DAMG 6210 Data Management and Database Design

Team Number – 7

Project Topic – Hospital Management

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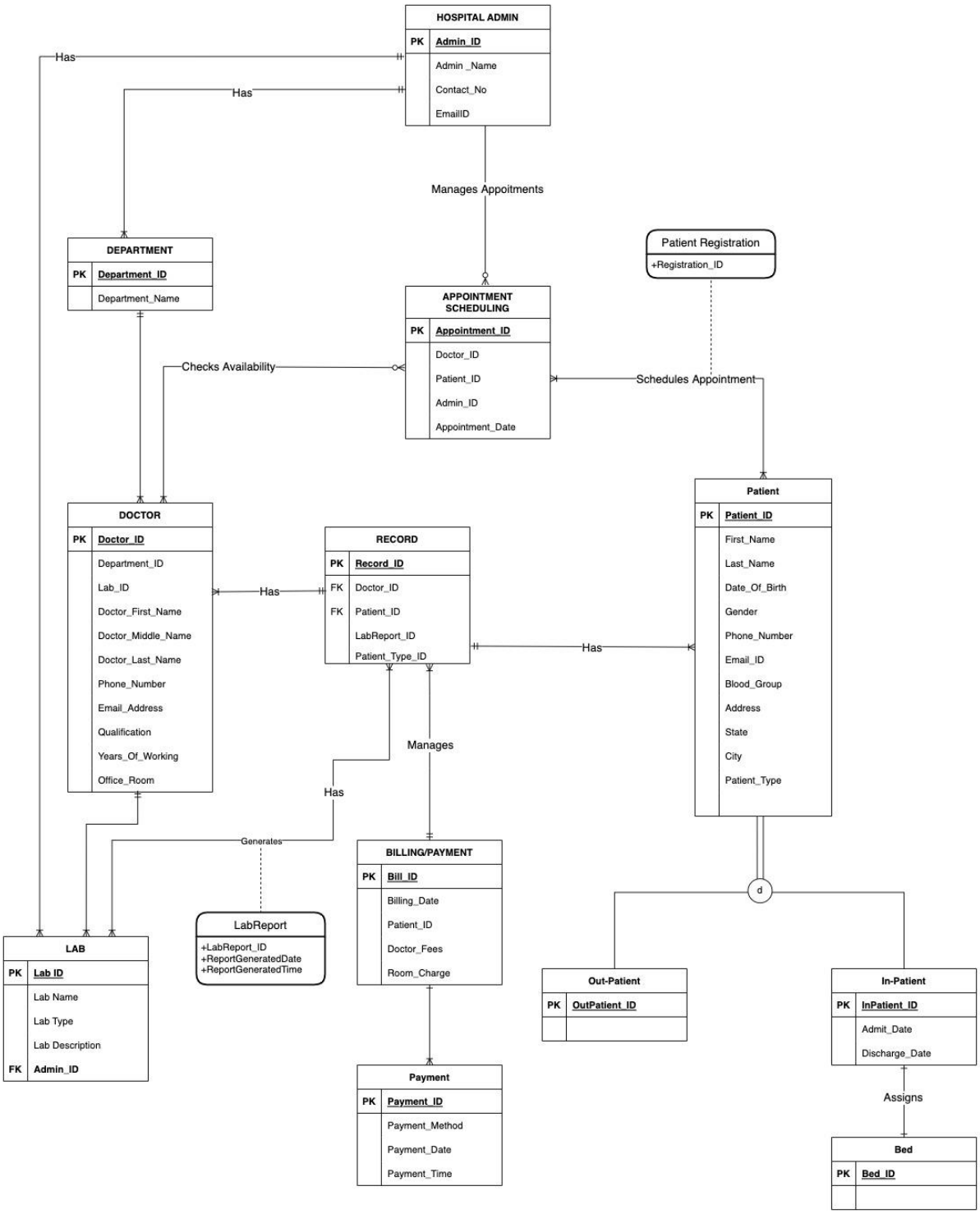
Hospital Management System

Summary:

This unexpected pandemic has created a multitude of acute challenges for health care delivery organizations, including inadequate capacity, supply shortages, the need for care redesign, and financial loss. Complexity science views health care delivery organizations as complex adaptive systems that operate in highly complex and unpredictable environments. The perspective assumes that much of organizational life is unknowable, uncertain, or unpredictable and thus cannot be standardized and controlled.

So, to overcome this situation for managing the Hospital, we are building a centralized database for Hospitals, which will maintain all the details required to manage the hospital and make the system more efficient. Also, with the help of this project, we will showcase and present the reports for common trends for the breakouts through visualization techniques. This will help understand the analytics based on the data or the information gathered from different hospitals.

Initial Entity Relation Diagram



HOSPITAL ADMIN –
The Hospital Admin Entity is the super Entity which is responsible for managing the Hospital management like scheduling the appointment, Doctors, Labs, Patients and Billings or Payments.

- The **HOSPITAL ADMIN** Entity has a 1:M relationship with **LAB** because a hospital can have multiple labs like Pathology Labs, Clinical Labs, etc.
- The **HOSPITAL ADMIN** Entity has a 1:M relationship with **DEPARTMENT** because a hospital can have multiple Departments like Dental, Orthopedics, Gynecology, General Physician, etc.

Appointment Scheduling-
The appointment scheduling entity is responsible for managing appointments for patients and doctors.

- **Appointment scheduling** has an M: M relationship with the Patient as appointments can be made by various patients and a patient can make various appointments. Also, it has an associative relationship with the Patient Registration entity.
- **Appointment scheduling** also has a 1: M relationship with a doctor as one appointment can have one doctor, but multiple doctors can have multiple appointments.

Doctor
The hospital employs many doctors. These doctors will be assigned to different departments. The identifier for a doctor is Doctor ID, whereas the identifier for a department is Department ID, the identifier for a lab is Lab ID.

- We identify the following additional attributes for the **Doctor**: Lab ID, Doctor Name, Phone Number, Email Address, Qualification, Years of working, Office Room.
- A Department may group any number of doctors but must group at least one doctor. Each doctor must belong to exactly one department.

Patient
The Patient entity stores the information regarding the patient as in multiple attributes. It is sub-divided into In-Patient and Out-Patient Entities, and it is determined by an attribute called Patient Type.

- The **Patient** has a 1:M relationship with the **Record** entity because there can be multiple records associated with each patient.
- **Out-Patient** has one attribute called OutPatientID and it is responsible for distinguishably identifying and segregating the records.
- **In-Patient** has attributes that define the date and time of his admission and discharge. Each In-Patient has a Bed associated with him for that visit.

LAB
The LAB Entity is responsible for collecting samples from the patients, generating a report based on the sample, and providing the report to doctors for further Investigation.

- **LAB** Entity has a 1:M relationship with **DOCTOR** because there will be multiple doctors submitting the samples of different patients but there will be only one Lab report generated for a single patient assigned to a specific doctor.

Lab Report
The Lab Report Entity is a generated report of collected lab reports from the patients

- **Lab Report** Entity is an associative entity established between **LAB** and **Record** entities. The relationship between these entities has an M:M relationship.
- **Lab Report** has attributes LabReportID, ReportGeneratedDate and ReportGeneratedTime.

Billing

The Billing entity is responsible for processing bills for the patient for multiple reasons such as Doctor fees, Room charges, and Insurance.

- **Billing** has a 1:M relationship with the **Patient** entity because there would be multiple bills for different patients but only one bill for a single patient.

Payment

The Payment entity is responsible for managing payments of the respective Bills generated.

- **Payment** has an M:1 relationship with the **Billing** entity because there would be multiple payments associated with each bill for a single patient.

Department

One hospital has many departments, and each department has many doctors.

- The identifier for a department is Department ID, and another attribute is Department Name. A department must belong to one hospital.

Record

The **RECORD** Entity is an important table from where the admin will be able to fetch all the details about a patient's visit to the doctor, from his appointment schedule to the doctor's name, the lab results associated with the patient, and the billing status of the patient.

- The **RECORD** Entity has a one-to-many relationship with both the DOCTOR Entity as well as the PATIENT Entity so that the Doctor can be associated with the Patient which he has treated.
- The **RECORD** Entity is also related to the LAB Entity via an associative Entity called LabReport, by which the patient's lab report can be accessed by the admin.
- Furthermore, the BILLING Entity is also linked with the **RECORD** entity so that the billing and payment information of the patient can be accessed by the admin when necessary.