Deliverable : LAB2 - Conceptual Design

Data Management Course
UM6P College of Computing

Professor: Karima Echihabi   **Program:** Computer Engineering
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Team Information

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Repository Link	https://github.com/StarsDB

1   Introduction

This deliverable aims to create a database for the MNHS in order to handle and organize critical healthcare information. It manages the various entities linked to this organisation and the relationships between them to optimise services, enforce security, and enhance accuracy, efficiency, and integrity.

2   Requirements

- Producing an ER diagram that represents the MNHS system.

- Requirements are as follows:

  - **Patients**
    * Each patient has an internal identifier and a national identifier (CIN).
    * Attributes: full name, date of birth, sex, blood group, phone.
    * A patient may use several contact locations (e.g., home, work), each includes street, city, province, postal code, and optional phone.

  - **Staff**
    * Staff work in departments and interact with patients via clinical activities.
    * For practitioners, capture license number and specialty when applicable.
    * For caregiving staff, record grade and ward when relevant.
    * For technical staff, record modality/equipment and certifications when relevant.

  - **Hospitals and Departments**
    * Keep hospitals with name, city, region.
    * Departments belong to one hospital.
    * Staff are assigned to departments.

  - **Appointments**
    * Track date, time, reason, and status (Scheduled, Completed, Cancelled).
    * An appointment links exactly one patient and one staff member and occurs in one department.

  - **Prescriptions and Medications**
    * A prescription is issued for a patient by a staff member on a given date.
    * A prescription may include several medications; for each, record dosage and duration.
    * Medications include: DrugID, name, form, strength, manufacturer, therapeutic class, and active ingredient.

  - **Insurance and Billing**
    * Supported coverage types: CNOPS, CNSS, RAMED, private, or none.
    * Bills must be attached to a clinical activity; some generated after consultations, others after prescriptions.

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* A patient can have more than one insurance, and a bill is only linked to one insurance.

– **Emergencies**

* Record patient, admission timestamp, triage level, outcome; optionally the staff member who handled triage/attending.

– **Pharmacy inventory**

* Track for each hospital the on-hand quantity, reorder level, last restock timestamp, and unit price per medication.

3   Methodology

- 'Contact location' represented as weak entity, because it depends on the patient and cannot exist without it.

- 'Department' is also considered a weak entity, because it belongs to a hospital.

- We aggregate 'Staff' and 'Patient' entities because they interact via clinical activities.

- ISA relationship is used for the 'Staff' since it has three child entities that have specific attributes (practitioners, caregivers, technical staff).

- We also used a ternary relationship to represent the link between 'Staff', 'Patient' and 'Appointment' because the appointment occurs only if there is a patient and a staff member.

- We chose to use 2 binary relationships instead of one ternary relationship to represent the issuing of prescriptions due to the difference between the meaning of 'issued by' and 'issued for'.

- We indicate the 'generated after/before consultations/prescriptions' as an attribute for the entity 'Bills' to avoid redundancy.

- We represented some links for the Insurance entity with bold lines since 'None' is one of the values of the attribute 'coverage types'.

- 'Patient' is considered an attribute for the entity 'Emergencies' for more efficient storage of data.

4   Implementation & Results

- Look at figure 1 page 5.

5 Discussion

- **Challenges:**

  - Considering 'Patient' as an attribute of 'Emergencies' entity or creating a relationship between the two.
  - Use of ternary or binary relationships.
  - Aggregating 'Staff' and 'Patient' entities or creating a new 'Clinical Activities' entity.
  - Use of bold lines/arrows.

- **Observation:**

  - Many statements can be interpreted differently.
  - Intuition must be avoided.

- **Lesson Learned:**

  - Working as a team allows better understanding of the requirements and provides deeper insight of the constraints.

6 Conclusion

The goal was finding the most efficient way to handle the huge data provided by the hospital through discussions and critical thinking together as a team.

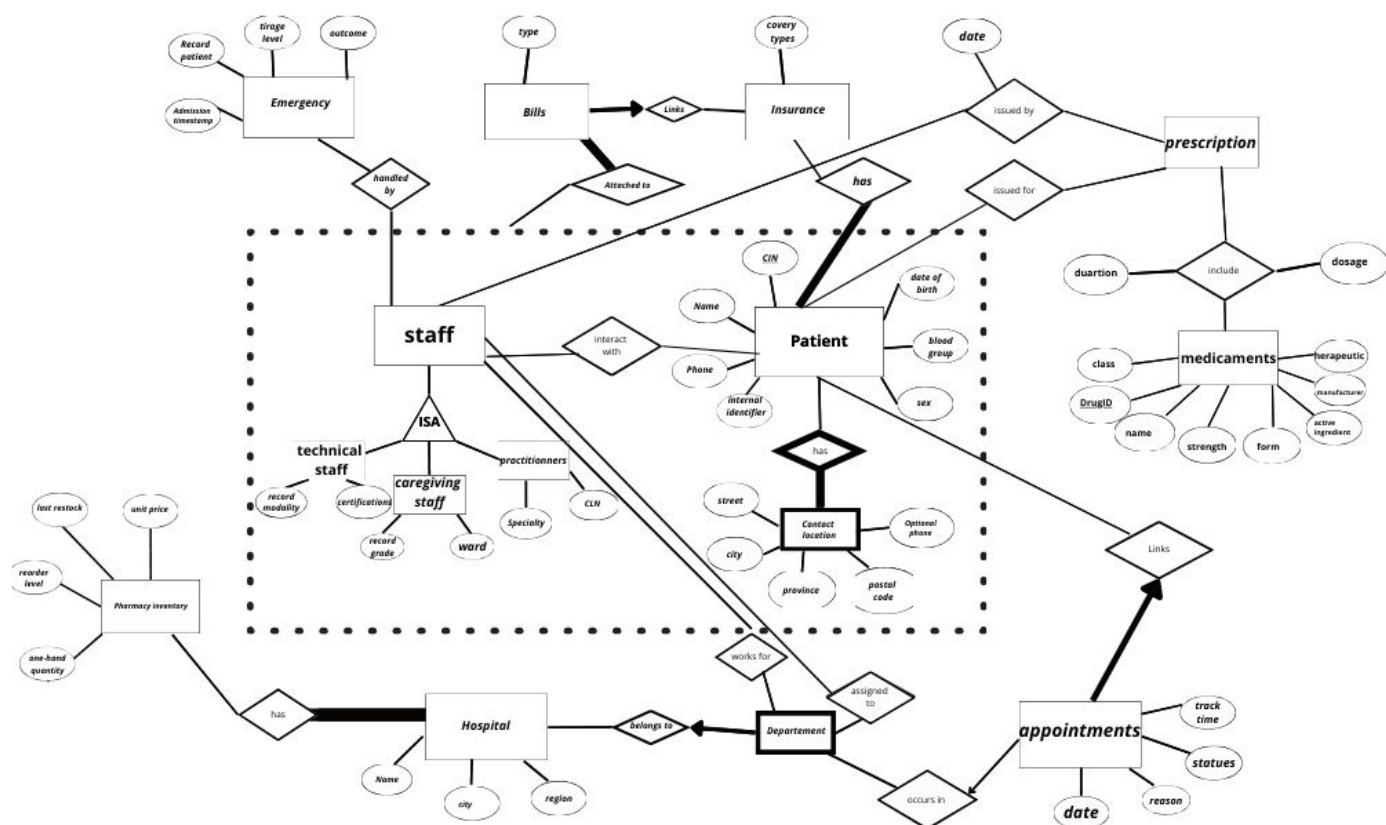PS: Ai was used to fix the output of the latex file , but the content is fully authentic.

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Figure 1: ER of MNHS