**Case Study: Hospital Management System**

**Problem Statement:**

Design and implement a Hospital Management System using Oracle SQL and PL/SQL. The system will be used to manage patient information, doctors, and appointments. Your task is to create the necessary database schema, populate the database with sample data, and develop PL/SQL procedures to handle appointment scheduling and patient discharge.

**Requirements:**

1. **Patient Management**:
   * Implement the functionality to add, update, delete, and search for patients.
   * Ensure that each patient has attributes such as PATIENT\_ID, FIRST\_NAME, LAST\_NAME, DATE\_OF\_BIRTH, GENDER, CONTACT\_NUMBER, and ADDRESS.
2. **Doctor Management**:
   * Implement the functionality to add, update, delete, and search for doctors.
   * Ensure that each doctor has attributes such as DOCTOR\_ID, FIRST\_NAME, LAST\_NAME, SPECIALIZATION, CONTACT\_NUMBER, and EMAIL.
3. **Appointment Management**:
   * Implement the functionality to create, update, and cancel appointments.
   * Track appointments with attributes such as APPOINTMENT\_ID, PATIENT\_ID, DOCTOR\_ID, APPOINTMENT\_DATE, APPOINTMENT\_TIME, and STATUS.

**Tasks:**

1. **Design the Database Schema**:
   * Create the Patients, Doctors, and Appointments tables with the appropriate fields and constraints.
   * Define primary keys and foreign keys to maintain data integrity.
2. **Populate the Database with Sample Data**:
   * Insert sample records into the Patients, Doctors, and Appointments tables to facilitate testing of the system.
3. **Develop PL/SQL Procedures**:
   * Create a procedure to schedule an appointment. The procedure should check doctor availability, insert a new appointment record, and update the appointment status.
   * Create a procedure to discharge a patient. The procedure should update the patient's record with discharge details and remove or update any pending appointments.

**Expected Outcomes:**

1. **Patients Table**:
   * Contains all information about the patients admitted or treated at the hospital.
2. **Doctors Table**:
   * Contains details of all doctors working in the hospital.
3. **Appointments Table**:
   * Tracks the appointments scheduled between patients and doctors, including appointment dates, times, and statuses.
4. **PL/SQL Procedures**:
   * Efficiently manage appointment scheduling and patient discharge, maintaining accurate records in the database.

**Deliverables:**

1. SQL scripts to create the Patients, Doctors, and Appointments tables.
2. SQL scripts to insert sample data into the tables.
3. PL/SQL scripts for the procedures to schedule appointments and discharge patients.
4. Documentation explaining how to set up and use the system, including how to run the PL/SQL procedures.

**Database Schema:**

1. **Patients Table**:
   * **PATIENT\_ID**: Number, Primary Key
   * **FIRST\_NAME**: Varchar2(50)
   * **LAST\_NAME**: Varchar2(50)
   * **DATE\_OF\_BIRTH**: Date
   * **GENDER**: Varchar2(10)
   * **CONTACT\_NUMBER**: Varchar2(15)
   * **ADDRESS**: Varchar2(200)
2. **Doctors Table**:
   * **DOCTOR\_ID**: Number, Primary Key
   * **FIRST\_NAME**: Varchar2(50)
   * **LAST\_NAME**: Varchar2(50)
   * **SPECIALIZATION**: Varchar2(50)
   * **CONTACT\_NUMBER**: Varchar2(15)
   * **EMAIL**: Varchar2(100)
3. **Appointments Table**:
   * **APPOINTMENT\_ID**: Number, Primary Key
   * **PATIENT\_ID**: Number, Foreign Key References Patients(PATIENT\_ID)
   * **DOCTOR\_ID**: Number, Foreign Key References Doctors(DOCTOR\_ID)
   * **APPOINTMENT\_DATE**: Date
   * **APPOINTMENT\_TIME**: Varchar2(10)
   * **STATUS**: Varchar2(20)

**Case Study Task:**

* **Design**: Create the database schema as provided.
* **Implement**: Insert sample data into the tables.
* **Develop**: Write PL/SQL procedures for scheduling appointments and discharging patients.
* **Test**: Test the procedures with various scenarios (e.g., scheduling an appointment, discharging a patient, ensuring proper updates).