**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\_parks** | **gym** | **balcony\_patio** | **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:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **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** |

Booking Table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **booking\_id** | **renter\_id** | **property\_id** | **start\_date** | **end\_date** | **review** |

Amenities Table:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **property\_id** | **bedrooms** | **bathrooms** | **furnishing** | **elevator** | **pool** | **common\_areas\_parks** | **gym** | **balcony\_patio** | **security** | **parking** | **wifi** | **ac** | **laundry\_facilities** |