Hospital Database Structure - Notes Summary

1. Staff-Related Tables

Table Name	Purpose	Key Fields	Relationships
Staff	Base table for all employees	StaffID (PK), Name, ContactInfo, JoiningDate	Parent table for all staff types
Doctor	Stores doctor-specific information	StaffID (PK/FK), ConsultationHours	Specializes from Staff
Nurse	Stores nurse-specific information	StaffID (PK/FK)	Specializes from Staff
AdminStaff	Administrative personnel	StaffID (PK/FK)	Specializes from Staff
LabTechnician	Laboratory personnel	StaffID (PK/FK)	Specializes from Staff
Pharmacist	Pharmacy personnel	StaffID (PK/FK)	Specializes from Staff
Department	Hospital departments	DeptID (PK), DeptName, Location	Referenced by Doctor_Department
Specialization	Medical specialties	SpecializationID (PK), Name, Description	Referenced by Doctor_Specialization
Doctor_Specialization	Connects doctors to specialties	DoctorID (PK/FK), SpecializationID (PK/FK)	Many-to-many relationship
Doctor_Department	Connects doctors to departments	DoctorID (PK/FK), DeptID (PK/FK)	Many-to-many relationship
Doctor_Supervision	Tracks mentorship relationships	SeniorDoctorID (PK/FK), JuniorDoctorID (PK/FK), StartDate	Recursive relationship on Doctor

2. Patient-Related Tables

Table Name	Purpose	Key Fields	Relationships
Patient	Base table for all patients	PatientID (PK), Name, DateOfBirth, Gender, Address, ContactInfo, RegisterDate	Parent table for patient types
InPatient	Patients admitted to hospital	PatientID (PK/FK), AdmissionDate, DischargeDate	Specializes from Patient
OutPatient	Patients not admitted	PatientID (PK/FK)	Specializes from Patient
Room	Hospital rooms information	RoomID (PK), RoomType ('ICU', 'Private', 'Shared'), DailyCharge	Contains beds
Bed	Individual beds in rooms	RoomID (PK/FK), BedNumber (PK), Status ('Occupied', 'Available')	Weak entity dependent on Room
InPatient_Room	Tracks room assignments	PatientID (PK/FK), RoomID (PK/FK), AssignmentDate (PK), ReleaseDate	Many-to-many with date tracking
Nurse_Assignment	Nurses assigned to rooms	NurseID (PK/FK), RoomID (PK/FK), AssignmentDate (PK), EndDate	Many-to-many with date tracking

3. Clinical Entities

Table Name	Purpose	Key Fields	Relationships

Table Name	Purpose	Key Fields	Relationships
Appointment	Scheduled meetings	AppointmentID (PK), PatientID (FK), DoctorID (FK), Date, Time, Status	Links patient to doctor
Prescription	Medicine orders	PrescriptionID (PK), PrescriptionDate	Referenced by Visit
Medicine	Drug information	MedicineID (PK), Name, Description, UnitPrice	Referenced by Prescription_Medicine
Prescription_Medicine	Medicines in a prescription	PrescriptionID (PK/FK), MedicineID (PK/FK), Dosage, Duration, Instructions	Many-to-many with attributes
Visit	Patient encounters	VisitID (PK), PatientID (FK), DoctorID (FK), VisitDate, VisitType, Notes, PrescriptionID (FK)	Central event in hospital system
Inventory	Medicine stock tracking	InventoryID (PK), MedicineID (FK), CurrentStock, ReorderThreshold	One-to-one with Medicine
Supplier	Medicine providers	SupplierID (PK), Name, ContactInfo, Address	Referenced by Inventory_Supplier
Inventory_Supplier	Links inventory to suppliers	InventoryID (PK/FK), SupplierID (PK/FK)	Many-to-many relationship

4. Laboratory Entities

Table Name	Purpose	Key Fields	Relationships
TestCategory	Types of lab tests	CategoryID (PK), CategoryName	Referenced by LabTest
LabTest	Available lab tests	TestID (PK), TestName, Description, Cost, CategoryID (FK)	Referenced by LabOrder_LabTest
LabOrder	Request for lab tests	OrderID (PK), OrderDate, VisitID (FK), TechnicianID (FK)	Referenced by LabOrder_LabTest
LabOrder_LabTest	Tests in an order	OrderID (PK/FK), TestID (PK/FK)	Many-to-many relationship
LabResult	Test findings	ResultID (PK), OrderID (FK), ResultDate, Report	One-to-one with LabOrder

5. Financial Entities

Table Name	Purpose	Key Fields	Relationships
Insurance	Patient insurance info	InsuranceID (PK), PatientID (FK), CompanyName, PolicyNumber, CoverageDetails	One-to-one with Patient
Bill	Invoice for a visit	BillID (PK), VisitID (FK), BillDate, TotalAmount, Status ('Paid', 'Pending')	One-to-one with Visit
BillItem	Line items in a bill	BillID (PK/FK), ItemID (PK), Description, Amount, ItemType	Weak entity dependent on Bill
InsuranceClaim	Insurance reimbursement	ClaimID (PK), BillID (FK), InsuranceID (FK), ClaimDate, ClaimAmount, Status	Links Bill to Insurance

Entity Relationships Overview

Staff Hierarchy

- **Staff** → specialized into → **Doctor**, **Nurse**, **AdminStaff**, **LabTechnician**, **Pharmacist**
- **Doctor** ↔ **Department** (many-to-many via Doctor_Department)
- **Doctor** ↔ **Specialization** (many-to-many via Doctor_Specialization)
- **Doctor** → supervises → **Doctor** (via Doctor_Supervision)

Patient Hierarchy

- **Patient** → specialized into → **InPatient**, **OutPatient**
- **InPatient** ↔ **Room** (many-to-many via InPatient_Room)
- **Room** → contains → **Bed** (one-to-many)
- **Nurse** ↔ **Room** (many-to-many via Nurse_Assignment)

Clinical Flow

- **Patient** → schedules → **Appointment** ← with ← **Doctor**
- **Patient** → makes → **Visit** ← attended by ← **Doctor**
- **Visit** → may generate → **Prescription**
- **Prescription** ↔ **Medicine** (many-to-many via Prescription_Medicine)
- **Medicine** → tracked in → **Inventory**
- **Inventory** ↔ **Supplier** (many-to-many via Inventory_Supplier)

Laboratory Flow

- **Visit** → may generate → **LabOrder** ← performed by ← **LabTechnician**
- **LabOrder** ↔ **LabTest** (many-to-many via LabOrder_LabTest)
- **LabOrder** → produces → **LabResult**
- **LabTest** → belongs to → **TestCategory**

Financial Flow

- **Patient** → has → **Insurance**
- **Visit** → generates → **Bill**
- **Bill** → contains → **BillItem** (multiple)
- **Bill** → may have → **InsuranceClaim** ← processed through ← **Insurance**

Table Creations

-- Hospital and Research Management System Database -- SQL Script for creating tables with relationships and sample data

-- Drop existing tables if they exist (in reverse order of dependencies) DROP TABLE IF EXISTS AdverseEvent; DROP TABLE IF EXISTS TrialMonitoring; DROP TABLE IF EXISTS TrialVisit; DROP TABLE IF EXISTS TrialEnrollment; DROP TABLE IF EXISTS Trial_Doctor; DROP TABLE IF EXISTS Trial_Drug; DROP TABLE IF EXISTS TrialDrugInventory; DROP TABLE IF EXISTS TrialDrug; DROP TABLE IF EXISTS ClinicalTrial; DROP TABLE IF EXISTS InsuranceClaim; DROP TABLE IF EXISTS BillItem; DROP TABLE IF EXISTS Bill; DROP TABLE IF EXISTS Insurance; DROP TABLE IF EXISTS LabResult; DROP TABLE IF EXISTS LabOrder_LabTest; DROP TABLE IF EXISTS LabOrder; DROP TABLE IF EXISTS TestCategory; DROP TABLE IF EXISTS LabTest; DROP TABLE IF EXISTS Inventory_Supplier; DROP TABLE IF EXISTS Supplier; DROP TABLE IF EXISTS Inventory; DROP TABLE IF EXISTS Prescription_Medicine; DROP TABLE IF EXISTS Medicine; DROP TABLE IF EXISTS Prescription; DROP TABLE IF EXISTS Visit; DROP TABLE IF EXISTS Appointment; DROP TABLE IF EXISTS Bed; DROP TABLE IF EXISTS InPatient_Room; DROP TABLE IF EXISTS Room; DROP TABLE IF EXISTS InPatient; DROP TABLE IF EXISTS OutPatient; DROP TABLE IF EXISTS Patient; DROP TABLE IF EXISTS Doctor_Department; DROP TABLE IF EXISTS Doctor_Specialization; DROP TABLE IF EXISTS Doctor_Supervision; DROP TABLE IF EXISTS Department; DROP TABLE IF EXISTS Specialization; DROP TABLE IF EXISTS Nurse_Assignment; DROP TABLE IF EXISTS Nurse; DROP TABLE IF EXISTS Doctor; DROP TABLE IF EXISTS AdminStaff; DROP TABLE IF EXISTS LabTechnician; DROP TABLE IF EXISTS Pharmacist; DROP TABLE IF EXISTS Staff;

-- 1. Staff-Related Entities CREATE TABLE Staff (StaffID VARCHAR(10) PRIMARY KEY, Name VARCHAR(100) NOT NULL, ContactInfo VARCHAR(100), JoiningDate DATE NOT NULL);

CREATE TABLE Doctor (StaffID VARCHAR(10) PRIMARY KEY, ConsultationHours VARCHAR(100), FOREIGN KEY (StaffID) REFERENCES Staff(StaffID));

CREATE TABLE Nurse (StaffID VARCHAR(10) PRIMARY KEY, FOREIGN KEY (StaffID) REFERENCES Staff(StaffID));

CREATE TABLE AdminStaff (StaffID VARCHAR(10) PRIMARY KEY, FOREIGN KEY (StaffID) REFERENCES Staff(StaffID));

CREATE TABLE LabTechnician (StaffID VARCHAR(10) PRIMARY KEY, FOREIGN KEY (StaffID) REFERENCES Staff(StaffID));

CREATE TABLE Pharmacist (StaffID VARCHAR(10) PRIMARY KEY, FOREIGN KEY (StaffID) REFERENCES Staff(StaffID));

CREATE TABLE Department (DeptID VARCHAR(10) PRIMARY KEY, DeptName VARCHAR(50) NOT NULL, Location VARCHAR(50));

CREATE TABLE Specialization (SpecializationID VARCHAR(10) PRIMARY KEY, Name VARCHAR(50) NOT NULL, Description TEXT);

CREATE TABLE Doctor_Specialization (DoctorID VARCHAR(10), SpecializationID VARCHAR(10), PRIMARY KEY (DoctorID, SpecializationID), FOREIGN KEY (DoctorID) REFERENCES Doctor(StaffID), FOREIGN KEY (SpecializationID) REFERENCES Specialization(SpecializationID));

CREATE TABLE Doctor_Department (DoctorID VARCHAR(10), DeptID VARCHAR(10), PRIMARY KEY (DoctorID, DeptID), FOREIGN KEY (DoctorID) REFERENCES Doctor(StaffID), FOREIGN KEY (DeptID) REFERENCES Department(DeptID));

CREATE TABLE Doctor_Supervision (SeniorDoctorID VARCHAR(10), JuniorDoctorID VARCHAR(10), StartDate DATE, PRIMARY KEY (SeniorDoctorID, JuniorDoctorID), FOREIGN KEY (SeniorDoctorID) REFERENCES Doctor(StaffID), FOREIGN KEY (JuniorDoctorID) REFERENCES Doctor(StaffID));

-- 2. Patient-Related Entities CREATE TABLE Patient (PatientID VARCHAR(10) PRIMARY KEY, Name VARCHAR(100) NOT NULL, DateOfBirth DATE, Gender VARCHAR(10), Address TEXT, ContactInfo VARCHAR(100), RegisterDate DATE NOT NULL);

CREATE TABLE InPatient (PatientID VARCHAR(10) PRIMARY KEY, AdmissionDate DATE NOT NULL, DischargeDate DATE, FOREIGN KEY (PatientID) REFERENCES Patient(PatientID));

CREATE TABLE OutPatient (PatientID VARCHAR(10) PRIMARY KEY, FOREIGN KEY (PatientID) REFERENCES Patient(PatientID));

CREATE TABLE Room (RoomID VARCHAR(10) PRIMARY KEY, RoomType VARCHAR(20) NOT NULL CHECK (RoomType IN ('ICU', 'Private', 'Shared')), DailyCharge DECIMAL(10, 2) NOT NULL);

CREATE TABLE Bed (RoomID VARCHAR(10), BedNumber INT, Status VARCHAR(20) NOT NULL CHECK (Status IN ('Occupied', 'Available')), PRIMARY KEY (RoomID, BedNumber), FOREIGN KEY (RoomID) REFERENCES Room(RoomID));

CREATE TABLE InPatient_Room (PatientID VARCHAR(10), RoomID VARCHAR(10), AssignmentDate DATE NOT NULL, ReleaseDate DATE, PRIMARY KEY (PatientID,

RoomID, AssignmentDate), FOREIGN KEY (PatientID) REFERENCES InPatient(PatientID), FOREIGN KEY (RoomID) REFERENCES Room(RoomID));

CREATE TABLE Nurse_Assignment (NurseID VARCHAR(10), RoomID VARCHAR(10), AssignmentDate DATE NOT NULL, EndDate DATE, PRIMARY KEY (NurseID, RoomID, AssignmentDate), FOREIGN KEY (NurseID) REFERENCES Nurse(StaffID), FOREIGN KEY (RoomID) REFERENCES Room(RoomID));

-- 3. Clinical Entities CREATE TABLE Appointment (AppointmentID VARCHAR(10) PRIMARY KEY, PatientID VARCHAR(10) NOT NULL, DoctorID VARCHAR(10) NOT NULL, Date DATE NOT NULL, Time TIME NOT NULL, Status VARCHAR(20) NOT NULL CHECK (Status IN ('Booked', 'Completed', 'Canceled')), FOREIGN KEY (PatientID) REFERENCES Patient(PatientID), FOREIGN KEY (DoctorID) REFERENCES Doctor(StaffID));

CREATE TABLE Prescription (PrescriptionID VARCHAR(10) PRIMARY KEY, PrescriptionDate DATE NOT NULL);

CREATE TABLE Medicine (MedicineID VARCHAR(10) PRIMARY KEY, Name VARCHAR(100) NOT NULL, Description TEXT, UnitPrice DECIMAL(10, 2) NOT NULL);

CREATE TABLE Prescription_Medicine (PrescriptionID VARCHAR(10), MedicineID VARCHAR(10), Dosage VARCHAR(50) NOT NULL, Duration VARCHAR(50), Instructions TEXT, PRIMARY KEY (PrescriptionID, MedicineID), FOREIGN KEY (PrescriptionID) REFERENCES Prescription(PrescriptionID), FOREIGN KEY (MedicineID) REFERENCES Medicine(MedicineID));

CREATE TABLE Visit (VisitID VARCHAR(10) PRIMARY KEY, PatientID VARCHAR(10) NOT NULL, DoctorID VARCHAR(10) NOT NULL, VisitDate DATE NOT NULL, VisitType VARCHAR(50), Notes TEXT, PrescriptionID VARCHAR(10), FOREIGN KEY (PatientID) REFERENCES Patient(PatientID), FOREIGN KEY (DoctorID) REFERENCES Doctor(StaffID), FOREIGN KEY (PrescriptionID) REFERENCES Prescription(PrescriptionID));

CREATE TABLE Inventory (InventoryID VARCHAR(10) PRIMARY KEY, MedicineID VARCHAR(10) UNIQUE, CurrentStock INT NOT NULL, ReorderThreshold INT NOT NULL, FOREIGN KEY (MedicineID) REFERENCES Medicine(MedicineID));

CREATE TABLE Supplier (SupplierID VARCHAR(10) PRIMARY KEY, Name VARCHAR(100) NOT NULL, ContactInfo VARCHAR(100), Address TEXT);

CREATE TABLE Inventory_Supplier (InventoryID VARCHAR(10), SupplierID VARCHAR(10), PRIMARY KEY (InventoryID, SupplierID), FOREIGN KEY (InventoryID) REFERENCES Inventory(InventoryID), FOREIGN KEY (SupplierID) REFERENCES Supplier(SupplierID));

-- 4. Laboratory Entities CREATE TABLE TestCategory (CategoryID VARCHAR(10) PRIMARY KEY, CategoryName VARCHAR(50) NOT NULL);

CREATE TABLE LabTest (TestID VARCHAR(10) PRIMARY KEY, TestName VARCHAR(100) NOT NULL, Description TEXT, Cost DECIMAL(10, 2) NOT NULL, CategoryID VARCHAR(10), FOREIGN KEY (CategoryID) REFERENCES TestCategory(CategoryID));

CREATE TABLE LabOrder (OrderID VARCHAR(10) PRIMARY KEY, OrderDate DATE NOT NULL, VisitID VARCHAR(10), TechnicianID VARCHAR(10), FOREIGN KEY (VisitID) REFERENCES Visit(VisitID), FOREIGN KEY (TechnicianID) REFERENCES LabTechnician(StaffID));

CREATE TABLE LabOrder_LabTest (OrderID VARCHAR(10), TestID VARCHAR(10), PRIMARY KEY (OrderID, TestID), FOREIGN KEY (OrderID) REFERENCES LabOrder(OrderID), FOREIGN KEY (TestID) REFERENCES LabTest(TestID));

CREATE TABLE LabResult (ResultID VARCHAR(10) PRIMARY KEY, OrderID VARCHAR(10) UNIQUE, ResultDate DATE NOT NULL, Report TEXT, FOREIGN KEY (OrderID) REFERENCES LabOrder(OrderID));

-- 5. Financial Entities CREATE TABLE Insurance (InsuranceID VARCHAR(10) PRIMARY KEY, PatientID VARCHAR(10) UNIQUE, CompanyName VARCHAR(100) NOT NULL, PolicyNumber VARCHAR(50) NOT NULL, CoverageDetails TEXT, FOREIGN KEY (PatientID) REFERENCES Patient(PatientID));

CREATE TABLE Bill (BillID VARCHAR(10) PRIMARY KEY, VisitID VARCHAR(10) UNIQUE, BillDate DATE NOT NULL, TotalAmount DECIMAL(10, 2) NOT NULL, Status VARCHAR(20) NOT NULL CHECK (Status IN ('Paid', 'Pending')), FOREIGN KEY (VisitID) REFERENCES Visit(VisitID));

CREATE TABLE BillItem (BillID VARCHAR(10), ItemID INT, Description VARCHAR(100) NOT NULL, Amount DECIMAL(10, 2) NOT NULL, ItemType VARCHAR(50) NOT NULL CHECK (ItemType IN ('ConsultationFee', 'TestCharge', 'MedicineCharge', 'RoomCharge')), PRIMARY KEY (BillID, ItemID), FOREIGN KEY (BillID) REFERENCES Bill(BillID));

CREATE TABLE InsuranceClaim (ClaimID VARCHAR(10) PRIMARY KEY, BillID VARCHAR(10) NOT NULL, InsuranceID VARCHAR(10) NOT NULL, ClaimDate DATE NOT NULL, ClaimAmount DECIMAL(10, 2) NOT NULL, Status VARCHAR(20) NOT NULL CHECK (Status IN ('Submitted', 'Approved', 'Rejected')), FOREIGN KEY (BillID) REFERENCES Bill(BillID), FOREIGN KEY (InsuranceID) REFERENCES Insurance(InsuranceID));

-- 6. Research Wing Entities -- Clinical Trial Data INSERT INTO ClinicalTrial VALUES ('CT001', 'Cardioprotective Effects of Drug X', '2023-01-01', '2024-01-01', 'Phase 3', 'Study on effectiveness of Drug X in reducing cardiovascular events'), ('CT002', 'Novel Treatment for Migraines', '2023-02-15', '2024-08-15', 'Phase 2', 'Evaluating efficacy of new migraine treatment'), ('CT003', 'Pediatric Asthma Management', '2023-03-10', NULL, 'Phase 4', 'Post-market study on asthma medication in children');

-- Trial Drug Data INSERT INTO TrialDrug VALUES ('TD001', 'Drug X', 'Experimental cardioprotective agent', 'Phase 3'), ('TD002', 'Migraine Relief Compound', 'Novel neural pathway inhibitor', 'Phase 2'), ('TD003', 'AsthmaEase Junior', 'Modified formulation for pediatric use', 'Phase 4');

-- Trial Drug Relationship INSERT INTO Trial_Drug VALUES ('CT001', 'TD001'), ('CT002', 'TD002'), ('CT003', 'TD003');

-- Trial Doctor Relationship INSERT INTO Trial_Doctor VALUES ('CT001', 'S001', 'Principal Investigator'), ('CT001', 'S002', 'Co-Investigator'), ('CT002', 'S002', 'Principal Investigator'), ('CT003', 'S003', 'Principal Investigator'), ('CT003', 'S009', 'Co-Investigator');

-- Trial Drug Inventory INSERT INTO TrialDrugInventory VALUES ('TDI001', 'TD001', 500, 'Pharmacy Storage Room A'), ('TDI002', 'TD002', 300, 'Pharmacy Storage Room B'), ('TDI003', 'TD003', 400, 'Pharmacy Storage Room A');

-- Trial Enrollment INSERT INTO TrialEnrollment VALUES ('TE001', 'P001', 'CT001', '2023-01-15', TRUE), ('TE002', 'P007', 'CT002', '2023-02-20', TRUE), ('TE003', 'P003', 'CT003', '2023-03-15', TRUE), ('TE004', 'P006', 'CT003', '2023-03-18', TRUE);

-- Trial Visit INSERT INTO TrialVisit VALUES ('TV001', 'TE001', 'S001', '2023-02-15', 'Patient reporting mild improvement'), ('TV002', 'TE001', 'S001', '2023-03-15', 'Continued improvement, no side effects'), ('TV003', 'TE002', 'S002', '2023-03-20', 'Patient reports 30% reduction in migraine frequency'), ('TV004', 'TE003', 'S003', '2023-04-15', 'Good response to treatment'), ('TV005', 'TE004', 'S003', '2023-04-18', 'Mild improvement in symptom control');

-- Trial Monitoring INSERT INTO TrialMonitoring VALUES ('TM001', 'TV001', '2023-02-15'), ('TM002', 'TV002', '2023-03-15'), ('TM003', 'TV003', '2023-03-20'), ('TM004', 'TV004', '2023-04-15'), ('TM005', 'TV005', '2023-04-18');

-- Adverse Event INSERT INTO AdverseEvent VALUES ('AE001', 'TV002', '2023-03-15', 'Mild headache', 'Mild'), ('AE002', 'TV003', '2023-03-20', 'Slight dizziness', 'Mild'), ('AE003', 'TV005', '2023-04-18', 'Nausea after medication', 'Moderate'); CREATE TABLE ClinicalTrial (TrialID VARCHAR(10) PRIMARY KEY, TrialName VARCHAR(100) NOT NULL, StartDate DATE NOT NULL, EndDate DATE, Phase VARCHAR(50), Description TEXT);

CREATE TABLE TrialDrug (DrugID VARCHAR(10) PRIMARY KEY, DrugName VARCHAR(100) NOT NULL, Description TEXT, CurrentPhase VARCHAR(50));

CREATE TABLE Trial_Drug (TrialID VARCHAR(10), DrugID VARCHAR(10), PRIMARY KEY (TrialID, DrugID), FOREIGN KEY (TrialID) REFERENCES ClinicalTrial(TrialID), FOREIGN KEY (DrugID) REFERENCES TrialDrug(DrugID));

CREATE TABLE Trial_Doctor (TrialID VARCHAR(10), DoctorID VARCHAR(10), Role VARCHAR(50) NOT NULL, PRIMARY KEY (TrialID, DoctorID), FOREIGN KEY (TrialID) REFERENCES ClinicalTrial(TrialID), FOREIGN KEY (DoctorID) REFERENCES Doctor(StaffID));

CREATE TABLE TrialDrugInventory (InventoryID VARCHAR(10) PRIMARY KEY, DrugID VARCHAR(10) UNIQUE, CurrentStock INT NOT NULL, Location VARCHAR(100), FOREIGN KEY (DrugID) REFERENCES TrialDrug(DrugID));

CREATE TABLE TrialEnrollment (EnrollmentID VARCHAR(10) PRIMARY KEY, PatientID VARCHAR(10) NOT NULL, TrialID VARCHAR(10) NOT NULL, EnrollmentDate DATE NOT NULL, ConsentForm BOOLEAN NOT NULL, FOREIGN KEY (PatientID) REFERENCES Patient(PatientID), FOREIGN KEY (TrialID) REFERENCES ClinicalTrial(TrialID));

CREATE TABLE TrialVisit (VisitID VARCHAR(10) PRIMARY KEY, EnrollmentID VARCHAR(10) NOT NULL, DoctorID VARCHAR(10) NOT NULL, VisitDate DATE NOT NULL, Notes TEXT, FOREIGN KEY (EnrollmentID) REFERENCES TrialEnrollment(EnrollmentID), FOREIGN KEY (DoctorID) REFERENCES Doctor(StaffID));

CREATE TABLE TrialMonitoring (MonitoringID VARCHAR(10) PRIMARY KEY, VisitID VARCHAR(10) UNIQUE, MonitoringDate DATE NOT NULL, FOREIGN KEY (VisitID) REFERENCES TrialVisit(VisitID));

CREATE TABLE AdverseEvent (EventID VARCHAR(10) PRIMARY KEY, VisitID VARCHAR(10) NOT NULL, EventDate DATE NOT NULL, Description TEXT, Severity VARCHAR(20) NOT NULL CHECK (Severity IN ('Mild', 'Moderate', 'Severe', 'Life-threatening')), FOREIGN KEY (VisitID) REFERENCES TrialVisit(VisitID));

-- Insert Sample Data

-- 1. Staff Data INSERT INTO Staff VALUES ('S001', 'Dr. John Smith', 'jsmith@hospital.com', '2018-05-15'), ('S002', 'Dr. Sarah Johnson', 'sjohnson@hospital.com', '2019-03-10'), ('S003', 'Dr. Michael Chen', 'mchen@hospital.com', '2017-11-22'), ('S004', 'Nurse Emma Wilson', 'ewilson@hospital.com', '2020-01-05'), ('S005', 'Nurse Robert Brown', 'rbrown@hospital.com', '2021-02-18'), ('S006', 'Admin Jane Doe', 'jdoe@hospital.com', '2019-09-30'), ('S007', 'Tech Lisa Park', 'lpark@hospital.com', '2020-07-12'), ('S008', 'Pharm David Lee', 'dlee@hospital.com', '2018-08-23'), ('S009', 'Dr. Amanda Miller', 'amiller@hospital.com', '2016-04-20'), ('S010', 'Nurse Kevin White', 'kwhite@hospital.com', '2021-05-17');

-- Doctor Data INSERT INTO Doctor VALUES ('S001', 'Mon-Wed 9AM-5PM'), ('S002', 'Tue-Thu 10AM-6PM'), ('S003', 'Mon-Fri 8AM-3PM'), ('S009', 'Wed-Fri 9AM-4PM');

-- Nurse Data INSERT INTO Nurse VALUES ('S004'), ('S005'), ('S010');

-- Admin Staff Data INSERT INTO AdminStaff VALUES ('S006');

-- Lab Technician Data INSERT INTO LabTechnician VALUES ('S007');

-- Pharmacist Data INSERT INTO Pharmacist VALUES ('S008');

-- Department Data INSERT INTO Department VALUES ('D001', 'Cardiology', 'Building A, Floor 2'), ('D002', 'Neurology', 'Building B, Floor 1'), ('D003', 'Pediatrics', 'Building A, Floor 3'), ('D004', 'Oncology', 'Building C, Floor 2');

-- Specialization Data INSERT INTO Specialization VALUES ('SP001', 'Cardiology', 'Heart and circulatory system'), ('SP002', 'Neurology', 'Brain and nervous system'), ('SP003', 'Pediatrics', 'Child healthcare'), ('SP004', 'Oncology', 'Cancer treatment');

-- Doctor Specialization INSERT INTO Doctor_Specialization VALUES ('S001', 'SP001'), ('S002', 'SP002'), ('S003', 'SP003'), ('S009', 'SP004');

-- Doctor Department INSERT INTO Doctor_Department VALUES ('S001', 'D001'), ('S002', 'D002'), ('S003', 'D003'), ('S009', 'D004');

-- Doctor Supervision INSERT INTO Doctor_Supervision VALUES ('S001', 'S002', '2020-01-15'), ('S003', 'S009', '2021-03-20');

-- 2. Patient Data INSERT INTO Patient VALUES ('P001', 'James Wilson', '1975-08-12', 'Male', '123 Main St, Cityville', 'jwilson@email.com', '2022-01-10'), ('P002', 'Maria Garcia', '1988-04-25', 'Female', '456 Oak Ave, Townsburg', 'mgarcia@email.com', '2022-02-15'), ('P003', 'Robert Johnson', '1965-11-03', 'Male', '789 Pine Rd, Villageton', 'rjohnson@email.com', '2022-03-05'), ('P004', 'Emily Chen', '1992-07-18', 'Female', '101 Cedar Ln, Hamletville', 'echen@email.com', '2022-03-20'), ('P005', 'Thomas Brown', '1980-02-22', 'Male', '202 Maple Dr, Boroughtown', 'tbrown@email.com', '2022-04-12'), ('P006', 'Sophia Kim', '1998-09-14', 'Female', '303 Birch Ave, Countryside', 'skim@email.com', '2022-05-08'), ('P007', 'William Davis', '1970-12-30', 'Male', '404 Elm St, Suburbia', 'wdavis@email.com', '2022-06-19'), ('P008', 'Olivia Martinez', '1985-06-05', 'Female', '505 Spruce Way, Downtown', 'omartinez@email.com', '2022-07-22');

-- InPatient Data INSERT INTO InPatient VALUES ('P001', '2023-01-15', '2023-01-20'), ('P003', '2023-02-05', '2023-02-15'), ('P005', '2023-03-10', NULL), ('P007', '2023-04-20', '2023-04-28');

-- OutPatient Data INSERT INTO OutPatient VALUES ('P002'), ('P004'), ('P006'), ('P008');

-- Room Data INSERT INTO Room VALUES ('R001', 'ICU', 1500.00), ('R002', 'Private', 800.00), ('R003', 'Shared', 400.00), ('R004', 'ICU', 1500.00), ('R005', 'Private', 800.00);

-- Bed Data INSERT INTO Bed VALUES ('R001', 1, 'Occupied'), ('R001', 2, 'Available'), ('R002', 1, 'Occupied'), ('R003', 1, 'Occupied'), ('R003', 2, 'Occupied'), ('R003', 3, 'Available'), ('R004', 1, 'Available'), ('R005', 1, 'Occupied');

-- InPatient Room Assignment INSERT INTO InPatient_Room VALUES ('P001', 'R002', '2023-01-15', '2023-01-20'), ('P003', 'R003', '2023-02-05', '2023-02-15'), ('P005', 'R001', '2023-03-10', NULL), ('P007', 'R005', '2023-04-20', '2023-04-28');

-- Nurse Assignment INSERT INTO Nurse_Assignment VALUES ('S004', 'R001', '2023-01-01', NULL), ('S004', 'R002', '2023-01-01', NULL), ('S005', 'R003', '2023-01-01', NULL), ('S010', 'R004', '2023-01-01', NULL), ('S010', 'R005', '2023-01-01', NULL);

-- 3. Clinical Entities -- Appointment Data INSERT INTO Appointment VALUES ('A001', 'P002', 'S001', '2023-05-10', '09:30:00', 'Completed'), ('A002', 'P004', 'S002', '2023-05-12', '14:00:00', 'Completed'), ('A003', 'P006', 'S003', '2023-05-15', '11:30:00', 'Completed'), ('A004', 'P008', 'S009', '2023-05-18', '10:00:00', 'Booked'), ('A005', 'P002', 'S001', '2023-06-10', '09:30:00', 'Booked');

-- Prescription Data INSERT INTO Prescription VALUES ('PR001', '2023-05-10'), ('PR002', '2023-05-12'), ('PR003', '2023-05-15'), ('PR004', '2023-01-16'), ('PR005', '2023-02-06');

-- Medicine Data INSERT INTO Medicine VALUES ('M001', 'Amoxicillin', 'Antibiotic', 15.99), ('M002', 'Lisinopril', 'ACE inhibitor for hypertension', 12.50), ('M003', 'Metformin', 'Anti-diabetic medication', 10.75), ('M004', 'Atorvastatin', 'Statin for cholesterol', 25.30), ('M005', 'Albuterol', 'Bronchodilator for asthma', 18.45), ('M006', 'Omeprazole', 'Proton pump inhibitor for acid reflux', 14.20);

-- Prescription Medicine Data INSERT INTO Prescription_Medicine VALUES ('PR001', 'M002', '10mg daily', '30 days', 'Take with food'), ('PR001', 'M004', '20mg daily', '30 days', 'Take at bedtime'), ('PR002', 'M003', '500mg twice daily', '60 days', 'Take with meals'), ('PR003', 'M005', '2 puffs every 4-6 hours', '30 days', 'As needed for breathing'), ('PR004', 'M001', '500mg 3 times daily', '7 days', 'Complete full course'), ('PR005', 'M006', '20mg daily', '30 days', 'Take before breakfast');

-- Visit Data INSERT INTO Visit VALUES ('V001', 'P002', 'S001', '2023-05-10', 'Regular Checkup', 'Patient reports feeling well, blood pressure slightly elevated', 'PR001'), ('V002', 'P004', 'S002', '2023-05-12', 'Follow-up', 'Headaches have decreased in frequency', 'PR002'), ('V003', 'P006', 'S003', '2023-05-15', 'New Complaint', 'Patient experiencing shortness of breath', 'PR003'), ('V004', 'P001', 'S001', '2023-01-15', 'Emergency', 'Patient admitted with chest pain', 'PR004'), ('V005', 'P003', 'S003', '2023-02-05', 'Regular Checkup', 'Routine pediatric examination', 'PR005'), ('V006', 'P005', 'S009', '2023-03-10', 'Emergency', 'Patient admitted with severe abdominal pain', NULL), ('V007', 'P007', 'S002', '2023-04-20', 'New Complaint', 'Patient reporting persistent migraines', NULL);

-- Inventory Data INSERT INTO Inventory VALUES ('INV001', 'M001', 200, 50), ('INV002', 'M002', 300, 75), ('INV003', 'M003', 250, 60), ('INV004', 'M004', 180, 40), ('INV005', 'M005', 150, 30), ('INV006', 'M006', 220, 55);

-- Supplier Data INSERT INTO Supplier VALUES ('SUP001', 'PharmaPro Inc.', 'contact@pharmapro.com', '100 Industry Blvd, Pharmatown'), ('SUP002', 'MedSupply Co.', 'info@medsupply.com', '200 Commerce Dr, Medicity'), ('SUP003', 'Health Distributors', 'service@healthdist.com', '300 Trade St, Healthville');

-- Inventory Supplier Data INSERT INTO Inventory_Supplier VALUES ('INV001', 'SUP001'), ('INV002', 'SUP001'), ('INV003', 'SUP002'), ('INV004', 'SUP002'), ('INV005', 'SUP003'), ('INV006', 'SUP003');

-- 4. Laboratory Entities -- Test Category Data INSERT INTO TestCategory VALUES ('TC001', 'Blood Test'), ('TC002', 'Imaging'), ('TC003', 'Urine Test'), ('TC004', 'Microbiology');

-- Lab Test Data INSERT INTO LabTest VALUES ('LT001', 'Complete Blood Count', 'Measures different components of blood', 50.00, 'TC001'), ('LT002', 'Lipid Panel', 'Measures cholesterol and triglycerides', 65.00, 'TC001'), ('LT003', 'Chest X-Ray', 'Imaging of chest cavity', 120.00, 'TC002'), ('LT004', 'MRI Brain', 'Magnetic resonance imaging of brain', 450.00, 'TC002'), ('LT005', 'Urinalysis', 'Physical, chemical, and microscopic examination of urine', 35.00, 'TC003'), ('LT006', 'Blood Culture', 'To detect bacteria in blood', 85.00, 'TC004');

-- Lab Order Data INSERT INTO LabOrder VALUES ('LO001', '2023-05-10', 'V001', 'S007'), ('LO002', '2023-05-12', 'V002', 'S007'), ('LO003', '2023-05-15', 'V003', 'S007'), ('LO004', '2023-01-15', 'V004', 'S007'), ('LO005', '2023-02-05', 'V005', 'S007');

-- Lab Order Test Data INSERT INTO LabOrder_LabTest VALUES ('LO001', 'LT001'), ('LO001', 'LT002'), ('LO002', 'LT004'), ('LO003', 'LT003'), ('LO004', 'LT001'), ('LO004', 'LT003'), ('LO005', 'LT001'), ('LO005', 'LT005');

-- Lab Result Data INSERT INTO LabResult VALUES ('LR001', 'LO001', '2023-05-11', 'CBC normal, slightly elevated LDL cholesterol'), ('LR002', 'LO002', '2023-05-13', 'MRI shows no abnormalities'), ('LR003', 'LO003', '2023-05-16', 'X-ray indicates mild pneumonia'), ('LR004', 'LO004', '2023-01-16', 'CBC shows elevated white blood cell count, X-ray normal'), ('LR005', 'LO005', '2023-02-06', 'All tests within normal range');

-- 5. Financial Entities -- Insurance Data INSERT INTO Insurance VALUES ('INS001', 'P001', 'HealthGuard', 'HG12345', 'Covers 80% of all medical expenses'), ('INS002', 'P002', 'MediShield', 'MS67890', 'Covers 85% of all medical expenses'), ('INS003', 'P003', 'FamilyCare', 'FC24680', 'Covers 75% of all medical expenses'), ('INS004', 'P004', 'WellProtect', 'WP13579', 'Covers 90% of all medical expenses');

-- Bill Data INSERT INTO Bill VALUES ('B001', 'V001', '2023-05-10', 175.99, 'Paid'), ('B002', 'V002', '2023-05-12', 515.00, 'Paid'), ('B003', 'V003', '2023-05-15', 138.45, 'Pending'), ('B004', 'V004', '2023-01-20', 7565.99, 'Paid'), ('B005', 'V005', '2023-02-15', 3049.20, 'Paid');

-- Bill Item Data INSERT INTO BillItem VALUES ('B001', 1, 'Consultation Fee', 60.00, 'ConsultationFee'), ('B001', 2, 'Complete Blood Count', 50.00, 'TestCharge'), ('B001', 3, 'Lipid Panel', 65.00, 'TestCharge'), ('B001', 4, 'Prescription Medications', 0.99, 'MedicineCharge'), ('B002', 1, 'Consultation Fee', 60.00, 'ConsultationFee'), ('B002', 2, 'MRI Brain', 450.00, 'TestCharge'), ('B002', 3, 'Prescription Medications', 5.00, 'MedicineCharge'), ('B003', 1, 'Consultation Fee', 60.00, 'ConsultationFee'), ('B003', 2, 'Chest X-Ray', 120.00, 'TestCharge'), ('B003', 3, 'Prescription Medications', 18.45, 'MedicineCharge'), ('B004', 1, 'ICU Room Charge (5 days)', 7500.00, 'RoomCharge'), ('B004', 2, 'Consultation Fee', 60.00, 'ConsultationFee'), ('B004', 3, 'Complete Blood Count', 50.00, 'TestCharge'), ('B004', 4, 'Chest X-Ray', 120.00, 'TestCharge'), ('B004', 5, 'Prescription Medications', 15.99, 'MedicineCharge'), ('B005', 1, 'Shared Room Charge (10 days)', 4000.00, 'RoomCharge'), ('B005', 2, 'Consultation Fee', 60.00, 'ConsultationFee'), ('B005', 3, 'Complete Blood Count', 50.00, 'TestCharge'), ('B005', 4, 'Urinalysis', 35.00, 'TestCharge'), ('B005', 5, 'Prescription Medications', 14.20, 'MedicineCharge');