Project Deliverable - Sprint 3

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Our group decided to build out the tables in three phases. Phase One was to define all table columns and their primary keys (green tables). Phase Two was to define all foreign key relations (yellow tables). Phase Three was to add any remaining constraints required (red tables).

DDL Language

CREATE TABLE Employee (Employee_ID INT AUTO_INCREMENT PRIMARY KEY, Address_ID INT NOT NULL, First_Name VARCHAR(40) NOT NULL, Last_Name VARCHAR(40) NOT NULL, Email VARCHAR(40), Phone VARCHAR(12) NOT NULL)	**create Employee table**
CREATE TABLE Address (Address_ID INT AUTO_INCREMENT PRIMARY KEY, Street VARCHAR(100) NOT NULL, City VARCHAR(50) NOT NULL, State VARCHAR(12) NOT NULL, Zip INT NOT NULL)	**create Address Table**
CREATE TABLE DonorContact (Donor_Contact_ID INT(11) PRIMARY KEY, Primary_phone VARCHAR(12) NOT NULL, Primary_email VARCHAR(40) NOT NULL, Donor_ID varchar(40) NOT NULL, Address_ID int(11) NOT NULL)	**create DonorContact Table**
CREATE TABLE Donor (Donor_ID varchar(40) PRIMARY KEY, First_name varchar(100) NOT NULL, Last_name varchar(100) NOT NULL, DOB date, Gender varchar(6))	**create Donor Table**
CREATE TABLE Donation (Donation_ID int(11) PRIMARY KEY, Collection_DateTime datetime, Statu varchar(12) NOT NULL Donor_ID varchar(100), Donation_Center_ID int(11) NOT NULL)	**create Donation Table**
CREATE TABLE Preparation (Preparation_ID int(11) AUTO_INCREMENT PRIMARY KEY, Separation_Method varchar(20),	**create Preparation Table**

Preparation_QC tinyint(1) NOT NULL)	
CREATE TABLE TestPanel (Test_Panel_ID int(11) AUTO_INCREMENT PRIMARY KEY, Comments varchar(400), Status varchar(8), Completed_Date datetime, Preparation_ID int(11) NOT NULL, Test_ID int(11) NOT NULL)	**create TestPanel Table**
CREATE TABLE Test (Test_ID int(11) AUTO_INCREMENT PRIMARY KEY, Test_Name varchar(20) NOT NULL, Result varchar(12) NOT NULL, Test_QC tinyint(1) NOT NULL)	**create Test Table**
CREATE TABLE DonationCenter (Donation_Center_ID varchar(100) PRIMARY KEY, Name varchar(40) NOT NULL, Phone varchar(12) NOT NULL, Email varchar(40) NOT NULL, Fax int(11), address_ID int(11) NOT NULL, Managing_Employee_ID int(11) NOT NULL)	**create DonationCenter Table**
CREATE TABLE Shipment (Shipment_ID int(11) AUTO_INCREMENT PRIMARY KEY, Transport_Mode varchar(40), Transport_DateTime datetime NOT NULL, Blood_ID int(11) NOT NULL, Receiving_Facility_ID int(11) NOT NULL)	**create Shipment Table**
CREATE TABLE ReceivingFacility (Receiving_Facility_ID INT AUTO_INCREMENT PRIMARY KEY, Address_ID INT NOT NULL, Facility_Type VARCHAR(40) NOT NULL, Name VARCHAR(40) NOT NULL, Email VARCHAR(40) NOT NULL, Phone VARCHAR(12) NOT NULL, Fax INT NOT NULL)	**Create ReceivingFacility table**
CREATE TABLE Blood (Blood_ID INT AUTO_INCREMENT PRIMARY KEY, Donation_ID INT NOT NULL, Subtype_Discriminator VARCHAR(4) NOT NULL, Blood_Type VARCHAR(2) NOT NULL, Volume DECIMAL(6, 2) NOT NULL, Storage_Temp DECIMAL(4, 2) NOT NULL, Exp_Date DATE);	**Create Blood table (need to add constraints on blood type and subtype discriminator).**

CREATE TABLE WholeRBC (
    WBC_ID INT AUTO_INCREMENT PRIMARY KEY,
    Blood_ID INT NOT NULL,
    Rh Char(1) NOT NULL,
    Hgb DECIMAL(4,2) NOT NULL,
    Hct DECIMAL(4,2) NOT NULL
);
	Create WholeRBC table

CREATE TABLE PRBC (
    PRBC_ID INT AUTO_INCREMENT PRIMARY KEY,
    Blood_ID INT NOT NULL,
    Rh Char(1) NOT NULL,
    Hgb DECIMAL(4,2) NOT NULL,
    Hct DECIMAL(4,2) NOT NULL,
    Irradiated BOOLEAN NOT NULL,
    Leukocyte_Reduced BOOLEAN NOT NULL
);
	Create PRBC table

CREATE TABLE PLT_ID (
    PLT_ID INT AUTO_INCREMENT PRIMARY KEY,
    Blood_ID INT NOT NULL,
    Plt DECIMAL(4,2) NOT NULL
);
	Create Plt table

CREATE TABLE Plasma (
    PLSM_ID INT AUTO_INCREMENT PRIMARY KEY,
    Blood_ID INT NOT NULL,
    Protien_Level DECIMAL(4,2) NOT NULL,
    FFP BOOLEAN NOT NULL DEFAULT TRUE
);
	Create Plasma table

-- WholeRBC Foreign Key ALTER TABLE WholeRBC ADD CONSTRAINT FK_WholeRBC_Blood FOREIGN KEY (Blood_ID) REFERENCES Blood(Blood_ID) -- PRBC Foreign Key ALTER TABLE PRBC ADD CONSTRAINT FK_PRBC_Blood FOREIGN KEY (Blood_ID) REFERENCES Blood(Blood_ID) -- Plasma Foreign Key ALTER TABLE Plasma ADD CONSTRAINT FK_Plasma_Blood FOREIGN KEY (Blood_ID) REFERENCES Blood(Blood_ID) -- Platelets Foreign Key ALTER TABLE PLT ADD CONSTRAINT FK_Platelets_Blood FOREIGN KEY (Blood_ID) REFERENCES Blood(Blood_ID);	
ALTER TABLE Employee ADD CONSTRAINT FK_Employee_Address FOREIGN KEY (Address_ID) REFERENCES Address(Address_ID);	
ALTER TABLE DonorContact	

ADD CONSTRAINT FK_DonorContact_Donor FOREIGN KEY (Donor_ID) REFERENCES Donor(Donor_ID);	
ALTER TABLE DonorContact ADD CONSTRAINT FK_DonorContact_Address FOREIGN KEY (Address_ID) REFERENCES Address(address_ID);	
ALTER TABLE DonorContact ADD CONSTRAINT UQ_DonorContact_DonorID UNIQUE (Donor_ID);	**Ensures 1:1**
ALTER TABLE Donation ADD CONSTRAINT UQ_Donotion_Preparation UNIQUE (Preparation_ID);	**Ensures 1:1**
ALTER TABLE ReceivingFacility ADD CONSTRAINT FK_ReceivingFacility_Address FOREIGN KEY (Address_ID) REFERENCES Address(Address_ID);	
ALTER TABLE PLTS ADD CONSTRAINT FK_PLTS_Blood FOREIGN KEY (Blood_ID) REFERENCES Blood(Blood_ID);	
ALTER TABLE WRBC ADD CONSTRAINT FK_WRBC_Blood FOREIGN KEY (Blood_ID) REFERENCES Blood(Blood_ID);	
ALTER TABLE PRBC ADD CONSTRAINT FK_PRBC_Blood FOREIGN KEY (Blood_ID) REFERENCES Blood(Blood_ID);	
ALTER TABLE PLSM ADD CONSTRAINT FK_PLSM_Blood FOREIGN KEY (Blood_ID) REFERENCES Blood(Blood_ID);	
ALTER TABLE Blood ADD CONSTRAINT FK_Blood_Donation FOREIGN KEY (Donation_ID) REFERENCES Donation(Donation_ID);	

ALTER TABLE DonationCenter ADD CONSTRAINT UQ_DonationCenter_Manager UNIQUE (Manager_Employee_ID);	**Manager can only manage one center at a time**
ALTER TABLE Shipment ADD CONSTRAINT UQ_Shipment_Blood_ReceivingFacility UNIQUE (Blood_ID, Receiving_Facility_ID);	**Associative**
ALTER TABLE TestPanel ADD CONSTRAINT UQ_TestPanel_Preparation_Test UNIQUE (Preparation_ID, Test_Panel_ID);	**Associative**

ALTER TABLE Blood ADD CONSTRAINT Subtype_Discriminator_check CHECK (Subtype_Discriminator IN ('WRBC', 'PRBC', 'PLSM', 'PLTS'));	**Blood (supertype discriminator)**
ALTER TABLE Blood ADD CONSTRAINT CK_Blood_Type CHECK (Blood_Type IN ('A', 'B', 'AB', 'O'));	**Blood Type**
ALTER TABLE group7.Blood ADD CONSTRAINT Blood_CHECK_2 CHECK (‘Volume’ <= 0.5);	**Blood volume**
Constraint ALTER TABLE Donor ADD CONSTRAINT CK_Donor_Gender CHECK (Gender IN ('Male', 'Female', 'Other'));	**Gender**
ALTER TABLE ReceivingFacility ADD CONSTRAINT UQ_ReceivingFacility_Phone UNIQUE (Phone);	
ALTER TABLE ReceivingFacility ADD CONSTRAINT UQ_ReceivingFacility_Email UNIQUE (Email);	
ALTER TABLE ReceivingFacility ADD CONSTRAINT UQ_ReceivingFacility_Fax UNIQUE (Fax);	
ALTER TABLE group7.Employee ADD CONSTRAINT Employee_UNIQUE UNIQUE KEY (Phone); ALTER TABLE group7.DonorContact ADD CONSTRAINT DonorContact_UNIQUE UNIQUE KEY (Primary_phone);	
ALTER TABLE Donation ADD CONSTRAINT Status_check CHECK (Status IN ('Pending', 'Completed', 'Inconclusive'));	

Constraint Testing

Test for Unique Constraint on DonationCenter

INSERT INTO DonationCenter (Donation_Center_ID, Name, Phone, Email, Fax, Address_ID, Managing_Employee_ID) VALUES (1, 'Center A', '1234567890', 'centerA@example.com', '1234567891', 1, 101);	**Finish time Thu Oct 24 13:40:12 EDT 2024**
-- Negative Test: Should fail because Manager_Employee_ID is not unique INSERT INTO DonationCenter (Donation_Center_ID, Name, Phone, Email, Fax, Address_ID, Managing_Employee_ID) VALUES (2, 'Center B', '123-456-7892', 'centerB@example.com', '1234567893', 1, 101);	**SQL Error [1062] [23000]: (conn=50) Duplicate entry '101' for key 'DonationCenter_UNIQUE'**

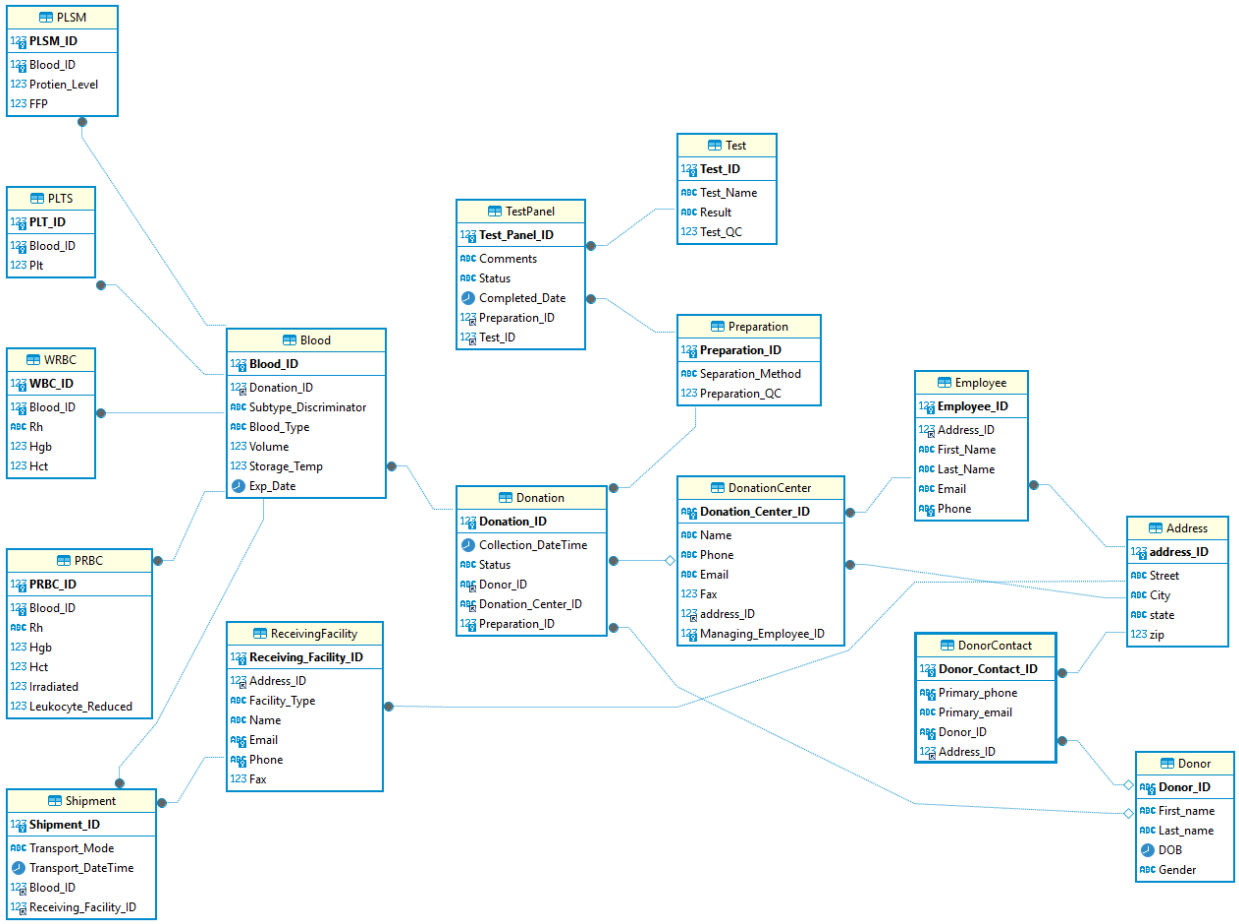
Test for Check Constraint on Blood

INSERT INTO Blood (Blood_ID, Donation_ID, Subtype_Discriminator, Blood_Type, Volume, Storage_Temp, Exp_Date) VALUES (1, 1001, 'PRBC', 'A', 450.00, , '2025-01-01');	**Finish time Thu Oct 24 14:09:11 EDT 2024**
INSERT INTO Blood (Blood_ID, Donation_ID, Subtype_Discriminator, Blood_Type, Volume, Storage_Temp, Exp_Date) VALUES (1, 1001, 'PRBC', 'X', 450.00, 0, '2025-01-01');	**SQL Error [4025] [23000]: (conn=50) CONSTRAINT `CK_Blood_Type` failed for `group7`.`Blood`**

ERDs

Dbeaver ERD Model:

[DBeaver ERD Model]



Note that we did change the relation between Donation and DonationCenter to be 1:M from 1:1, as a donation center can accommodate multiple donations. These updated ERD diagrams can be found here:

[Visio Link]

[SVG Link]