NATIONAL TEACHERS COLLEGE

# Process Management and Foundation Day Connection


**Submitted By:**

Olea, Simon Anakin
Sanchez,Rafael V.
Sildo,Vhone Gabrielle M.
Tumlos, Marth Dominique P.
Trigusa, Sam Lawrence A.

**Submitted To:**

Justin Louise R. Neypes

**Barangay Health Management System**

## I. Introduction

### 1.1 Project Overview & UN SDG Target

The Barangay Clinic Appointment Management System is a MySQL-based database application designed to efficiently manage patient records, doctor schedules, healthcare services, and appointment bookings. The system supports organized data storage, reliable transaction handling, and accurate reporting for clinic operations. This project aligns with the United Nations Sustainable Development Goal (SDG) 3: Good Health and Well-Being, by improving access to primary healthcare services through better data management and scheduling efficiency at the barangay level.

### 1.2 Problem Statement

Many barangay clinics rely on manual record-keeping or unstructured data systems, which often result in scheduling conflicts, duplicate records, and inaccurate patient information. These issues lead to inefficient clinic operations, longer waiting times, and increased risk of data errors. The system addresses this real-world data problem by providing a centralized MySQL database that enforces data integrity, prevents invalid appointments, and ensures accurate, consistent, and timely management of clinic information.

- **Double Booking:** Patients scheduled for the same doctor at the same time.
- **Schedule Conflicts:** Appointments made when doctors are unavailable.
- **Data Redundancy:** Patient details repeated across multiple logbooks.
- **Reporting Delays:** Difficulty in generating summary reports for local government requirements.

## II. Requirements & Analysis

### 2.1 Functional & Non-Functional Requirements

**Functional Requirements (FR)**

| ID | Requirement | Alignment |
|---|---|---|
| **FR1** | The system successfully loads and stores input data into a fully designed relational database using MySQL. This is achieved through properly structured tables such as patients, doctors, services, appointments, and health_records, all defined using DDL. | **DDL/DML:** |
| **FR2** | DBMS concepts using MySQL, including referential integrity through foreign keys, data validation using constraints and triggers, and controlled data operations through stored procedures. These ensure data consistency, accuracy, and reliability. | **Core Concepts** |
| **FR3** | The system performs transactional operations using a MySQL stored procedure that enforces ACID properties. Appointment bookings are executed atomically and validated through triggers, ensuring consistency, isolation from conflicts such as double booking, and durability of committed data. | **Finals Concept:** |
| **FR4** | The system generates reports using MySQL views and DQL (SELECT) statements, allowing efficient retrieval and presentation of summarized data such as elderly appointments and service-based statistics. | **DQL/Reporting** |

**Non-Functional Requirements (NFR)**

| ID | Requirement | Metric |
|---|---|---|
| **NFR1** | **Robustness:** The system handles invalid inputs and operations gracefully without violating database integrity. This is enforced through MySQL triggers that validate appointment dates, doctor schedules, service compatibility, and duplicate bookings. Informative error messages are returned when violations occur. | Error messages are clear and informative |
| **NFR2** | **Maintainability:**<br>The database schema and stored logic are modular, well-structured, and follow SQL best practices. The use of views, triggers, and stored procedures improves readability and simplifies future updates or modifications to the system. | Use of comments and logical VIEW definitions. |
| **NFR3** | **Performance:**<br>The system ensures efficient execution of required reports by using indexed columns, optimized joins, and pre-defined views. This allows report queries to return results quickly, even as data volume increases. | Reports should return results in under 1 second on standard hardware with test data. |

### 2.2 Data Requirements

The system is pre-loaded with over 50 records, including:

- **Patients:** 53 registered residents with contact info and addresses.
- **Doctors:** 3 specialists (General checkup, Obstetrician, Pediatrician).
- **Services:** 3 core services (Checkup, Prenatal, Pediatric).

### 2.3 Schema Normalization Analysis

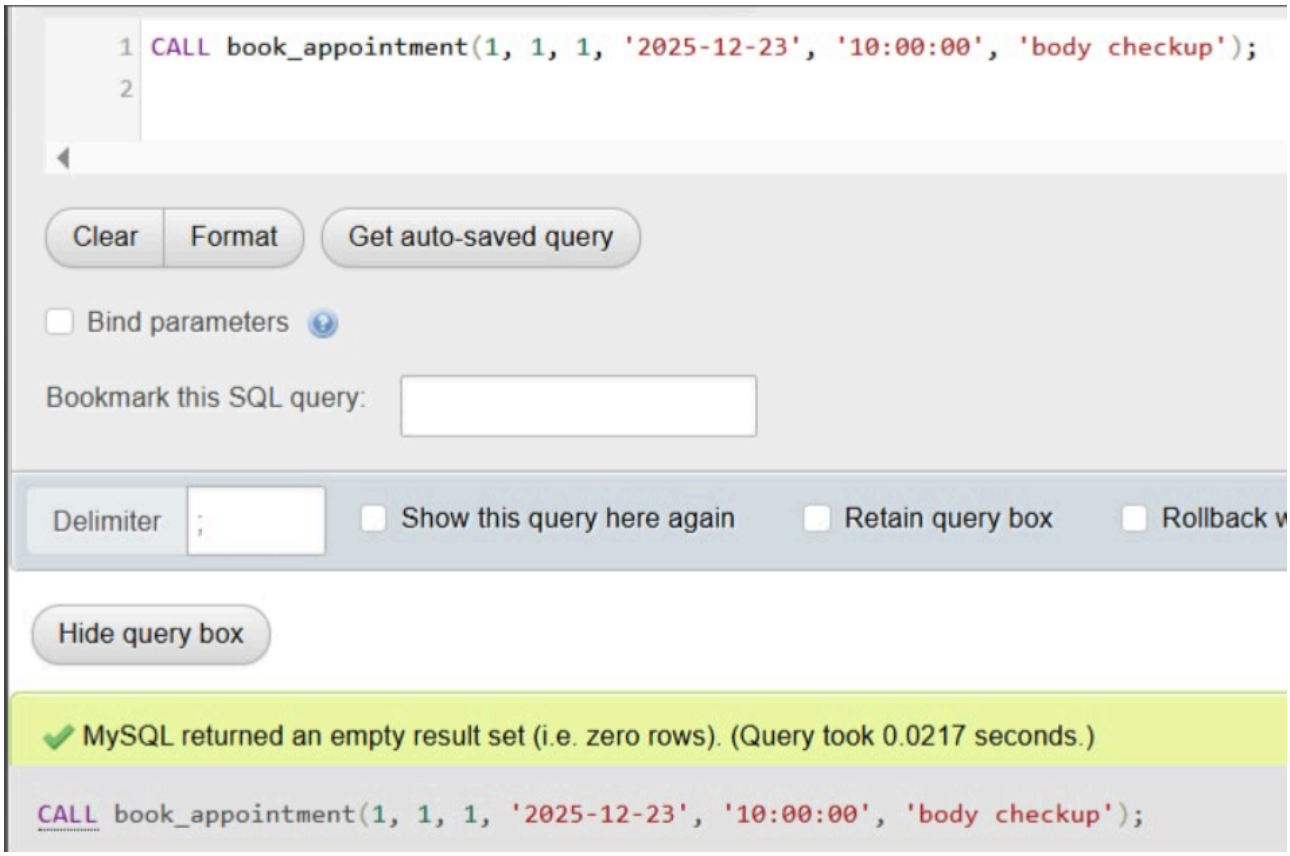
**The database is designed in Third Normal Form (3NF):**

- **1NF:** All columns contain atomic values.
- **2NF:** All non-key attributes are fully dependent on the primary key (e.g., Doctor specialization depends only on doctor_id).
- **3NF:** Transitive dependencies are removed. For instance, appointment details reference patient_id rather than duplicating patient names, ensuring that updating a patient's address in the patients table reflects everywhere.

## III. Design Specification

### 3.1 Core DBMS Concepts Used

**Concept 1: Stored Procedure**



**Concept 2: Triggers**

**Error**

**SQL query:** Copy

```
INSERT INTO appointments
(patient_id, doctor_id, service_id, date, time, reason)
VALUES
(21, 1, 1, '2025-01-01', '10:00:00', 'test for trigger');
```

**MySQL said:**

```
#1644 - Appointment date cannot be in the past.
```

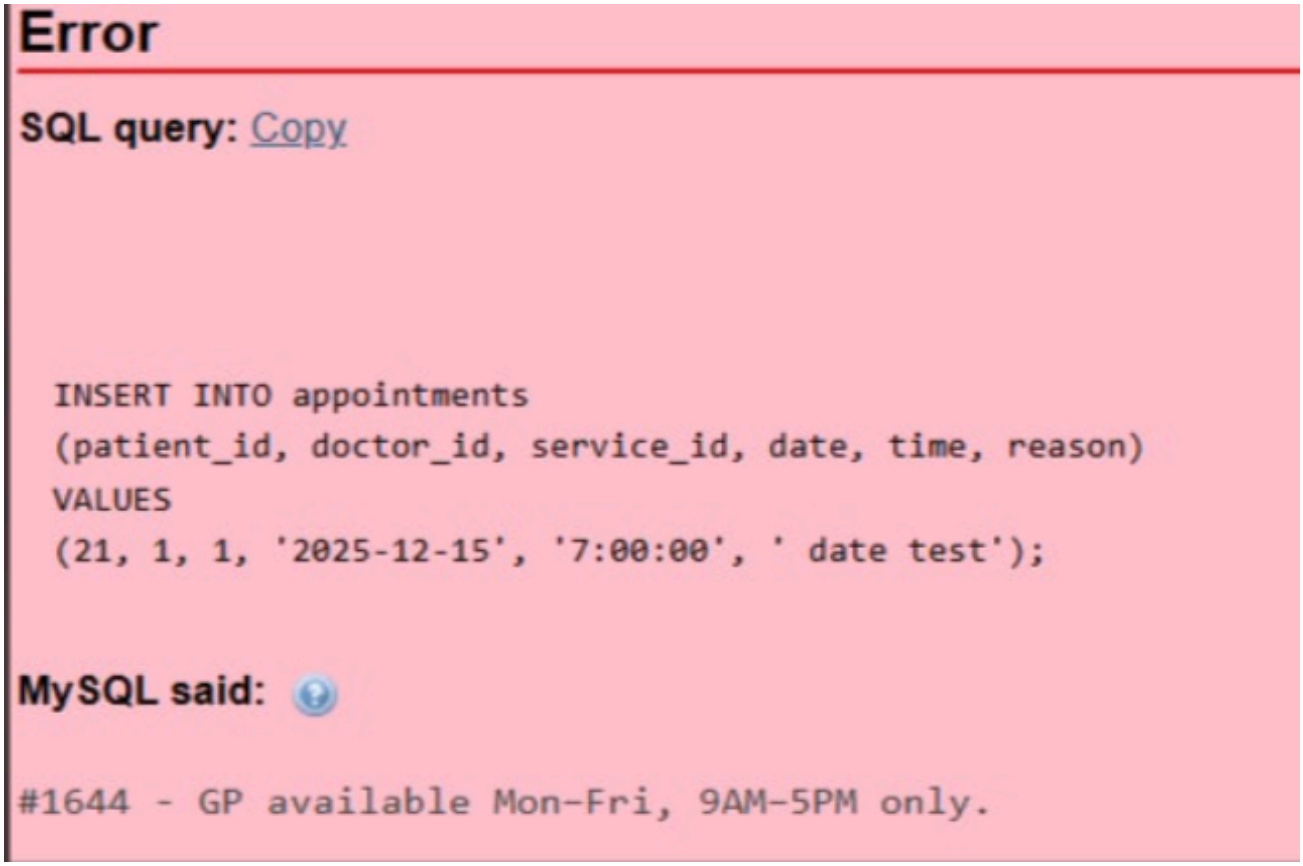
**Error**

**SQL query:** Copy

```
INSERT INTO appointments
(patient_id, doctor_id, service_id, date, time, reason)
VALUES
(21, 1, 2, '2025-12-24', '10:00:00', 'Wrong service test');
```

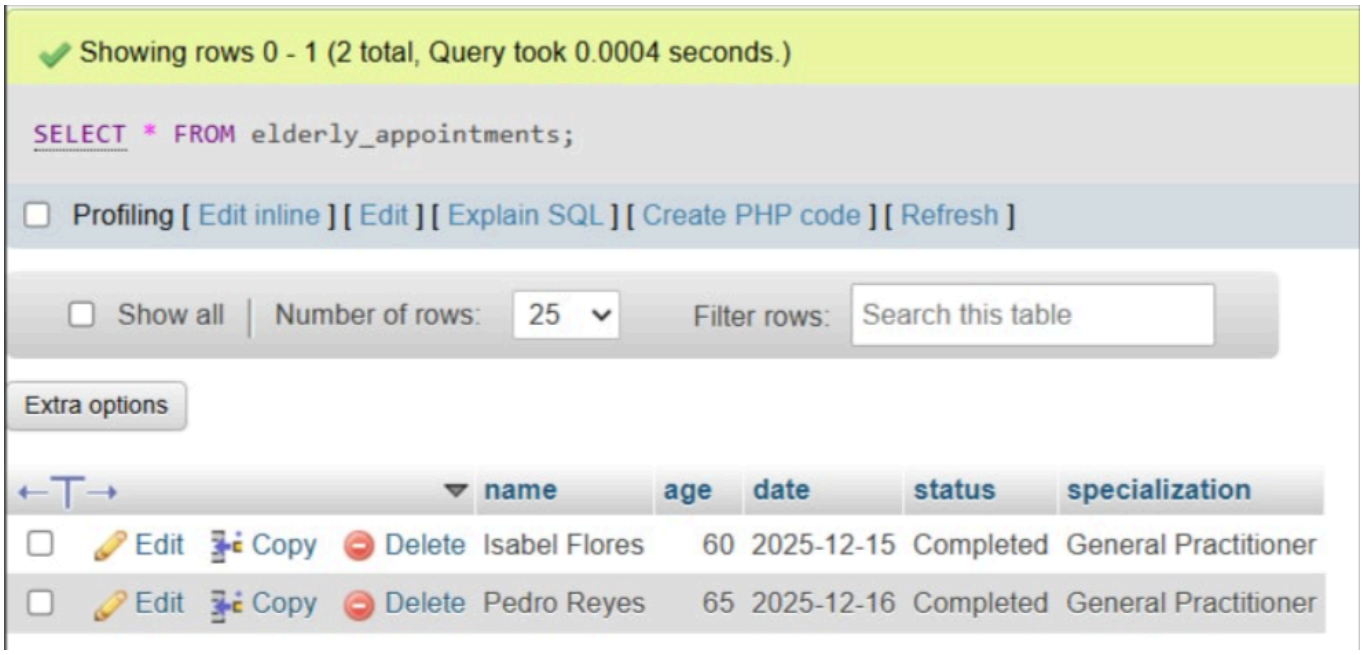
**MySQL said:**

```
#1644 - GP can only do General Checkup.
```




**(Concept 3: Foreign Key (Referential Integrity)**

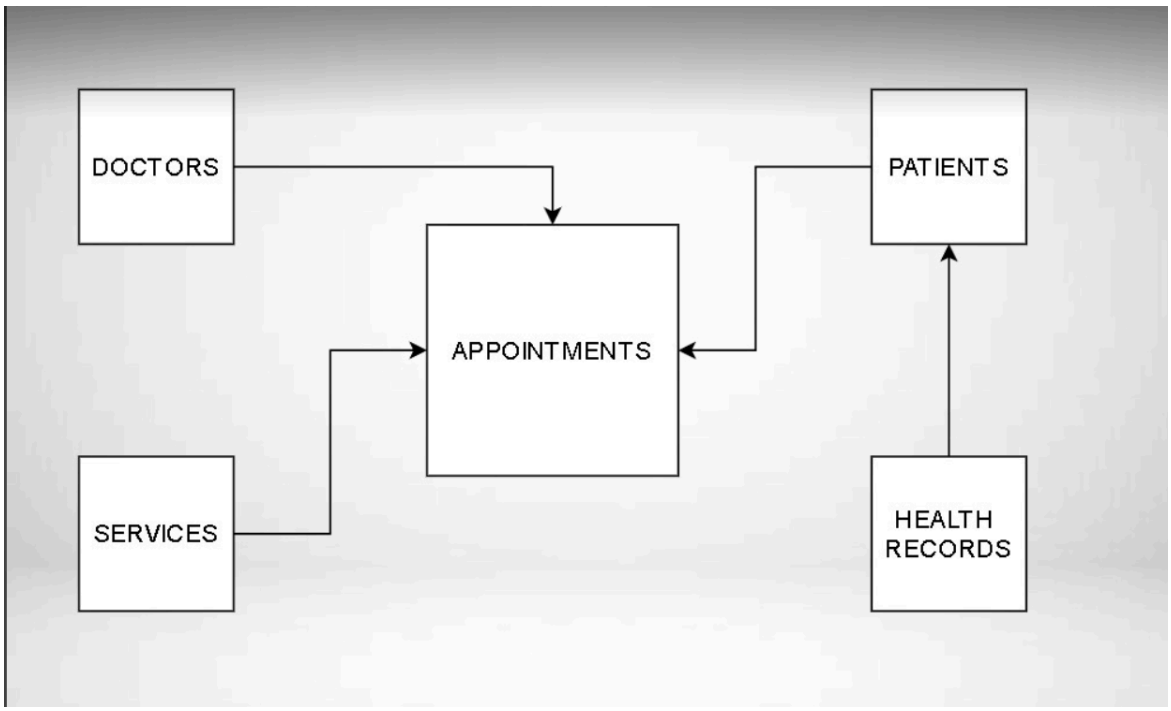
**(Concept 4: View)**



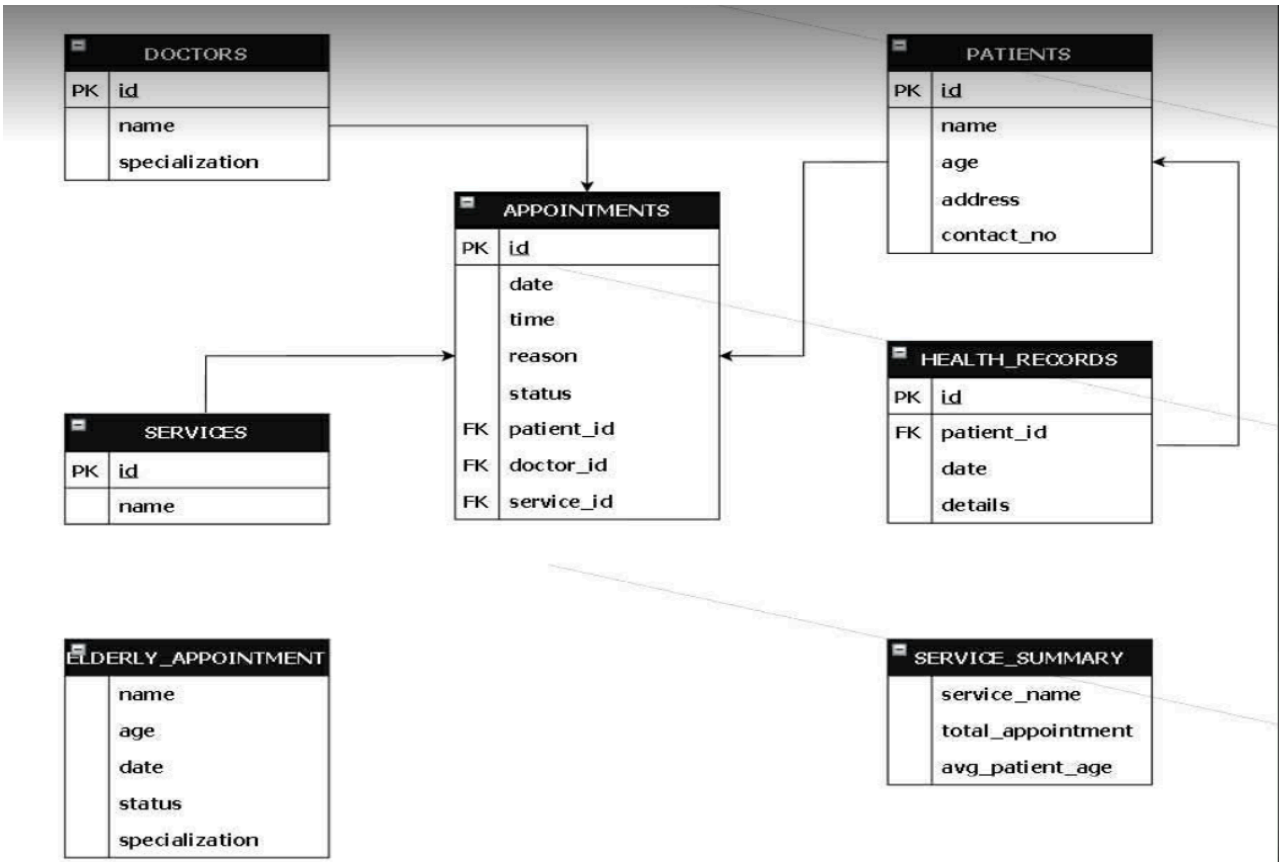

**(Concept 5: constraints)**

### 3.2 ER Diagram Guidance (For your visual ERD)

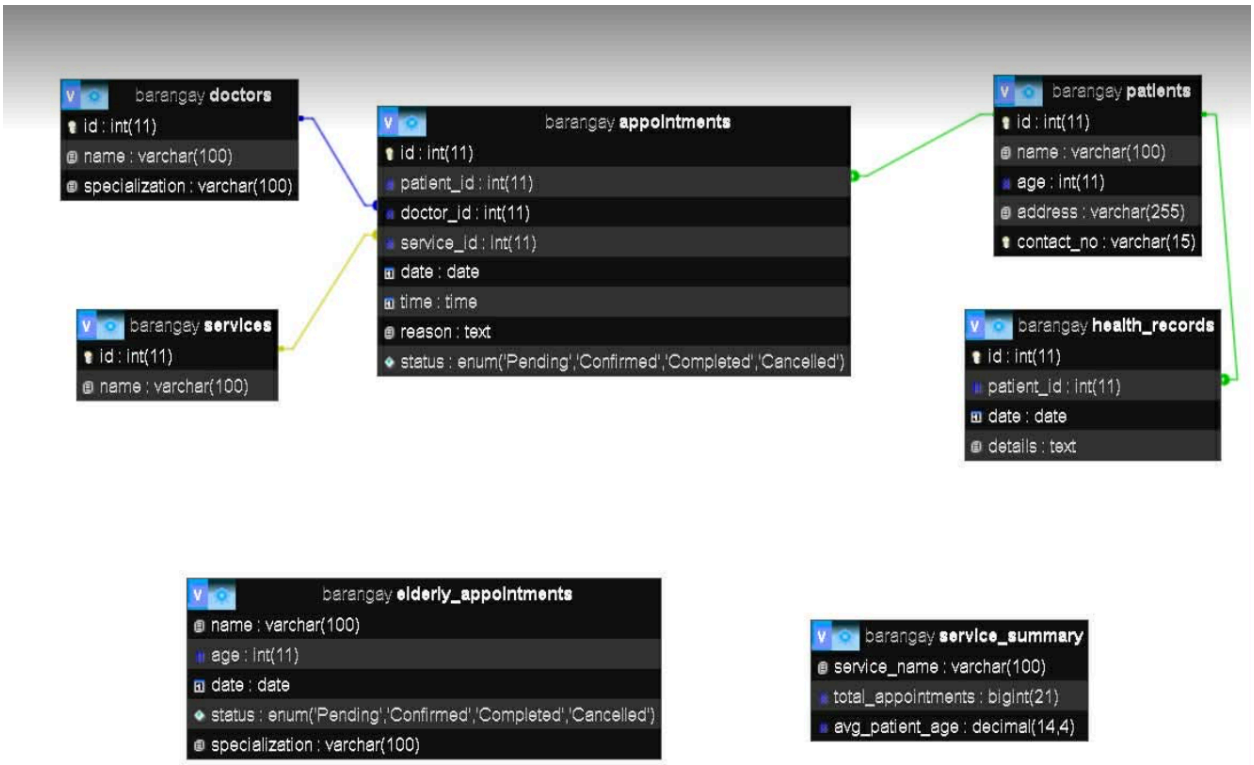
**Conceptual erd**



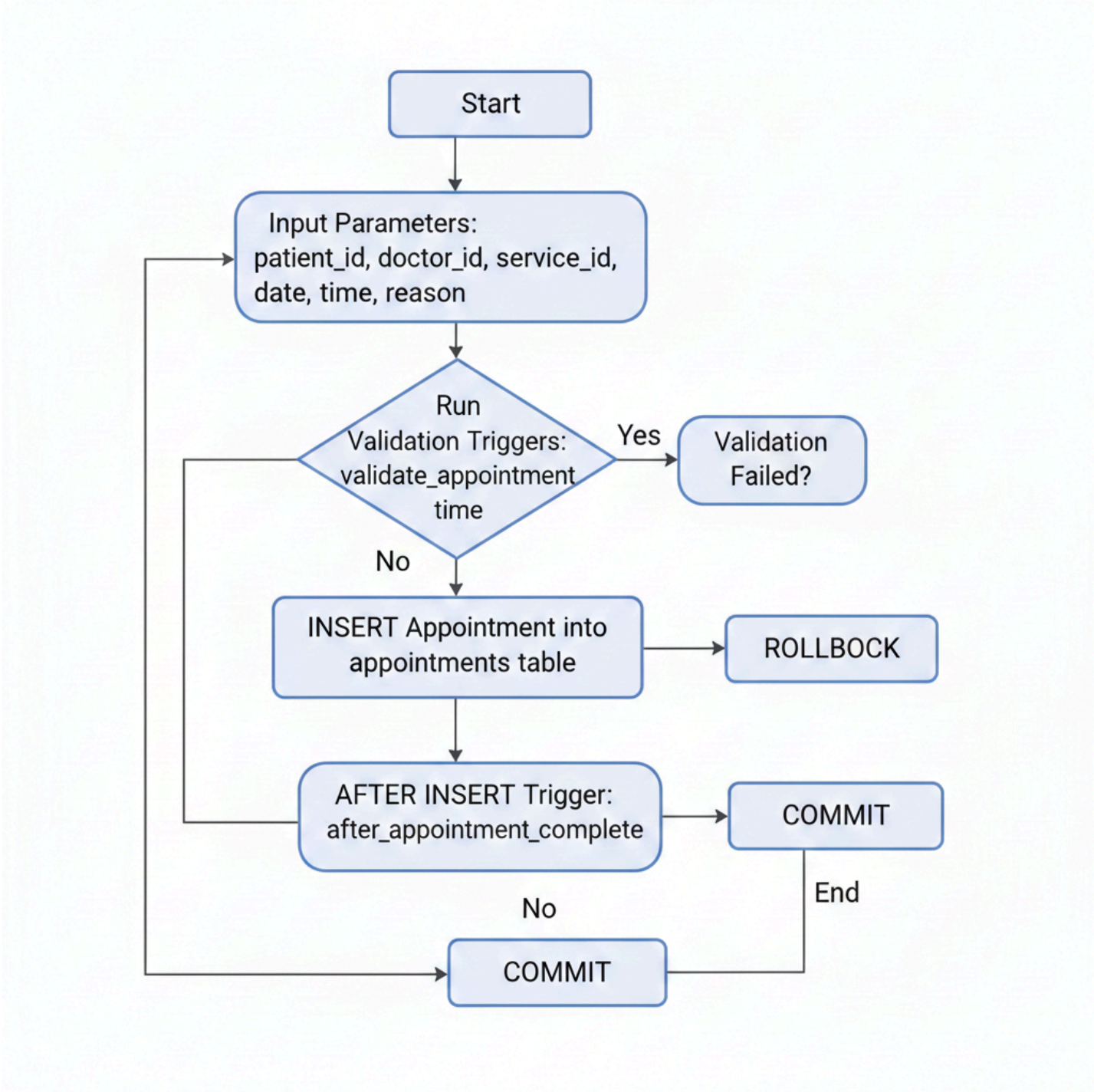

**Logical erd**



## Physical erd



### 3.3 Transaction Flowchart Guidance (For book_appointment)



## V. Conclusion

The Barangay Clinic Appointment Management System successfully applies core DBMS concepts using MySQL. The system efficiently manages patient, doctor, service, and appointment data through a well-designed relational schema. Stored procedures and triggers ensure secure and consistent transactions by enforcing business rules and maintaining data integrity. Foreign keys, constraints, and views further support data accuracy and simplify reporting. Overall, the system demonstrates a reliable, organized, and practical database solution suitable for clinic operations.

## Contributions

| | |
|---|---|
| SAM LAWRENCE A. TRIGUSA | DDL (PRE LIM) |
| RAFAEL V. SANCHEZ | ERD (MIDTERM) |
| SIMON ANAKIN OLEA | JOINTS(MIDTERM) |
| MARTH DOMINIQUE P. TUMLOS | STORED PROCEDURE (FINALS) |
| VHONE GABRIELLE M. SILDO | TRIGGER(FINALS) |