Health Information Network (HIN) Database Requirements and Business Rules

The Health Information Network (HIN) system is a national web-based platform that manages and exchanges health records in compliance with HIPAA standards. The system supports three main types of stakeholders: **patients**, **health providers**, and **government regulators**.

Below are the database requirements and business rules that define the constraints for the system:

1. Patient Management

- A patient must have a **unique ID** in the system.
- A patient can access and view their own **health records**.
- Each patient can maintain a list of **caregivers** (family or friends) who will be notified in case of an emergency.
    - A patient may have zero or more associated caregivers but can add or remove caregivers at any time.
    - Caregiver notifications can be sent via **email** and/or **SMS**.
- Health insurance information is **optional** for patients.
    - If a patient has health insurance, it must be linked to only **one** registered **insurance company** in the system.
    - If a patient does not have insurance, they must pay for services via **credit card**, **bank transfer**, or **cash**.
- A patient can make appointment requests with health providers, and these requests must be based on the patient's treatment history and illness type.
    - Patients can cancel or change appointments.

2. Health Provider Management

- Each health provider in the system must have a **unique ID**, as well as their **specialty**, **location**, and **availability** for appointments.
- A health provider can have multiple patients, but each patient can only have one active appointment with a provider at any given time.
- **Emergency appointments take precedence** over regular appointments based on availability.

3. Appointment System

- An **appointment** is identified by a **unique ID** and includes the date, time, type of illness, and emergency status.
- Patients can request appointments, and the system automatically assigns them to a health provider.
- **Appointment changes** are possible depending on the provider's availability and the nature of the illness.

4. Health Record Management

- Each patient has a **collection of health records** that must include details such as the date of the incident, type of illness, and treatment details.
- **Health records must be updated** by health providers after each appointment and made accessible to patients.
- The system ensures **HIPAA compliance** by tracking all data exchanges between patients, providers, and regulators.
    - Every time a provider accesses patient health records, pairwise evidence is generated for regulatory and audit purposes.

5. Insurance and Payment

- **A patient's insurance status** determines their payment method:
    - Patients with insurance are charged through their **health insurance company**, based on their **insurance package**.
    - Uninsured patients must pay using a **credit card**, **bank transfer**, or **cash**.
- **A health insurance company must be registered** in the system before it can be associated with patients.
- Payments for each appointment must be logged in the system, including the **amount**, **payment method**, and **payment date**.

6. Regulatory Compliance

- **Government regulators** have access to all **health records** which allows them to monitor nationwide health trends and ensure HIPAA compliance.
- Regulators must be able to track data flows and verify that patient information shared between providers and the system is compliant with HIPAA standards.
    - **Evidence logs** must be created every time patient information is shared, recording the data exchanged and the entities involved.
- Regulators can run **custom reports** to monitor trends related to illness, treatments, and patient outcomes at a national level.