT (Primary Key)
- **owner_name:** VARCHAR
- **owner_email:** VARCHAR
- **owner_phone:** VARCHAR

Location Table:

- **location_id:** INT (Primary Key)
- **city:** VARCHAR
- **state:** VARCHAR
- **country:** VARCHAR
- **pincode:** VARCHAR

Booking Table:

- **booking_id:** INT (Primary Key)
- **renter_id:** INT (Foreign Key - References Renter Table)

- **property_id:** INT (Foreign Key - References Property Table)
- **start_date:** DATE
- **end_date:** DATE
- **review:** VARCHAR

Amenities Table:

- **property_id:** INT (Foreign Key - References Property Table)
- **bedrooms, bathrooms:** INT
- **furnishing:** VARCHAR
- **elevator, pool, common_areas_parks, gym, balcony_patio, security, parking, wifi, ac, laundry_facilities:** BOOLEAN

NORMALISATION STEPS:

Initial Tables

Renter Table:

renter_id	renter_name	renter_email	renter_phone	start_date	end_date	review
-----------	-------------	--------------	--------------	------------	----------	--------

Property Table:

property_id	property_name	property_type	price_per_night	location	rating	owner_id	owner_name	owner_email	owner_phone	availability	amenities
-------------	---------------	---------------	-----------------	----------	--------	----------	------------	-------------	-------------	--------------	-----------

First Normal Form (1NF):

Reasoning:

- **Multi-valued attributes:** The **location** field in the Property Table and the **amenities** field contain multiple values.
- **Actions Taken:**
 - **location** is split into separate columns (**city**, **state**, **country**, **pincode**) within the Property Table.
 - **amenities** are moved to a separate **Amenities Table** with the property's ID and various amenity attributes.
- **Primary Keys:** **renter_id** for Renter Table, **property_id** for Property Table.

Renter Table:

renter_id	renter_name	renter_email	renter_phone	start_date	end_date	review
-----------	-------------	--------------	--------------	------------	----------	--------

Property Table:

property_id	property_name	property_type	price_per_night	city	state	country	pincode	rating	owner_id	owner_name	owner_email	owner_phone	availability
-------------	---------------	---------------	-----------------	------	-------	---------	---------	--------	----------	------------	-------------	-------------	--------------

Amenities Table:

property_id	bedrooms	bathrooms	furnishing	elevator	pool	common_areas	gym	balcony	security	parking	wifi	ac	laundry_facilities
-------------	----------	-----------	------------	----------	------	--------------	-----	---------	----------	---------	------	----	--------------------

Second Normal Form (2NF):

Reasoning:

- **Partial Dependencies:** Some attributes depend only on a part of the primary key rather than the entire key.
- **Actions Taken:**
 - Creation of a **Location Table** to hold location details, establishing a separate entity with a unique **location_id**.
 - The Property Table replaces **location** with **location_id**, removing the partial dependency.
 - Owner details are separated into a distinct table (**Owner Table**) with an **owner_id**, removing redundancy.
- **Primary and Foreign Keys:**
 - **location_id** in Property Table serves as a foreign key referencing the Location Table.
 - **owner_id** in Property Table serves as a foreign key referencing the Owner Table.

Property Table:

property_id	property_name	property_type	price_per_night	location_id	rating	owner_id	availability
--------------------	----------------------	----------------------	------------------------	--------------------	---------------	-----------------	---------------------

Owner Table:

owner_id	owner_name	owner_email	owner_phone
-----------------	-------------------	--------------------	--------------------

Location Table:

location_id	city	state	country	pincode
--------------------	-------------	--------------	----------------	----------------

Third Normal Form (3NF):

Reasoning:

- **Transitive Dependencies:** Certain attributes indirectly depend on the primary key through other non-key attributes.
- **Actions Taken:**
 - No changes in the Renter Table, as it contains attributes directly linked to the renter.
 - The Property Table now only includes details directly linked to the property, such as **owner_id** and **location_id**.
 - Introduce the **Booking Table** to remove transitive dependency by housing booking-related attributes (**start_date**, **end_date**, **review**). This table links renters with properties for bookings.
- **Primary and Foreign Keys:**
 - **renter_id** and **property_id** in Booking Table serve as foreign keys referencing the Renter Table and Property Table, respectively.

Renter Table:

renter_id	renter_name	renter_email	renter_phone
-----------	-------------	--------------	--------------

Booking Table:

booking_id	renter_id	property_id	start_date	end_date	review
------------	-----------	-------------	------------	----------	--------

Final Tables

Renter Table:

renter_id	renter_name	renter_email	renter_phone
-----------	-------------	--------------	--------------

Property Table:

proper ty_id	property _name	property _type	price_ per_n ight	location _id	rating	owner_id	availability
-----------------	-------------------	-------------------	-------------------------	-----------------	--------	----------	--------------

Owner Table:

owner_id	owner_name	owner_email	owner_phone
----------	------------	-------------	-------------

Location Table:

location_id	city	state	country	pincode
-------------	------	-------	---------	---------

Booking Table:

booking_id	renter_id	property_id	start_date	end_date	review
------------	-----------	-------------	------------	----------	--------

Amenities Table:

prop erty_ id	bed roo ms	bath roo ms	furn ishi ng	ele vat or	p o ol	common _areas_p arks	g y m	balco ny_pa tio	sec uri ty	pa rki ng	wifi	ac	laundr y_facili ties
---------------------	------------------	-------------------	--------------------	------------------	--------------	----------------------------	-------------	-----------------------	------------------	-----------------	------	----	----------------------------