Hospital Management System

BUAN 6320

Group 7

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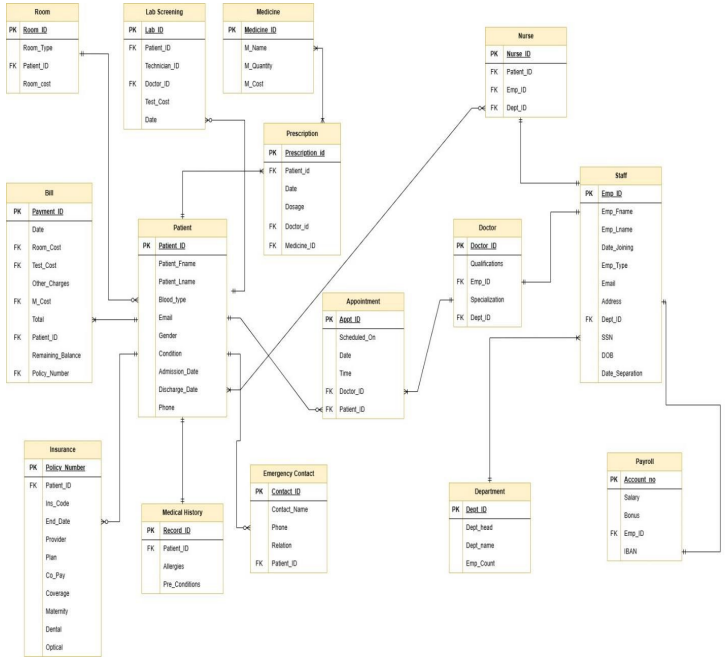
Introduction

- Real-time issues with mismanagement of scheduling and retrieving patient information
- Digitalization of medical records
- Quick and efficient access to patient information
- Easy storage and simultaneous updates

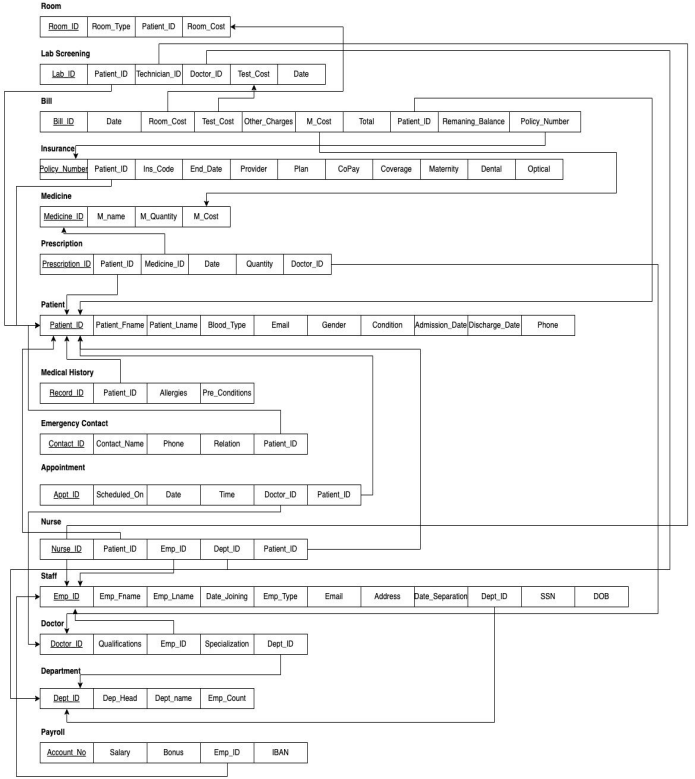
ER Diagram and Assumptions

- Tables include: Room, Bill, Lab Screening, Medicine, Prescription, Patient, Insurance, Medical History, Emergency Contact, Appointment, Doctor, Nurse, Staff, Department, and Payroll
- Room (1:M) Patient, Patient (1:M) Bill, Patient (1:M) Insurance, Patient (1:1) Medical_History, Lab_Screening (1:M) Patient, Patient (1:M) Emergency_Contact, Patient (1:M) Prescription, Prescription (M:M) Medicine, Appointment (1:M) Patient, Appointment (1:M) Doctor, Patient (1:M) Nurse, Doctor (1:1) Staff, Nurse (1:1) Staff, Payroll (1:1) Staff, Department (1:M) Staff,
- Example interpretation: A doctor may have one to many appointments and an appointment must be scheduled with one and only one doctor.



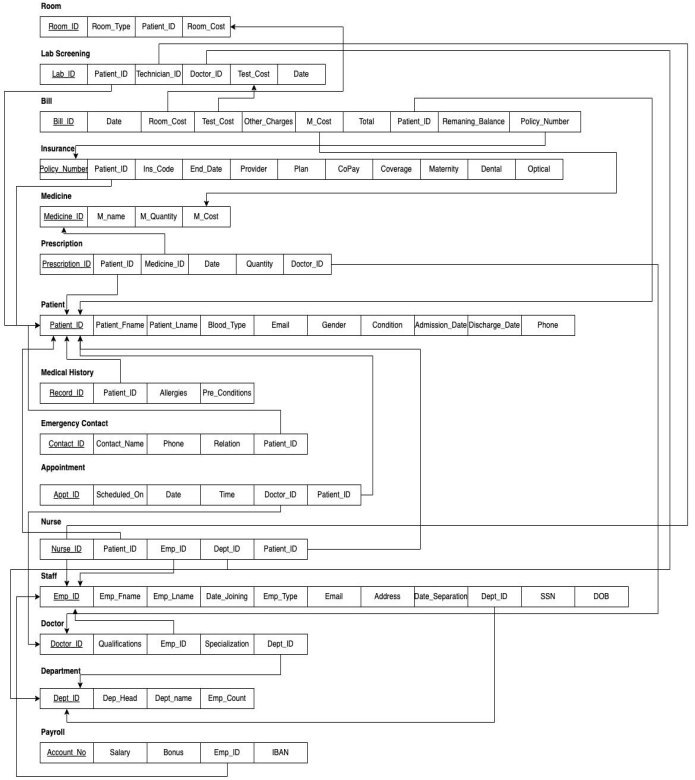
Relational Schema

- Room: Room_ID(PK), Room_Type, Patient_ID(FK), Room_Cost
- Lab Screening: Lab_ID(PK), Patient_ID(FK), Technician_ID, Doctor_ID(FK), Test_Cost, Date
- Insurance: Policy_Number(PK), Patient_ID(FK), Ins_Code, End_Date, Provider, Plan, Co_Pay, Coverage, Maternity, Dental, Optical
- Bill: Bill_ID(PK), Date, Room_Cost(FK), Test_Cost(FK), Other_Charges, M_Cost(FK), Total, Patient_ID(FK), Remaning_Balance, Policy_Number(FK)
- Medicine: Medicine_ID(PK), M_Name, M_Quantity, M_Cost
- Prescription: Prescription_ID(PK), Patient_ID(FK), Medicine_ID(FK), Date, Dosage, Doctor_ID(FK)
- Patient: Patient_ID(PK), Patient_FName, Patient_LName, Phone, Blood_Type, Email, Gender, Condition, Admission_Date, Discharge_Date



Relational Schema Cont.

- Medical_History: Record_ID(PK), Patient_ID(FK), Allergies, Pre_Conditions
- Emergency_Contact: Contact_ID(PK), Contact_Name, Phone, Relation, Patient_ID(FK)
- Appointment: Appt_ID(PK), Scheduled_On, Date, Time, Doctor_ID(FK), Patient_ID(FK)
- Nurse: Nurse_ID(PK), Patient_ID(FK), Emp_ID(FK), Dept_ID(FK)
- Staff: Emp_ID(PK), Emp_FName, Emp_LName, Date_Joining, Date_Separation, Emp_Type, Email, Address, Dept_ID(FK), SSN
- Doctor: Doctor_ID(PK), Qualifications, Emp_ID(FK), Specialization, Dept_ID(FK)
- Department: Dept_ID(PK), Dept_Head, Dept_Name, Emp_Count
- Payroll: Account_No(PK), Salary, Bonus, Emp_ID(FK), IBAN



Normalization and Functional Dependencies

- **Patient**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: Patient_ID → Patient_Fname, Patient_Lname, Phone, Blood_Type, Email, Gender, Condition, Admission_date, Discharge_date
- **Lab_Screening**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: (Lab_ID, Patient_ID) → Technician_ID, Doctor_ID, Test_Cost, Date
- **Medicine**: 1NF ✅, 2NF ❌, 3NF ❌
  - Resolving 2NF by creating Prescription Table which also resolves 3NF
  - FDs: Medicine_ID -> M_Name, M_cost, M_Quantity, Prescription_ID -> Medicine_ID, Patient_ID, Date, Dosage, Doctor_ID,
- **Emergency Contact**: 1NF ✅, 2NF ✅, 3NF✅
  - FDs: Contact_ID → Contact_Name, Phone, Relation, Patient_ID
- **Room**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: Room_id → Room_Type, Patient_ID, Room_Cost
- **Bill**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: Payment_ID, Patient_ID → Date, Room_Cost, Test_Cost,Other_Charges, M_Cost, Total

Normalization and Functional Dependencies Cont.

- **Staff**: 1NF ✅, 2NF ✅, 3NF ❌
  - Resolving 3NF by creating Department table
  - FDs: Emp_id → Emp_fname, Emp_lname, Date_Joining, Emp_Type, Email, Address, Date_separation, Dept_ID, SSN, Dept_ID → Dept_Name
- **Doctor**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: Doctor_ID → Qualifications, Patient_ID, Specialization, Emp_ID
- **Nurse**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: Nurse_ID → Patient_ID, Emp_ID
- **Medical History**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: Patient_ID → Allergies, Pre_Conditions
- **Insurance**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: Patient_ID → Policy_Number, Ins_Code, End_date, Provider, Plan, Co_Pay, Coverage, Maternity, Dental, Optical
- **Payroll**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: Emp_ID → Salary, Bonus, Account_No, IBAN
- **Appointment**: 1NF ✅, 2NF ✅, 3NF ✅
  - FDs: Appt_ID → Scheduled_On, Date, Time, Doctor_ID, Patient_id, Doctor_ID → Doctor_name, Doctor_specialization, Patient_id → Patient_name

Conclusion

- Help hospital staff to properly maintain information with secured access.
- Everyone will be in loop
- Designed to provide information which is compatible, accurate, flexible, and efficient
- Capable of storing a variety of information and large volume of data into the database
- Can be improved or upgraded to meet any criteria by the hospital

SQL Demo