

## **Extended Project Medical Clinic Management Application Health-Care Clinic.**

The **Health-Care Clinic** is a growing private healthcare institution. Currently, it faces several challenges in managing its daily operations. The administration is overwhelmed by appointment scheduling, coordinating doctors' shifts, and communicating with patients. Information is scattered across paper files and spreadsheets, slowing down receptionists' work and leading to frequent mistakes, such as double bookings or poorly coordinated doctor schedules.

To address these issues, **Health-Care Clinic** has decided to develop a centralized digital application to streamline all its operations. The goal is to implement an intuitive and secure solution to manage patients, doctors, and appointments while automating repetitive tasks as much as possible. The application will require an authentication system to ensure that only authorized users can access sensitive information. Each user will have specific roles: administrators will manage all operations, while doctors and receptionists will have limited access to their respective functions.

The system must also manage doctors' schedules.

Since each doctor has different availability and specialties, the system must prevent scheduling conflicts by blocking appointments when a doctor is already fully booked.

The clinic also expects a smooth patient registration process, collecting necessary details like name, date of birth, and contact information. The system should offer a comprehensive view of each patient, including visit history and appointment records.

In addition, the clinic aims to plan and view appointments according to available time slots, in line with its opening hours. Once an appointment is booked, it must be visible immediately to both doctors and receptionists, with real-time notifications for any changes or cancellations.

Administrators will also need the ability to generate monthly reports to monitor activities, such as the number of appointments scheduled or canceled, as well as each doctor's occupancy.

To ensure the project's longevity, the application must be designed in a modular way, facilitating the addition of new features in the future.

The clinic also expects to receive complete documentation describing the application's functionality, along with access to design diagrams and source code to allow for future adjustments or enhancements.

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**PART I – INFORMATION SYSTEM ANALYSIS & DESIGN**

**1- System Analysis**

- 1.1- Identify the objects that will be part of the system.
- 1.2- Identify the characteristics of each object as well as its functionalities.

**2- Design ( U.M.L. Diagrams)**

- 2.1- Use case Diagrams
- 2.2- Class Diagrams
- 2.3- Activity Diagrams
- 2.4- Sequence Diagram.

**PART II – DATABASE DESIGN & IMPLEMENTATION .**

**1- Logical Data Model - Entity-Relationship Diagram. (E.R.D.)**

- Identify the entities and characteristics of each entity.
- Identify the relationships between entities and cardinalities.

**DRAW the E.R.D.**

**2- Physical Data Model - Relational Data Model. (R.D.M.)**

- Identify parent and association tables, and the columns and type of each attribute.
- Define domain-level constraints (column-level constraints).
- Define table constraints and relationship constraints between tables.

**DRAW the R.D.M.**

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**3- Database Implementation using MICROSOFT SQL SERVER 2019/2022**

Implement a database named **HealthCareClinicDB** and its objects:

- Tables
- Constraints
- Views and stored procedures that will be used in the Multi-Tiers Application in the client side, which will be implemented in Part III.
- Insert data by using Insert statement in the Transact-SQL Console.

**SQL scripting :**

**Use Transact\_SQL to implement the database as well as all its objects and inserting data.**

Save the database scripting into a file named **HealthCareClinicDB.sql**

**PART III – MULTI-TIERS APPLICATION DEVELOPMENT.**

**1 - Business Logic Layer: BLL project.**

**Implement the business classes.**

**2 – Data Access Layer: DAL project.**

**Implement the database classes.**

**2 – Graphic User Interface: UI project.**

**Implement the friendly user interface classes.**

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**Submission date:**

**Part I – System Analysis & Design:**

**Monday, Nov. 10, 2025**

**Part II – Database Design & Implementation:**

**Monday, Nov. 24, 2025**

**Part III: Multi-Tiers Application Development:**

**Monday, Dec. 08, 2025**