Apartment Leasing Management System

Phase III

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CSCI 5333 Database Management System

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User Interface Design

A User Interface (UI) Design Diagram for the Apartment Leasing Management System (ALMS) can visually represent the key components and functionalities of the system. Here's a simplified UI design diagram focusing on the main features:

1. Login Page:

- **Username**
- **Password**
- **Login button**

2. Dashboard:

- **Overview of key metrics (e.g., total tenants, total payments, total complaints)**
- **Quick access to important features (e.g., manage tenants, manage apartments, view payments)**

3. Tenants Management:

- **List of tenants with basic details (name, contact)**
- **Ability to add, edit, and delete tenants**
- **View tenant details, including leasing information and complaints history**

4. Apartments Management:

- **List of apartments with details (unit number, size, type)**
- **Ability to add, edit, and delete apartments**
- **View apartment details, including owner information and current tenant**

5. Payments Management:

- **List of payments with details (payment date, amount, tenant)**
- **Ability to add, edit, and delete payments**
- **Filter payments by date, tenant, or payment type**

6. Employees Management:

- List of employees with details (name, role, contact)
- Ability to add, edit, and delete employees
- View employee details, including working hours and assigned tasks

7. Complaints Management:

- List of complaints with details (complaint date, description, status)
- Ability to add, edit, and resolve complaints
- Filter complaints by date, tenant, or status

8. Parking Management:

- List of parking spots with details (spot number, type, tenant)
- Ability to assign or unassign parking spots
- View parking spot details, including tenant information

9. Blocks Management:

- List of blocks with details (block name, address)
- Ability to add, edit, and delete blocks
- View block details, including apartment count and current occupancy

10. Settings:

- User profile management (change password, update contact information)
- System settings (manage user roles, configure email notifications)

This diagram provides a high-level overview of the user interface design for the ALMS, focusing on the main functionalities and interactions. Detailed wireframes and mockups can be created for each feature to further refine the user experience.

Data type and their description

Listing the data types and descriptions for each attribute, along with proposed domain constraints for each attribute. We'll also organize the table attributes in tabular format for clarity:

Proposed Domains for attributes:

Attribute	Proposed Domain	Description
Email	EmailDomain	Domain for email attribute with specific format.
Password	PasswordDomain	Domain for password attribute with specific criteria.
Phone_no	PhoneNoDomain	Domain for phone number attribute with specific format.
Emp_ID	EmpIdDomain	Domain for employee ID attribute with specific constraints.
Age	AgeDomain	Domain for age attribute with specific constraints.
Complaint_date	ComplaintDateDomain	Domain for complaint date attribute with specific constraints.
Rent_amount	RentAmountDomain	Domain for rent amount attribute with specific constraints.

- **Description of table attributed in tabular format:**

Table Name	Attribute	Data Type/Domain	Description
Owner	Owner_id	VARCHAR(10)	Unique identifier for owners.
	Name	VARCHAR(20)	Name of the owner.
	SSN	VARCHAR(9)	Social Security Number of the owner.
	Phone_no	VARCHAR(10)	Phone number of the owner.
	Address	VARCHAR(30)	Address of the owner.
	Email	Email Domain	Email address of the owner.
Payment	Payment_id	VARCHAR(20)	Unique identifier for payments.
	Mode	VARCHAR(10)	Payment mode (e.g., cash, credit card).
	Payment_date	DATE	Date of the payment.
	Amount	NUMERIC(5,2)	Amount of the payment.
	Owner_id	VARCHAR(10)	Foreign key referencing the owner.
	Tenant_id	VARCHAR(10)	Foreign key referencing the tenant.
Login	Email	Email Domain	Email address used for login.
	Password	Password Domain	Password for login.

Admin	**Emp_ID**	**Emp_ID Domain**	**Unique identifier for admins.**
	Name	**CHAR(10)**	**Name of the admin.**
	Phone	**VARCHAR(10)**	**Phone number of the admin.**
	Shift_Timings	**VARCHAR(50)**	**Shift timings of the admin.**
	Authorization_Type	**VARCHAR(15)**	**Type of authorization for the admin (e.g., manager).**
	Email	**Email Domain**	**Email address of the admin.**
Maintenance_Staff	**Emp_ID**	**Emp_ID Domain**	**Unique identifier for maintenance staff.**
	Name	**CHAR(10)**	**Name of the maintenance staff.**
	Phone	**VARCHAR(10)**	**Phone number of the maintenance staff.**
	Shift_Timings	**VARCHAR(50)**	**Shift timings of the maintenance staff.**
	Contract_Length	**VARCHAR(20)**	**Length of the maintenance staff's contract.**
	Role	**VARCHAR(20)**	**Role of the maintenance staff (e.g., technician).**
	Email	**Email Domain**	**Email address of the maintenance staff.**

Tenant	**Tenant_id**	**VARCHAR(10)**	**Unique identifier for tenants.**
	Name	**CHAR(20)**	**Name of the tenant.**
	SSN	**VARCHAR(9)**	**Social Security Number of the tenant.**
	Age	**Age Domain**	**Age of the tenant.**
	Perm_address	**VARCHAR(50)**	**Permanent address of the tenant.**
	Apt_no	**VARCHAR(10)**	**Apartment number of the tenant.**
	Email	**Email Domain**	**Email address of the tenant.**
Tenant_Contact	**Tenant_id**	**VARCHAR(10)**	**Foreign key referencing the tenant.**
	Phone	**Phone Number Domain**	**Phone number of the tenant.**
Block	**Block_id**	**INT**	**Unique identifier for blocks.**
	Block_name	**VARCHAR(10)**	**Name of the block.**
	Address	**VARCHAR(50)**	**Address of the block.**
Apartment	**Apt_No**	**VARCHAR(10)**	**Apartment number.**
	Block_id	**INT**	**Foreign key referencing the block.**
	Bedrooms	**INT**	**Number of bedrooms in the apartment.**
	Type	**VARCHAR(10)**	**Type of apartment (e.g., studio, one-bedroom).**

	Area	INT	Area of the apartment in square feet.
	Floor	INT	Floor number of the apartment.
	Address	VARCHAR(50)	Address of the apartment.
	Owner_id	VARCHAR(10)	Foreign key referencing the owner.
Parking	Spot_no	INT	Parking spot number.
	Type	VARCHAR(10)	Type of parking spot (e.g., reserved, visitor).
	Block_id	INT	Foreign key referencing the block.
	Tenant_id	VARCHAR(10)	Foreign key referencing the tenant.
Manages	Emp_ID	Emp_ID Domain	Foreign key referencing the admin.
	Block_id	INT	Foreign key referencing the block.
Complaint	Complaint_ID	VARCHAR(20)	Unique identifier for complaints.
	Complaint_description	VARCHAR(100)	Description of the complaint.
	Complaint_date	Complaint_date Domain	Date when the complaint was filed.
	Emp_ID	Emp_ID Domain	Foreign key referencing the maintenance staff.
	Tenant_id	VARCHAR(10)	Foreign key referencing the tenant.

Rents	Tenant_id	VARCHAR(10)	Foreign key referencing the tenant.
	Owner_id	VARCHAR(10)	Foreign key referencing the owner.
	Rent_amount	Rent_amount Domain	Rent amount for the tenant.
Apartment_application	Email	Email Domain	Email address used for application.
	Phone	Phone Number Domain	Phone number used for application.
	Name	CHAR(20)	Name of the applicant.
	Apt_address	VARCHAR(50)	Address of the apartment applied for.
	Owner_id	VARCHAR(10)	Foreign key referencing the owner.

Proposed constraints for attributes and implementation

Attribute	Proposed Constraint	Implementation
Email	Email format	ALTER TABLE <Table_Name> ADD CONSTRAINT check_email CHECK (Email ~ '^[a-zA-Z0-9.%]+@[a-zA-Z]+\.[a-zA-Z]+$');
Password	Password criteria	ALTER TABLE <Table_Name> ADD CONSTRAINT check_password CHECK (Password ~

		'^(?=.*[a-z])(?=.*[A-Z])(?=.*[0-9])(?=.*[!@#$%^&*])(?=.{8,})[a-zA-Z0-9!@#$%^&*]+$');
Phone_no	Phone number format	ALTER TABLE <Table_Name> ADD CONSTRAINT check_phone CHECK (Phone_no ~ '^\+[0-9]{1,3}[0-9]{10}$');
Owner_id	Unique constraint	ALTER TABLE Owner ADD CONSTRAINT unique_owner_id UNIQUE (Owner_id);
Name	No constraints	No additional constraints needed
SSN	Unique constraint	ALTER TABLE <Table_Name> ADD CONSTRAINT unique_ssn UNIQUE (SSN);
Address	No constraints	No additional constraints needed
Emp_ID	Unique constraint	ALTER TABLE <Table_Name> ADD CONSTRAINT unique_emp_id UNIQUE (Emp_ID);
Shift_Timings	No constraints	No additional constraints needed
Authorization_Type	No constraints	No additional constraints needed
Tenant_id	Unique constraint	ALTER TABLE <Table_Name> ADD CONSTRAINT unique_tenant_id UNIQUE (Tenant_id);
Apt_no	No constraints	No additional constraints needed

Block_id	Unique constraint	ALTER TABLE <Table_Name> ADD CONSTRAINT unique_block_id UNIQUE (Block_id);
Spot_no	No constraints	No additional constraints needed
Complaint_ID	Unique constraint	ALTER TABLE <Table_Name> ADD CONSTRAINT unique_complaint_id UNIQUE (Complaint_ID);
Tenant_id	No constraints	No additional constraints needed
Rent_amount	No constraints	No additional constraints needed
Email	Unique constraint	ALTER TABLE <Table_Name> ADD CONSTRAINT unique_email UNIQUE (Email);
Phone	No constraints	No additional constraints needed
Apt_address	No constraints	No additional constraints needed

Planning and implementing referential integrity (cascade delete/update, and others)

```sql
-- Add foreign key constraints using ALTER TABLE statements
ALTER TABLE Owner ADD CONSTRAINT fk_owner_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Payment ADD CONSTRAINT fk_payment_owner FOREIGN KEY (Owner_id) REFERENCES Owner ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Payment ADD CONSTRAINT fk_payment_tenant FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Admin ADD CONSTRAINT fk_admin_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Maintenance_Staff ADD CONSTRAINT fk_maintenance_staff_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Tenant ADD CONSTRAINT fk_tenant_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Tenant ADD CONSTRAINT fk_tenant_apartment FOREIGN KEY (Apt_no,block_id) REFERENCES Apartment;
ALTER TABLE Tenant_Contact ADD CONSTRAINT fk_tenant_contact FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Apartment ADD CONSTRAINT fk_apartment_block FOREIGN KEY (Block_id) REFERENCES Block ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Apartment ADD CONSTRAINT fk_apartment_owner FOREIGN KEY (Owner_id) REFERENCES Owner ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Parking ADD CONSTRAINT fk_parking_block FOREIGN KEY (Block_id) REFERENCES Block ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Parking ADD CONSTRAINT fk_parking_tenant FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Manages ADD CONSTRAINT fk_manages_admin FOREIGN KEY (Emp_ID) REFERENCES Admin ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Manages ADD CONSTRAINT fk_manages_block FOREIGN KEY (Block_id) REFERENCES Block ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Complaint ADD CONSTRAINT fk_complaint_maintenance_staff FOREIGN KEY (Emp_ID) REFERENCES Maintenance_Staff ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Complaint ADD CONSTRAINT fk_complaint_tenant FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Rents ADD CONSTRAINT fk_rents_tenant FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Rents ADD CONSTRAINT fk_rents_owner FOREIGN KEY (Owner_id) REFERENCES Owner ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Apartment_application ADD CONSTRAINT fk_apartment_application_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;
ALTER TABLE Apartment_application ADD CONSTRAINT fk_apartment_application_owner FOREIGN KEY (Owner_id) REFERENCES Owner ON UPDATE CASCADE ON DELETE CASCADE;
```

- **ALTER TABLE Owner ADD CONSTRAINT fk_owner_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;**
    - ★ **This statement adds a foreign key constraint named fk_owner_login to the Owner table.**
    - ★ **It ensures that the Email column in the Owner table references the email column in the Login table.**
    - ★ **The ON UPDATE CASCADE ON DELETE CASCADE specifies that if the referenced email in the Login table is updated or deleted, the corresponding rows in the Owner table will also be updated or deleted, cascading the changes.**
- **ALTER TABLE Payment ADD CONSTRAINT fk_payment_owner FOREIGN KEY (Owner_id) REFERENCES Owner ON UPDATE CASCADE ON DELETE CASCADE;**
    - ★ **Adds a foreign key constraint named fk_payment_owner to the Payment table.**
    - ★ **Ensures that the Owner_id column in the Payment table references the Owner_id column in the Owner table.**
    - ★ **Uses ON UPDATE CASCADE ON DELETE CASCADE to cascade updates and deletes.**

- **ALTER TABLE Payment ADD CONSTRAINT fk_payment_tenant FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;**
    - ★ **Adds a foreign key constraint named fk_payment_tenant to the Payment table.**
    - ★ **Ensures that the Tenant_id column in the Payment table references the Tenant_id column in the Tenant table.**
    - ★ **Uses ON UPDATE CASCADE ON DELETE CASCADE for cascading updates and deletes.**

- **ALTER TABLE Admin ADD CONSTRAINT fk_admin_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;**
    - ★ **Adds a foreign key constraint named fk_admin_login to the Admin table.**
    - ★ **Ensures that the Email column in the Admin table references the Email column in the Login table.**
    - ★ **Uses ON UPDATE CASCADE ON DELETE CASCADE for cascading updates and deletes.**

- **ALTER TABLE Maintenance_Staff ADD CONSTRAINT fk_maintenance_staff_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;**
    - ★ **Adds a foreign key constraint named fk_maintenance_staff_login to the Maintenance_Staff table.**
    - ★ **Ensures that the Email column in the Maintenance_Staff table references the Email column in the Login table.**
    - ★ **Uses ON UPDATE CASCADE ON DELETE CASCADE for cascading updates and deletes.**

- **ALTER TABLE Tenant ADD CONSTRAINT fk_tenant_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;**
    - ★ **Adds a foreign key constraint named fk_tenant_login to the Tenant table.**
    - ★ **Ensures that the Email column in the Tenant table references the Email column in the Login table.**
    - ★ **Uses ON UPDATE CASCADE ON DELETE CASCADE for cascading updates and deletes.**

- **ALTER TABLE Tenant ADD CONSTRAINT fk_tenant_apartment FOREIGN KEY (Apt_no,block_id) REFERENCES Apartment;**
    - ★ **Adds a foreign key constraint to the Tenant table.**
    - ★ **Ensures that the combination of Apt_no and block_id columns in the Tenant table references the corresponding columns in the Apartment table.**

- **ALTER TABLE Tenant_Contact ADD CONSTRAINT fk_tenant_contact FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;**
    - ★ **Adds a foreign key constraint named fk_tenant_contact to the Tenant_Contact table.**
    - ★ **Ensures that the Tenant_id column in the Tenant_Contact table references the Tenant_id column in the Tenant table.**
    - ★ **Uses ON UPDATE CASCADE ON DELETE CASCADE for cascading updates and deletes.**

- **ALTER TABLE Apartment ADD CONSTRAINT fk_apartment_block FOREIGN KEY (Block_id) REFERENCES Block ON UPDATE CASCADE ON DELETE CASCADE;**
    - ★ **Adds a foreign key constraint named fk_apartment_block to the Apartment table.**

- ★ Ensures that the Block_id column in the Apartment table references the Block_id column in the Block table.
- ★ Uses ON UPDATE CASCADE ON DELETE CASCADE for cascading updates and deletes.

- **ALTER TABLE Apartment ADD CONSTRAINT fk_apartment_owner FOREIGN KEY (Owner_id) REFERENCES Owner ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ Adds a foreign key constraint named fk_apartment_owner to the Apartment table.
  - ★ Ensures that the Owner_id column in the Apartment table references the Owner_id column in the Owner table.
  - ★ Uses ON UPDATE CASCADE ON DELETE CASCADE for cascading updates and deletes.

- **ALTER TABLE Parking ADD CONSTRAINT fk_parking_block FOREIGN KEY (Block_id) REFERENCES Block ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ Adds a foreign key constraint named fk_parking_block to the Parking table.
  - ★ Ensures that the Block_id column in the Parking table references the Block_id column in the Block table.
  - ★ Uses ON UPDATE CASCADE ON DELETE CASCADE for cascading updates and deletes.

- **ALTER TABLE Parking ADD CONSTRAINT fk_parking_tenant FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ Adds a foreign key constraint named fk_parking_tenant to the Parking table.
  - ★ Ensures that the Tenant_id column in the Parking table references the Tenant_id column in the Tenant table.

- ★ Uses ON UPDATE CASCADE ON DELETE CASCADE for cascading updates and deletes.

- **ALTER TABLE Manages ADD CONSTRAINT fk_manages_admin FOREIGN KEY (Emp_ID) REFERENCES Admin ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ This statement adds a foreign key constraint named fk_manages_admin to the Manages table.
  - ★ It ensures that the Emp_ID column in the Manages table references the Emp_ID column in the Admin table.
  - ★ ON UPDATE CASCADE ON DELETE CASCADE specifies that if the referenced Emp_ID in the Admin table is updated or deleted, the corresponding rows in the Manages table will also be updated or deleted, ensuring referential integrity.

- **ALTER TABLE Manages ADD CONSTRAINT fk_manages_block FOREIGN KEY (Block_id) REFERENCES Block ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ This statement adds a foreign key constraint named fk_manages_block to the Manages table.
  - ★ It ensures that the Block_id column in the Manages table references the Block_id column in the Block table.
  - ★ Similar to the previous statement, ON UPDATE CASCADE ON DELETE CASCADE specifies the cascading behavior for updates and deletes.

- **ALTER TABLE Complaint ADD CONSTRAINT fk_complaint_maintenance_staff FOREIGN KEY (Emp_ID) REFERENCES Maintenance_Staff ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ This statement adds a foreign key constraint named fk_complaint_maintenance_staff to the Complaint table.

- ★ It ensures that the Emp_ID column in the Complaint table references the Emp_ID column in the Maintenance_Staff table.
- ★ Once again, ON UPDATE CASCADE ON DELETE CASCADE is used for cascading updates and deletes.

- **ALTER TABLE Complaint ADD CONSTRAINT fk_complaint_tenant FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ This statement adds a foreign key constraint named fk_complaint_tenant to the Complaint table.
  - ★ It ensures that the Tenant_id column in the Complaint table references the Tenant_id column in the Tenant table.
  - ★ The cascade options ON UPDATE CASCADE ON DELETE CASCADE specify the desired behavior for updates and deletes.

- **ALTER TABLE Rents ADD CONSTRAINT fk_rents_tenant FOREIGN KEY (Tenant_id) REFERENCES Tenant ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ This statement adds a foreign key constraint named fk_rents_tenant to the Rents table.
  - ★ It ensures that the Tenant_id column in the Rents table references the Tenant_id column in the Tenant table.
  - ★ Once again, ON UPDATE CASCADE ON DELETE CASCADE is used for cascading updates and deletes.

- **ALTER TABLE Rents ADD CONSTRAINT fk_rents_owner FOREIGN KEY (Owner_id) REFERENCES Owner ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ This statement adds a foreign key constraint named fk_rents_owner to the Rents table.

- ★ It ensures that the Owner_id column in the Rents table references the Owner_id column in the Owner table.
- ★ The cascade options ON UPDATE CASCADE ON DELETE CASCADE specify the desired behavior for updates and deletes.

- **ALTER TABLE Apartment_application ADD CONSTRAINT fk_apartment_application_login FOREIGN KEY (Email) REFERENCES Login ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ This statement adds a foreign key constraint named fk_apartment_application_login to the Apartment_application table.
  - ★ It ensures that the Email column in the Apartment_application table references the Email column in the Login table.
  - ★ Once again, ON UPDATE CASCADE ON DELETE CASCADE is used for cascading updates and deletes.

- **ALTER TABLE Apartment_application ADD CONSTRAINT fk_apartment_application_owner FOREIGN KEY (Owner_id) REFERENCES Owner ON UPDATE CASCADE ON DELETE CASCADE;**
  - ★ This statement adds a foreign key constraint named fk_apartment_application_owner to the Apartment_application table.
  - ★ It ensures that the Owner_id column in the Apartment_application table references the Owner_id column in the Owner table.
  - ★ The cascade options ON UPDATE CASCADE ON DELETE CASCADE specify the desired behavior for updates and deletes.

User Roles for the Database and Tables:

User roles created for the database and table are as follows:

- ➔ **`app_admin_role`**
- ➔ **`app_owner_role`**
- ➔ **`app_tenant_role`)**

Each role is assigned specific permissions to access and interact with the database tables. Let's explain the roles and their permissions.

1. app_admin_role: This role is intended for administrative users who have full control over the system.

- ❖ **Permissions:**
  - **Granted `SELECT`, `INSERT`, `UPDATE`, and `DELETE` permissions on all tables in the `public` schema. This allows admins to perform CRUD operations on all data.**
  - **Granted `ALL PRIVILEGES` on all sequences in the `public` schema. Sequences are typically used for generating unique identifiers, and granting all privileges ensures admins can manipulate them as needed.**

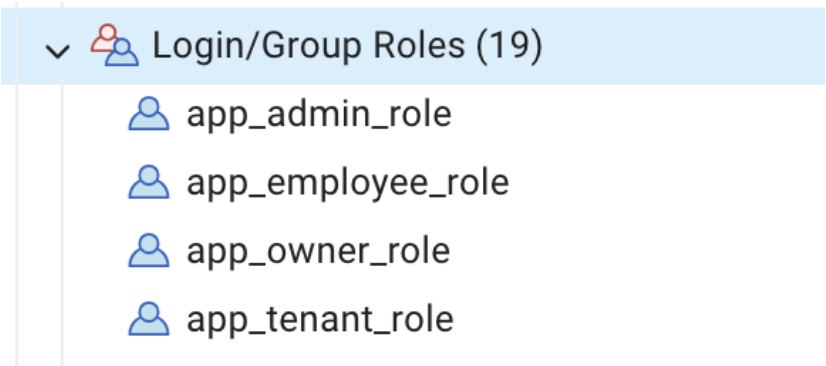
2. app_owner_role: This role is intended for apartment owners who need to manage their properties.

- ❖ **Permissions:**
  - **Granted `SELECT` permission on the `apartment` table. Owners can view details of their own properties.**
  - **Granted `SELECT` and `UPDATE` permissions on the `complaint` table. This allows owners to respond to complaints related to their properties.**
  - **Granted `SELECT` permission on the `payment` table. Owners can view payment details for their properties.**
  - **Granted `SELECT` permission on the `tenant` table. Owners can view tenant information for their properties.**

3. App_tenant_role: This role is intended for tenants who rent apartments within the complex.

- **Permissions:**
  - **Granted `INSERT` and `SELECT` permissions on the `payment` table. Tenants can make payments and view their own payment history.**
  - **Granted `INSERT` and `SELECT` permissions on the `complaint` table. Tenants can file complaints and view their own complaints.**
  - **Granted `SELECT` permission on the `apartment` table. Tenants can view details of their own apartments.**

Each role is assigned permissions tailored to the specific needs and responsibilities of the users within the system. By carefully defining roles and permissions, access control is enforced, ensuring that users can only perform actions relevant to their roles while maintaining the security and integrity of the data.



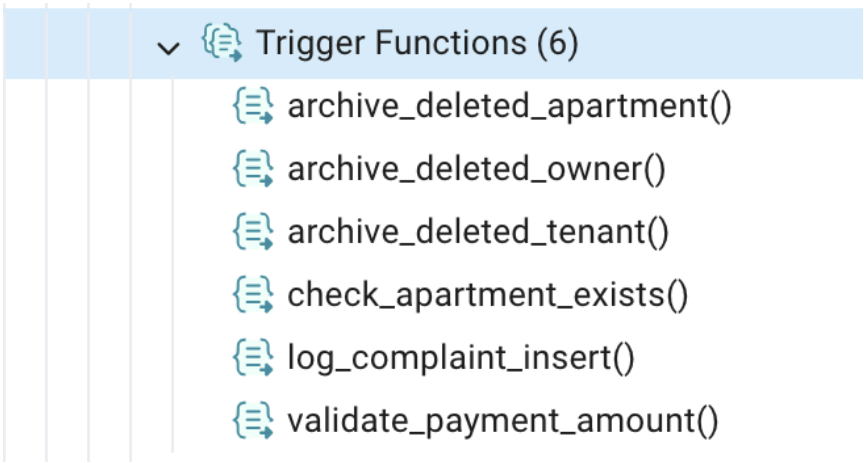
```sql
CREATE ROLE app_admin_role LOGIN PASSWORD 'admin_password';
CREATE ROLE app_owner_role LOGIN PASSWORD 'owner_password';
CREATE ROLE app_tenant_role LOGIN PASSWORD 'tenant_password';

GRANT CONNECT ON DATABASE AptMgmt TO app_admin_role ;
GRANT CONNECT ON DATABASE AptMgmt TO app_owner_role ;
GRANT CONNECT ON DATABASE AptMgmt TO app_tenant_role ;


GRANT USAGE ON SCHEMA schema_name TO app_admin_role;
GRANT SELECT, INSERT, UPDATE, DELETE ON ALL TABLES IN SCHEMA public TO app_admin_role;
GRANT ALL PRIVILEGES ON ALL SEQUENCES IN SCHEMA public TO app_admin_role;



-- owner
-- Grant access to view their properties
GRANT SELECT ON TABLE apartments TO app_owner_role;
-- Grant access to manage (respond to) complaints related to their properties
GRANT SELECT, UPDATE ON TABLE complaints TO app_owner_role;
-- Grant access to view payments for their properties
GRANT SELECT ON TABLE payments TO app_owner_role;
-- Grant access to view tenants for their properties
GRANT SELECT ON tenants TO app_owner_role;


--tenant role
GRANT SELECT, INSERT, Update, delete ON complaints TO app_tenant_role;
-- Grant access to view their apartment details
GRANT SELECT ON TABLE apartment TO app_tenant_role;
-- Grant access to make payments and view their own payments
GRANT INSERT, SELECT ON TABLE payment TO app_tenant_role;
```

Data Output Messages Notifications

Total rows: 0 of 0 Ln 27,

Planning and implementing referential integrity

Triggers:



1. Complaint Audit Trigger

Name: after_complaint_insert

Operation: AFTER INSERT

Table: complaint

Purpose: This trigger captures the details of each new complaint when it is inserted into the complaint table. It logs the complaint_id, the date it was created, and the tenant_id associated with the complaint to a separate complaint_audit table. The log can be used for audit purposes to maintain a record of all complaints filed.

```
-- since admin or tenant might delete a complaint either to withdraw or once complaint is solved might delete it
CREATE OR REPLACE FUNCTION log_complaint_insert()
RETURNS TRIGGER AS $$
BEGIN
  INSERT INTO complaint_audit (complaint_id, created_at, tenant_id)
  VALUES (NEW.complaint_id, NEW.date, NEW.tenant_id);
  RETURN NEW;
END;
$$ LANGUAGE plpgsql;

CREATE TRIGGER after_complaint_insert
AFTER INSERT ON complaint
FOR EACH ROW EXECUTE FUNCTION log_complaint_insert();
```

2. Apartment Existence Check Trigger

Name: before_tenant_insert

Operation: BEFORE INSERT

Table: tenant

Purpose: This trigger validates the existence of an apartment number in the apartment table before a new tenant record is inserted into the tenant table. If the apartment number does not exist, the trigger raises an exception to prevent the creation of a tenant record with an invalid apartment reference, thus maintaining referential integrity.

```sql
-- Check if the apartment number exists in the apartment table
CREATE OR REPLACE FUNCTION check_apartment_exists()
RETURNS TRIGGER AS $$
BEGIN
    -- Check if the apartment number exists in the apartment table
    IF NOT EXISTS (SELECT 1 FROM apartment WHERE apt_no = NEW.apt_no) THEN
        RAISE EXCEPTION 'Apartment number does not exist.';
    END IF;
    RETURN NEW;
END;
$$ LANGUAGE plpgsql;

CREATE TRIGGER before_tenant_insert
BEFORE INSERT ON tenant
FOR EACH ROW EXECUTE FUNCTION check_apartment_exists();
```

3. Payment Validation Trigger

Name: before_payment_insert

Operation: BEFORE INSERT

Table: payment

Purpose: This trigger ensures that the amount for a new payment is positive before it is inserted into the payment table. If the amount is not positive, the trigger raises an exception and prevents the insertion. This helps maintain data integrity by enforcing business rules that payment amounts must be greater than zero.

```sql
-- Trigger to Validate Payment Amount
CREATE OR REPLACE FUNCTION validate_payment_amount()
RETURNS TRIGGER AS $$
BEGIN
  IF NEW.amount <= 0 THEN
    RAISE EXCEPTION 'Payment amount must be positive.';
  END IF;
  RETURN NEW;
END;
$$ LANGUAGE plpgsql;

CREATE TRIGGER before_payment_insert
BEFORE INSERT ON payment
FOR EACH ROW EXECUTE FUNCTION validate_payment_amount();
```

4. Owner Archiving Trigger

Name: owner_before delete

Operation: BEFORE DELETE

Table: owner

Purpose: Similar to the tenant archiving trigger, this trigger archives the data of owners when they are deleted from the owner table. The archived information includes personal details and the date of archiving, and it is stored in the owner_archive table for future reference or audit trails.

```
-- When a owner is removed from the system, archive their information for record-keeping purposes.
CREATE OR REPLACE FUNCTION archive_deleted_owner()
RETURNS TRIGGER AS $$
BEGIN
  INSERT INTO owner_archive (owner_id, ssn, phone_no, address, name, email, archived_date)
  VALUES (OLD.owner_id, OLD.ssn, OLD.phone_no, OLD.address, OLD.name, OLD.email, CURRENT_DATE);
  RETURN OLD;
END;
$$ LANGUAGE plpgsql;

CREATE TRIGGER owner_before_delete
BEFORE DELETE ON owner
FOR EACH ROW EXECUTE FUNCTION archive_deleted_owner();
```

5. Apartment Archiving Trigger

Name: apartment_before_delete

Operation: BEFORE DELETE

Table: APARTMENT

Purpose: This trigger is invoked before the deletion of an apartment record. It archives the details of the apartment, including its number, block ID, and other attributes, into an apartment_archive table with the addition of the archival date. It serves to keep a historical log of apartment data that has been removed from active listings.

```sql
CREATE OR REPLACE FUNCTION archive_deleted_apartment()
RETURNS TRIGGER AS $$
BEGIN
    INSERT INTO apartment_archive (
        Apt_No,
        Block_id,
        Bedrooms,
        Type,
        Area,
        Floor,
        Address,
        Owner_id,
        Archived_date
    ) VALUES (
        OLD.Apt_No,
        OLD.Block_id,
        OLD.Bedrooms,
        OLD.Type,
        OLD.Area,
        OLD.Floor,
        OLD.Address,
        OLD.Owner_id,
        CURRENT_DATE
    );
    RETURN OLD;
END;
$$ LANGUAGE plpgsql;

CREATE TRIGGER apartment_before_delete
BEFORE DELETE ON Apartment
FOR EACH ROW EXECUTE FUNCTION archive_deleted_apartment();
```

Encryption/Decryption Details

Concepts of bcrypt and salt used for securely hashing passwords in our database.

1. Hashing Passwords:

- When storing passwords in a database, it's essential to ensure that they are securely hashed to prevent unauthorized access to sensitive user data.

- Hashing is a process of converting plain text passwords into a fixed-size string of characters, called a hash value, using a cryptographic hash function.

A good cryptographic hash function should have the following properties:

- **Deterministic: The same input always produces the same output.**
- **Irreversible: It should be computationally infeasible to reverse the hash to obtain the original password.**
- **Unique: Different inputs should produce different hash values.**
- **Collision-resistant: It should be computationally infeasible to find two different inputs that produce the same hash value.**

2. Bcrypt Algorithm:

- **Bcrypt (Blowfish-crypt) is a popular password-hashing function designed to be computationally expensive, making it resistant to brute-force attacks.**
- **It uses the Blowfish cipher internally and incorporates a salt value and a cost parameter to enhance security.**
- **Bcrypt introduces a work factor or cost parameter (typically denoted as `cost` or `strength`), which determines the**

number of iterations used in the hashing process. The higher the cost, the more computationally expensive the hashing becomes.

- The cost parameter allows developers to adjust the computational intensity of the algorithm, making it adaptive to hardware advancements and increasing security over time.

3. Salt:

- In addition to the cost parameter, bcrypt also incorporates a salt value into the hashing process.
- A salt is a randomly generated value that is combined with the password before hashing. It ensures that even if two users have the same password, their hash values will be different due to the unique salt.
- Salting prevents rainbow table attacks, where attackers pre-compute hashes for commonly used passwords and compare them to stolen password hashes to find matches.
- By using a unique salt for each password, even if two users have the same password, their hash values will be different, adding an extra layer of security.

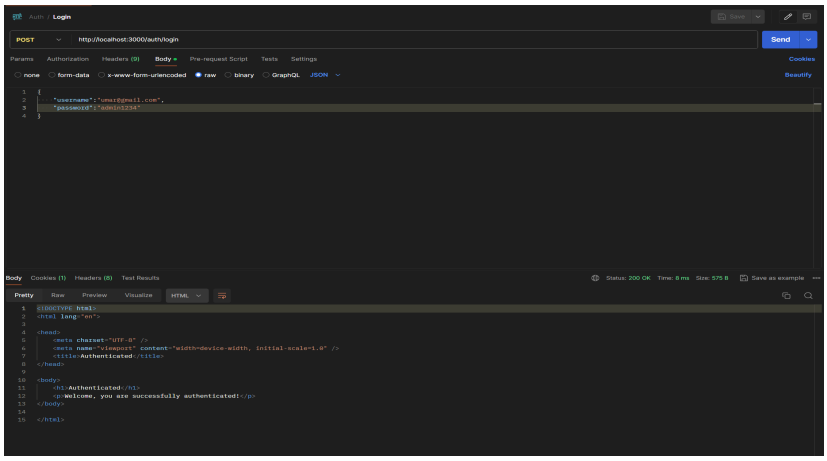
In summary, bcrypt with salt provides a robust mechanism for securely hashing passwords by incorporating a cost parameter to adjust computational intensity and a unique salt value for each password to prevent attacks such as brute-forcing and rainbow table attacks. This combination ensures that passwords are securely stored and protected in a database.

User logging in with the username and password and bcrypt hashing with a plain password authentication request
Example:
Username :umar@gmail.com
Password: admin1234

After Encryption:

Data Output Messages Notifications

	email [PK] character varying (50)	password character varying (72)	role character varying (15)
1	umar@gmail.com	$2b$10$ae.JxngKDt30zs2zGp8WiOUPOO4RAOSl5CZAot8PHSbwCrzVfn...	Admin



Data Output Messages Notifications

	email [PK] character varying (50)	password character varying (72)	role character varying (15)
1	umar@gmail.com	$2b$10$ae.JxngKDt30zs2zGp8WiOUPOO4RAOSl5CZAot8PHSbwCrzVfn...	Admin
2	employee@gmail.com	$2b$10$.BCDMmC07T347VhMfE/hJukFWQiBpYJDRbep.i1c5bpWr7fepf...	Employee
3	Reed65@hotmail.com	$2b$10$.O.LeHF4qN/gE6PTz2x6Mub6yavuDEUCg/a9iFECJWuxnOaWiw...	Admin
4	Kadin97@gmail.com	$2b$10$LsEjSCBv9NYea.OEFh1KP.AXOQEkMoDMuP86i0DWIXjrIvizssbLy	Admin
5	Burnice.Weimann@hotmail.c...	$2b$10$gTZ50z2KM2GcrzVOoUigfekqgfXNOpzT4dpWF1exCHxQQzRV5...	Admin
6	Nyah.Rempel@hotmail.com	$2b$10$8Byc1DV5EU76ZgXR5OpJ8u3gYYnLZCHRiPKlsYTvORczDonG.r...	Admin
7	Aric37@yahoo.com	$2b$10$RDHoARymGRrgOaqAblX05eJJKPQ4Btu440tQZP0xjfs9GP94gj...	Admin
8	Karine59@yahoo.com	$2b$10$RDsavXCMCQHKkcUmAxPTQOcKFr9YmRmpUwxOHPr4Sontl3y...	Admin
9	Rex.Schneider75@gmail.com	$2b$10$XbGQLPsvOPDAk/OHDT/vcOKp8jNnEjf.oUbytjwCStVk2eLQtaw...	Admin
10	Liam19@gmail.com	$2b$10$tVDVderzbYjrEx1rYvz5Z..fMzr3iHLlES/FjMHhWbtJ0EuLoiCmu	Admin
11	Francisca.Frami@yahoo.com	$2b$10$OGDnnnh8WqB.D9IVgjy3autX23bnlVq.JRB2va/kiiwopxH.NTR0q	Owner
12	Stella.Windler51@yahoo.com	$2b$10$/8KDBCaGG5OQQVDson227OQPZlgvmhgrIAcakmCBZTUJWvp...	Owner
13	Leon70@gmail.com	$2b$10$58bgmadXJphAUSSLtLMjiuiLLb.S9jUIep1UXfR1aWfxYTBomnf...	Owner
14	Murl.Stehr52@gmail.com	$2b$10$qw6.zGGbN23cVwPgdi1C7Oin1/.hrcV8RbJoaswAuw3l3oJ0XK...	Owner
15	Lou.Lakin@gmail.com	$2b$10$O.si9ej34O2BvskQvrgtneylXHlnmVejFeLSlrL1raR1X4q.RU9sW	Owner
16	Cleta77@gmail.com	$2b$10$Jt7qnkGx38HYQAc9WnOl3.LahQqDAY5sJrilspmHQJ5zU0ReA8...	Owner
17	Alfred.Herzog@gmail.com	$2b$10$27xXwL.f3lyT9YJuertyIO0heAdY48SjM0avK8ZhpuOaoDrlV6PHi	Owner
18	Jefferey.Brekke@hotmail.com	$2b$10$KhEENF2PaQReKtNlrWnRTOzbo2yOX6L5P1g.jB.f5sd6mve1Dj2...	Owner
19	Imelda72@hotmail.com	$2b$10$RkVGYQKL585TpkbbqDc0RumU1eQ8vLWaYBeGP6m5Hlo6Ezw...	Owner
20	London60@hotmail.com	$2b$10$GHYuUP5JMRL9yUk7o4.cCOjUUrtkE6kyVGRngCIGu9qiiV3Iv5v...	Owner

Tuple data for each table of the database

1. Admin Table:

Query Query History

```
select * from admin;
```

Data Output Messages Notifications

	emp_id [PK] character varying (38)	name character	phone character varying (15)	shift_timings character varying (50)	authorization_type character varying (15)	email character varying (50)
1	A52c756f6-df17-4df0-892c-b1efcf141d38	umar	+1234567890123	9:00 AM - 5:00 PM	Admin	umar@gmail.com
2	A6efb4f57-cbe9-4266-8a8a-594b7f251f3d	Kaylah	+802753137791	9:00 AM - 5:00 PM	Admin	Reed65@hotmail.com
3	Aaaedbb47-6b2b-4537-824e-ed4ef638ba1b	Aniyah	+502933154536	9:00 AM - 5:00 PM	Admin	Kadin97@gmail.com
4	A79603b2d-f217-4954-a814-5bc42a2460fc	Keara	+689756122145	9:00 AM - 5:00 PM	Admin	Burnice.Weimann@hotmail.com
5	Ad6ced32a-e88f-4306-900b-d64cb7c55509	Jayne	+769333122989	9:00 AM - 5:00 PM	Admin	Nyah.Rempel@hotmail.com
6	Afee35ea3-dbb3-4895-9c0f-dbf16fda4938	Reuben	+146544112885	9:00 AM - 5:00 PM	Admin	Aric37@yahoo.com
7	A48b6c8b0-2b93-43f7-9913-96810a1c03e7	Angela	+948166093293	9:00 AM - 5:00 PM	Admin	Karine59@yahoo.com
8	A0c709594-d480-4547-91fa-b75862a6c81f	Deanna	+866089062780	9:00 AM - 5:00 PM	Admin	Rex.Schneider75@gmail.com
9	A6e870bca-526d-4baf-b935-6888d6067ab1	Bernadine	+997848316184	9:00 AM - 5:00 PM	Admin	Liam19@gmail.com

2. Login table:

Query Query History

```
select * from login;
```

Data Output Messages Notifications

	email [PK] character varying (50)	password character varying (72)	role character varying (15)
1	umar@gmail.com	$2b$10$ae.JxngKDt30zs2zGp8WiOUPOO4RAOSl5CZAot8PHSbwCrzVfn...	Admin
2	employee@gmail.com	$2b$10$.BCDMmC07T347VhMfE/hJukFWQiBpYJDRbep.i1c5bpWr7fepf...	Employee
3	Reed65@hotmail.com	$2b$10$.O.LeHF4qN/gE6PTz2x6Mub6yavuDEUCg/a9iFECJWuxnOaWiw...	Admin
4	Kadin97@gmail.com	$2b$10$LsEjSCBv9NYea.OEFh1KP.AXOQEkMoDMuP86i0DWIXjrIvizssbLy	Admin
5	Burnice.Weimann@hotmail.c...	$2b$10$gTZ50z2KM2GcrzVOoUigfekqgfXNOpzT4dpWF1exCHxQQzRV5...	Admin
6	Nyah.Rempel@hotmail.com	$2b$10$8Byc1DV5EU76ZgXR5OpJ8u3gYYnLZCHRiPKlsYTvORczDonG.r...	Admin
7	Aric37@yahoo.com	$2b$10$RDHoARymGRrgOaqAblX05eJJKPQ4Btu440tQZP0xjfs9GP94gj...	Admin
8	Karine59@yahoo.com	$2b$10$RDsavXCMCQHKkcUmAxPTQOcKFr9YmRmpUwxOHPr4Sontl3y...	Admin
9	Rex.Schneider75@gmail.com	$2b$10$XbGQLPsvOPDAk/OHDT/vcOKp8jNnEjf.oUbytjwCStVk2eLQtaw...	Admin
10	Liam19@gmail.com	$2b$10$tVDVderzbYjrEx1rYvz5Z..fMzr3iHLlES/FjMHhWbtJ0EuLoiCmu	Admin
11	Francisca.Frami@yahoo.com	$2b$10$OGDnnnh8WqB.D9IVgjy3autX23bnlVq.JRB2va/kiiwopxH.NTR0q	Owner
12	Stella.Windler51@yahoo.com	$2b$10$/8KDBCaGG5OQQVDson227OQPZlgvmhgrIAcakmCBZTUJWvp...	Owner
13	Leon70@gmail.com	$2b$10$58bgmadXJphAUSSLtLMjiuiLLb.S9jUIep1UXfR1aWfxYTBomnf...	Owner
14	Murl.Stehr52@gmail.com	$2b$10$qw6.zGGbN23cVwPgdi1C7Oin1/.hrcV8RbJoaswAuw3l3oJ0XK...	Owner
15	Lou.Lakin@gmail.com	$2b$10$O.si9ej34O2BvskQvrgtneylXHlnmVejFeLSlrL1raR1X4q.RU9sW	Owner
16	Cleta77@gmail.com	$2b$10$Jt7qnkGx38HYQAc9WnOl3.LahQqDAY5sJrilspmHQJ5zU0ReA8...	Owner
17	Alfred.Herzog@gmail.com	$2b$10$27xXwL.f3lyT9YJuertyIO0heAdY48SjM0avK8ZhpuOaoDrlV6PHi	Owner
18	Jefferey.Brekke@hotmail.com	$2b$10$KhEENF2PaQReKtNIrWnRTOzbo2yOX6L5P1g.jB.f5sd6mve1Dj2...	Owner
19	Imelda72@hotmail.com	$2b$10$RkVGYQKL585TpkbbqDc0RumU1eQ8vLWaYBeGP6m5Hlo6Ezw...	Owner
20	London60@hotmail.com	$2b$10$GHYuUP5JMRL9yUk7o4.cCOjUUrtkE6kyVGRngCIGu9qiiV3Iv5v...	Owner

3. Owner table:

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Query History

```
select * from owner;
```

Data Output Messages Notifications

	owner_id [PK] character varying (38)	name character varying (20)	ssn character varying (9)	phone_no character varying (15)	address character varying (30)	email character varying (50)
1	0f230bd53-f96a-49f2-ad95-dc77d1d7854e	Barton	123546987	+235744983942	07842 Braxton Hills	Francisca.Frami@yahoo.com
2	0b6c977a5-5845-4d7f-b2b5-3df5eba282ce	Janet	125687887	+647757836935	441 Mandy Drive	Stella.Windler51@yahoo.com
3	040740fe1-1371-41f6-b006-de3e84c9c07b	Claude	125617887	+873569698189	4718 Lonnie Ridge	Leon70@gmail.com
4	0d1410bac-2e35-4e26-aa96-fc0fe8ac5334	Aliyah	125617887	+626972802066	43298 Ethyl Plain	Murl.Stehr52@gmail.com
5	076ac053c-0e2f-4e5d-bf43-5d1442e89162	Elsie	125677887	+133796310613	58866 Rebekah Hollow	Lou.Lakin@gmail.com
6	0e567f8a6-dce2-4b2e-845b-e49bbdde8277	Irma	121577887	+818224400914	463 Elta Trace	Cleta77@gmail.com
7	04e9f1b75-e141-402d-9032-8dd91e4da3b0	Elias	224588887	+843402151053	1236 Paris Plains	Alfred.Herzog@gmail.com
8	0ed4d58de-e8bc-44b3-be04-9de6d9b39e59	Rebekah	224668887	+769563319228	92427 Cummings Heights	Jefferey.Brekke@hotmail.com
9	05e10aee0-5e5c-4918-b2ec-bd2d17d13fe8	Chesley	998668887	+112508674193	732 Sheldon Corners	Imelda72@hotmail.com
10	08b95ad9b-7082-410d-a342-adf2a7ba900c	Jailyn	998568887	+716674751612	7773 Jacobi Plaza	London60@hotmail.com

4. Block Table

Query Query History

```
select * from owner;
select * from block;
```

Data Output Messages Notifications

	block_id [PK] integer	block_name character varying (10)	address character varying (50)
1	33028789	A	1170 Kessler Vista
2	42509553	B	447 Timmy Walk
3	52505100	B	3056 Wilhelmine Fields
4	93702634	D	3116 Idell Crossing
5	49786040	C	59675 Gutmann Trace
6	51206222	J	1552 Serenity Lock
7	41251798	I	0846 Korbin Burg
8	34543390	E	08546 Orin Corner
9	93731880	A	55321 Jacobs Ranch
10	39169924	C	301 Charlotte Island

5. Apartment Table:

Query Query History

```
select * from apartment;
```

Data Output Messages Notifications

	apt_no [PK] character varying (10)	block_id [PK] integer	bedrooms integer	type character varying (10)	area integer	floor integer	address character varying (50)	owner_id character varying (38)
1	412	33028789	4	Penthouse	2250	4	1170 Kessler Vista	0f230bd53-f96a-49f2-ad95-dc77d1d7854e
2	101	39169924	2	Apartment	1200	3	301 Charlotte Island	08b95ad9b-7082-410d-a342-adf2a7ba90...
3	102	39169924	2	Apartment	1200	3	301 Charlotte Island	0b6c977a5-5845-4d7f-b2b5-3df5eba282ce
4	103	39169924	2	Apartment	1200	3	301 Charlotte Island	040740fe1-1371-41f6-b006-de3e84c9c07b
5	201	39169924	2	Apartment	1200	2	301 Charlotte Island	076ac053c-0e2f-4e5d-bf43-5d1442e89162
6	111	34543390	3	Apartment	1300	1	08546 Orin Corner	08b95ad9b-7082-410d-a342-adf2a7ba90...
7	112	34543390	3	Apartment	1300	1	08546 Orin Corner	076ac053c-0e2f-4e5d-bf43-5d1442e89162
8	101	41251798	1	Apartment	800	1	0846 Korbin Burg	040740fe1-1371-41f6-b006-de3e84c9c07b
9	102	41251798	1	Apartment	800	1	0846 Korbin Burg	0b6c977a5-5845-4d7f-b2b5-3df5eba282ce
10	408	33028789	4	Penthouse	2000	4	1170 Kessler Vista	0e567f8a6-dce2-4b2e-845b-e49bbdde82...
11	404	33028789	1	Penthouse	1500	4	1170 Kessler Vista	0b6c977a5-5845-4d7f-b2b5-3df5eba282ce

6. Tenant table:

Query Query History

```
select * from tenant;
```

Data Output Messages Notifications

	tenant_id [PK] character varying (38)	name character	ssn character varying (9)	age integer	perm_address character varying (50)	apt_no character varying (10)	email character varying (50)	phone_no character varying (15)	block_id integer
1	T897dfba1-37af-448d-ba1e-0e0763e2dea3	Rebekah	292366311	[null]	63239 Hirthe Villages	201	Lilly40@hotmail.com	+915033244800	39169924
2	T719d6e21-e213-4883-8bec-a7bd07d2a8f9	Eddie	292649311	[null]	684 Otho Falls	111	Caesar.Howe87@yahoo.com	+83154540238	34543390
3	Tdafe6666-12ab-4425-8c85-5570f850c4f5	Efren	192669311	[null]	58199 Rosenbaum Ca...	112	Rachael.Jacobson67@gmail.com	+622547293796	34543390
4	Ta076e342-48cd-497f-bd84-95868382cede	Joy	192669311	[null]	38939 Mayert Neck	102	Lois.Klocko@yahoo.com	+977335304525	41251798
5	Ta48d457d-cf25-4c70-9966-7e6df868e51a	Buck	192669311	[null]	211 Raynor Crossroad	101	Dudley.Lubowitz@yahoo.com	+198453726326	41251798
6	Te08f6e81-c550-46a0-b523-9779fd851ad6	Haley	879654321	[null]	9943 Cecile Crossroad	412	Cynthia36@yahoo.com	+16739084567	33028789
7	Te6b3a611-d92d-4d08-99d9-27900ee1d25b	Lavada	874254321	[null]	12669 Catalina Light	408	Kathryn.Rolfson@yahoo.com	+42890375689	33028789
8	Tc55d5b49-15f8-4074-9b14-c27a7aa87322	Janiya	924254321	[null]	730 Kristopher Views	101	Kurt92@hotmail.com	+71984562130	39169924
9	Tafcb0515-94e5-4355-9596-1773985dbb59	Giovani	924222311	[null]	23973 Trace Via	102	Hardy1@yahoo.com	+59321768450	39169924
10	Tfccaf0af-14a4-42f0-94b0-b27bddb9a7ea	Chandler	297652311	[null]	1920 Wyman Lodge	103	Amira92@hotmail.com	+82150693724	39169924
11	Tbdf13862-11c8-45d8-8306-a7661731a008	Brooklyn	292366311	[null]	86687 Reginald Burg	201	Dolly41@yahoo.com	+95431027856	39169924

7. Apartment_application Table:

Query Query History

```
select * from apartment_application;
```

Data Output Messages Notifications

	email [PK] character varying (50)	phone character varying (15)	name character	owner_id character varying (38)	apt_no character varying (10)	addresss character varying (50)	block_id integer
1	Thad.Mante@hotmail.com	+83644865990	Tillman	0b6c977a5-5845-4d7f-b2b5-3df5eba282ce	404	1170 Kessler Vista	33028789
2	Rylan.Pacocha@gmail.com	+868378754563	Ally	0b6c977a5-5845-4d7f-b2b5-3df5eba282ce	404	1170 Kessler Vista	33028789
3	Holly.Schroeder@hotmail.com	+216464805769	Jimmie	0b6c977a5-5845-4d7f-b2b5-3df5eba282ce	404	1170 Kessler Vista	33028789
4	Anya_Jaskolski@gmail.com	+253347935843	Gerald	0b6c977a5-5845-4d7f-b2b5-3df5eba282ce	102	301 Charlotte Island	39169924
5	Ara.Lang89@yahoo.com	+36668005977	Axel	0b6c977a5-5845-4d7f-b2b5-3df5eba282ce	102	301 Charlotte Island	39169924
6	Tania.Mraz@yahoo.com	+78889642031	Daren	040740fe1-1371-41f6-b006-de3e84c9c07b	103	301 Charlotte Island	39169924
7	Herminia97@gmail.com	+778957595109	Allan	040740fe1-1371-41f6-b006-de3e84c9c07b	103	301 Charlotte Island	39169924
8	Jude21@gmail.com	+469589335008	Carmel	040740fe1-1371-41f6-b006-de3e84c9c07b	103	301 Charlotte Island	39169924
9	Patrick.Rolfson@gmail.com	+287884146791	Makenzie	040740fe1-1371-41f6-b006-de3e84c9c07b	103	301 Charlotte Island	39169924
10	Adriana_OHara17@yahoo.com	+518182125181	Mallie	040740fe1-1371-41f6-b006-de3e84c9c07b	101	0846 Korbin Burg	41251798
11	Josefa67@hotmail.com	+483446602218	Clara	040740fe1-1371-41f6-b006-de3e84c9c07b	101	0846 Korbin Burg	41251798

8. Complaint table:

Query Query History

```
1 select * from complaint;
```

Data Output Messages Notifications

	complaint_id [PK] character varying (38)	complaint_description character varying (100)	complaint_date date	emp_id character varying (38)	tenant_id character varying (38)
1	CP07bf3e8f-6552-423d-9550-b686347f1653	Ceiling Dripping water	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
2	CP66cb8865-b91d-44ae-acb3-09ca4bb77e78	Toilet Flush issue	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
3	CP36e64036-4a87-4e2f-8ae1-0026ecfa20e6	door squeky	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
4	CPfd463548-1865-47bf-a324-6d8baa369a43	Kitchen Exhaust Not Working	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
5	CP8cb85e93-1e5f-4b29-b9fa-05f367aa900f	Window is cracked	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
6	CP8b28ce5c-e968-4ad6-8ae2-03ccae5ff894	water is not clear	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
7	CPb448fb88-a612-4dc4-b81c-42b0c9f4209f	other complaint	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
8	CP41b7cdc7-6f11-4789-a33f-7c002023f1a9	other complaint	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
9	CP7694a68b-022b-48f3-b027-4529fa5b13e0	Regular Maintainence	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
10	CPa499cfcf-f402-4f1d-983d-a82e97d5925a	Regular Maintainence	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb
11	CP4de78609-255e-48df-ba71-703ed0422218	Regular Maintainence	2024-04-14	[null]	Tca3aac71-9e61-4b35-a12a-de36f901c3eb

9. Tenant_Contact Table:

Query Query History

```
select * from tenant_contact;
```

Data Output Messages Notifications

	tenant_id [PK] character varying (38)	phone [PK] character varying (15)
1	Te08f6e81-c550-46a0-b523-9779fd851ad6	+64543996676
2	Te6b3a611-d92d-4d08-99d9-27900ee1d2...	+496079992634
3	Tc55d5b49-15f8-4074-9b14-c27a7aa873...	+576037012984
4	Tafcb0515-94e5-4355-9596-1773985dbb...	+66054258725
5	Tfccaf0af-14a4-42f0-94b0-b27bddb9a7ea	+105112177954
6	Tbdf13862-11c8-45d8-8306-a7661731a0...	+332619071034
7	T897dfba1-37af-448d-ba1e-0e0763e2dea3	+915033244800
8	T719d6e21-e213-4883-8bec-a7bd07d2a8...	+83154540238
9	Tdafe6666-12ab-4425-8c85-5570f850c4f5	+622547293796
10	Ta076e342-48cd-497f-bd84-95868382cede	+977335304525
11	Ta48d457d-cf25-4c70-9966-7e6df868e51a	+198453726326

10. Rents table:

Query Query History

```
1 select * from rents;
```

Data Output Messages Notifications

	tenant_id [PK] character varying (38)	owner_id [PK] character varying (38)	rent_amount numeric (5,2)
1	T897dfba1-37af-448d-ba1e-0e0763e2dea3	O76ac053c-0e2f-4e5d-bf43-5d1442e89162	120.00
2	T719d6e21-e213-4883-8bec-a7bd07d2a8f9	O8b95ad9b-7082-410d-a342-adf2a7ba90...	120.00
3	Tdafe6666-12ab-4425-8c85-5570f850c4f5	O76ac053c-0e2f-4e5d-bf43-5d1442e89162	280.00
4	Ta076e342-48cd-497f-bd84-95868382cede	Ob6c977a5-5845-4d7f-b2b5-3df5eba282ce	350.00
5	Te08f6e81-c550-46a0-b523-9779fd851ad6	Of230bd53-f96a-49f2-ad95-dc77d1d7854e	190.00
6	Te6b3a611-d92d-4d08-99d9-27900ee1d2...	Oe567f8a6-dce2-4b2e-845b-e49bbdde82...	190.00
7	Tc55d5b49-15f8-4074-9b14-c27a7aa87322	O8b95ad9b-7082-410d-a342-adf2a7ba90...	225.00
8	Tafcb0515-94e5-4355-9596-1773985dbb59	Ob6c977a5-5845-4d7f-b2b5-3df5eba282ce	500.00
9	Tbdf13862-11c8-45d8-8306-a7661731a0...	O76ac053c-0e2f-4e5d-bf43-5d1442e89162	500.00
10	Tca3aac71-9e61-4b35-a12a-de36f901c3eb	O40740fe1-1371-41f6-b006-de3e84c9c07b	450.00

11. Maintenance_staff:

Query Query History

```
select * from maintenance_staff;
```

Data Output Messages Notifications

	emp_id [PK] character varying (38)	name character	phone character varying (15)	shift_timings character varying (50)	contract_length character varying (20)	role character varying (15)	email character varying (50)
1	E8d27048a-3493-4964-a0f5-31759ba54587	majdoor	+11234567891	9:00 AM - 5:00 PM	20D	Employee	employee@gmail.com
2	Ecdc336cd-87e2-4bc6-8004-d6833490dc11	Jensen	+586295475243	9:00 AM - 5:00 PM	20D	Employee	Verdie28@gmail.com
3	Ea58cec09-788c-4335-b79e-2d0d523d62b8	Gianni	+916234108267	9:00 AM - 5:00 PM	15D	Employee	Ruben_OKeefe@hotmail.com
4	E2548435c-be3d-4a81-a851-92327112623c	Baron	+983844158382	9:00 AM - 5:00 PM	15D	Employee	Rowland_Olson9@hotmail.com
5	Ee0178007-144d-47b1-8f1c-46d410489191	Mellie	+568062589473	9:00 AM - 5:00 PM	35D	Employee	Trace27@hotmail.com
6	E91e31e26-ff8e-4a9a-9b17-81063ef16ae6	Reta	+925753977207	9:00 AM - 5:00 PM	24HR	Employee	Celestino_Stracke78@hotmail.com
7	E892c5e74-b87e-40f0-b31e-fcb111c9efba	Josie	+887136289942	9:00 AM - 5:00 PM	50D	Employee	Judy.Schoen@hotmail.com
8	Ed187b20a-03b7-462b-9850-6e37bfdec262	Ernie	+797489143458	9:00 AM - 5:00 PM	2Y	Employee	Deja.Lehner@yahoo.com
9	E322bde1c-3056-42b5-bea7-d68ee2139dfe	Cristobal	+119564275407	9:00 AM - 5:00 PM	5Y	Employee	Lamont.Wolff9@gmail.com
10	Ed09e6b87-9dc3-4ce9-bca4-925db18ee09e	Maryam	+214117367518	9:00 AM - 5:00 PM	65D	Employee	Valentine.Reynolds32@yahoo.com

12. Manages:

Query Query History

```
SELECT * FROM public.manages
ORDER BY emp_id ASC, block_id ASC
```

Data Output Messages Notifications

	emp_id [PK] character varying (38)	block_id [PK] integer
1	E2548435c-be3d-4a81-a851-9232711262...	33028789
2	E322bde1c-3056-42b5-bea7-d68ee2139dfe	33028789
3	E322bde1c-3056-42b5-bea7-d68ee2139dfe	52505100
4	E892c5e74-b87e-40f0-b31e-fcb111c9efba	33028789
5	E892c5e74-b87e-40f0-b31e-fcb111c9efba	42509553
6	E892c5e74-b87e-40f0-b31e-fcb111c9efba	52505100
7	E8d27048a-3493-4964-a0f5-31759ba54587	42509553
8	E91e31e26-ff8e-4a9a-9b17-81063ef16ae6	93702634
9	Ecdc336cd-87e2-4bc6-8004-d6833490dc11	42509553
10	Ed187b20a-03b7-462b-9850-6e37bfdec262	42509553