Case Study: Multi-Branch Healthcare Diagnostic Center

Scenario Overview:

You are hired by **MediCare Diagnostic Services Pvt. Ltd.**, a chain of **diagnostic labs and health check-up centers** operating across several cities. The company wants to **digitally transform** its manual operations and needs a robust **relational database design**.

You, as a PL/SQL developer/DB designer, must work with a team to **design the database**, normalize it, and prepare the backend for automation.

Business Requirements

1. Branch & Department Management

- MediCare has **multiple branches** across different cities.
- Each branch may have **multiple departments** (Radiology, Pathology, Cardiology, etc.).
- Every department has a **head (HOD)** and a **defined room/floor**.

2. Patient Registration

- A patient can register **once** but visit **multiple times** across branches.
- Each visit generates a **Visit_ID** and includes:
    - Complaints
    - Department consulted
    - Lab tests prescribed
- Patients should have:
    - Name, DOB, Gender, Contact, Email, Aadhaar
    - Emergency contact person

3. Doctors & Technicians

- Doctors are assigned to specific branches and departments.
- Doctors may consult multiple patients in a day.
- Technicians conduct diagnostic tests (can be full-time or on-call).
- Each doctor has:
    - Name, Specialty, Experience, Contact Info, License ID

4. Diagnostic Tests

- Tests have:
    - Unique Test_ID
    - Name, Type (Blood, MRI, X-Ray)

    - Price
    - Preparation instructions (e.g., fasting)
- Some tests are **packages** (e.g., Full Body Check-up) which include **multiple sub-tests**.

5. Appointments & Reports

- Appointments are booked against available slots.
- Test reports are uploaded with:
    - Result summary, Detailed values, Range (Normal/Abnormal), Date
- Each report is linked to:
    - Patient
    - Test performed
    - Technician

6. Billing & Payments

- Bills are generated per visit.
- Each bill contains multiple services/tests.
- Payment Modes: Cash, Card, Insurance
- Discounts and taxes are applied.

7. Inventory for Lab Items

- Each branch maintains its own inventory for test-related materials.
- Items: Gloves, Syringes, Reagents, X-ray films, etc.
- Each item has:
    - Reorder level
    - Supplier
    - Price
    - Expiry Date

Deliverables :-

1. Entity Identification

- Identify **minimum 12-14** entities.
- Define attributes for each entity.

2. ER Diagram

- Show all **1:M**, **M:N**, and **recursive** relationships.
- Show weak entities where applicable (e.g., Report for a Test).
- Use Crow’s Foot or UML notation.

3. Normalization

- Perform 1NF → 2NF → 3NF step-by-step.
- Justify decisions (e.g., separating Address table for Patients).
- Avoid repeating groups or derived attributes.