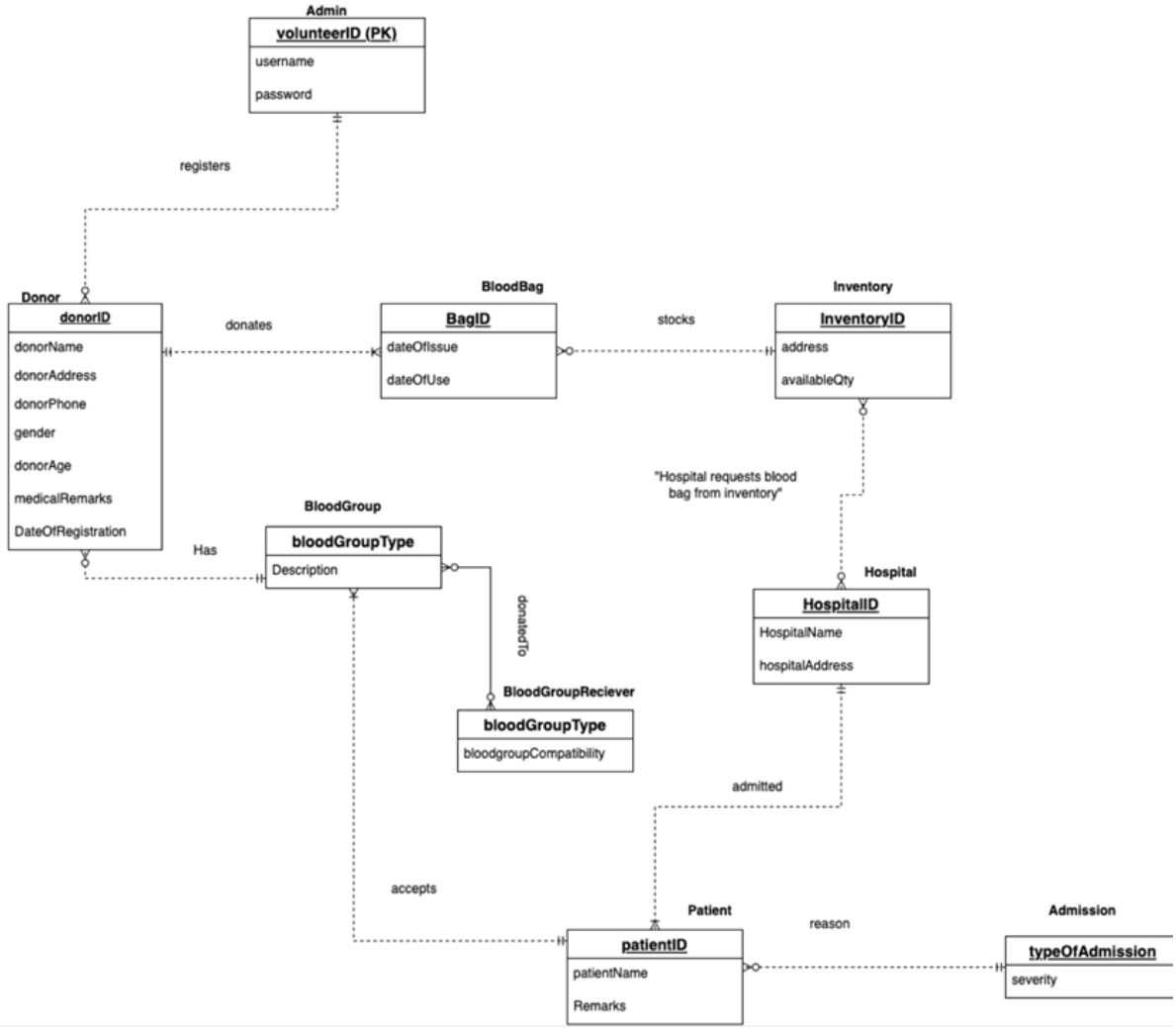
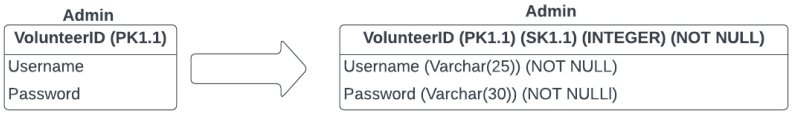
CS 5200 Hands-on #2: Design



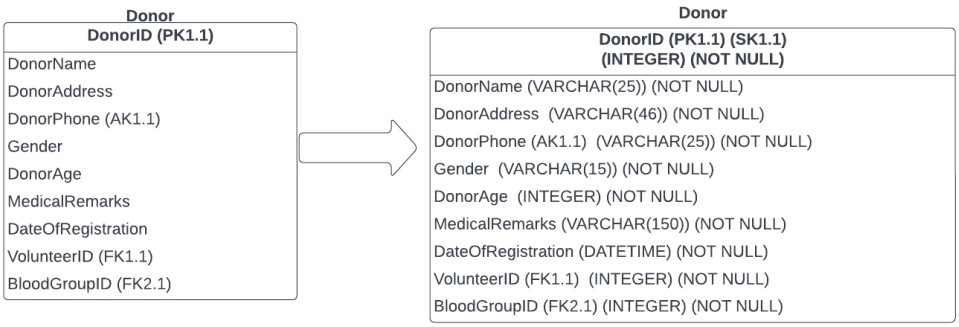
2. (40pt) Transformation Process from ER model to Database Design

(20pt) For each entity, describe the transformation from an entity to a table



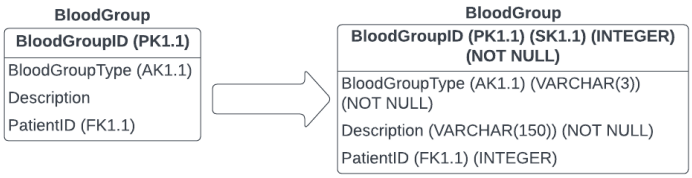
Admin

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
VolunteerID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
Username	VARCHAR(25)	NOT NULL	NONE	ALTERNATE KEY	UNIQUE (PK1.1)
Password	VARCHAR(30)	NOT NULL	NONE	NONE	NONE



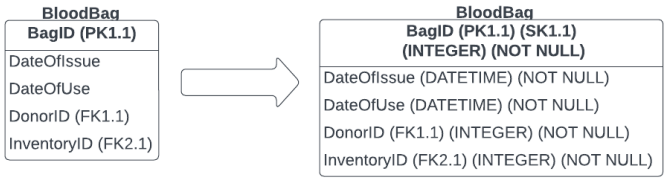
Donor

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
DonorID	INTEGER	NONE	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
DonorName	VARCHAR(25)	NOT NULL	NONE	NONE	NONE
DonorAddress	VARCHAR(46)	NOT NULL	NONE	NONE	USPS ADDRESS
DonorPhone	INTEGER	NOT NULL	NONE	NONE	ALTERNATE KEY (AK1.1)
Gender	VARCHAR(15)	NOT NULL	NONE	NONE	NONE
DonorAge	INTEGER	NOT NULL	NONE	NONE	NONE
MedicalRemarks	VARCHAR(150)	NOT NULL	NONE	NONE	NONE
DateOfRegistration	DATETIME	NOT NULL	NONE	NONE	NONE
VolunteerID	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS ADMIN (FK1.1)
BloodGroupID	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS BLOODGROUP (FK2.1)



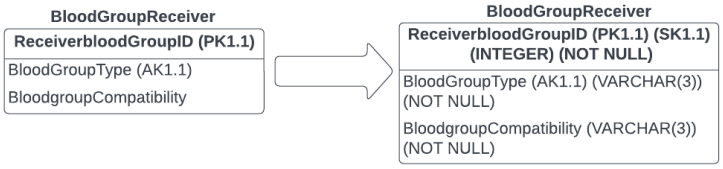
BloodGroup

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
BloodGroupID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
BloodGroupType	VARCHAR(3)	NOT NULL	NONE	ALTERNATE KEY	(AK1.1)
Description	VARCHAR(150)	NOT NULL	NONE	NONE	NONE
PatientID	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS PATIENT (FK1.1)



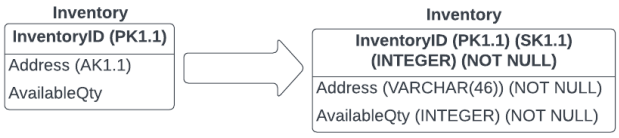
BloodBag

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
BagID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
DateOfIssue	DATETIME	NOT NULL	NONE	NONE	NONE
DateOfUse	DATETIME	NOT NULL	NONE	NONE	NONE
DonorID	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS DONOR (FK1.1)
InventoryID	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS INVENTORY (FK2.1)



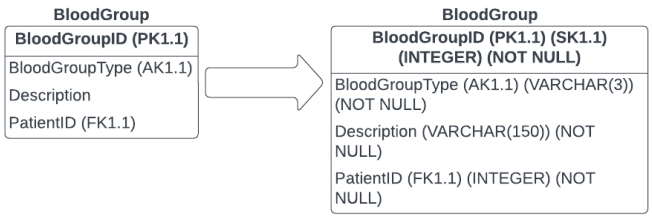
BloodGroupReceiver

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
ReceiverbloodGroupID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
BloodGroupType	VARCHAR(3)	NOT NULL	NONE	ALTERNATE KEY	(AK1.1)
BloodgroupCompatibility	VARCHAR(3)	NOT NULL	NONE	NONE	NONE



Inventory

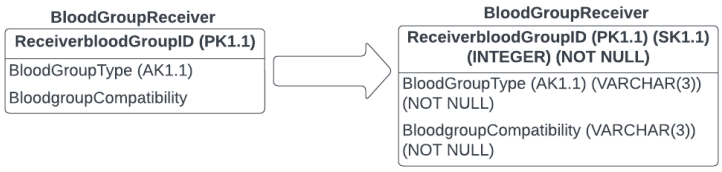
Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
InventoryID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
Address	VARCHAR(46)	NOT NULL	NONE	NONE	(AK1.1)
AvailbleQty	INTEGER	NOT NULL	NONE	NONE	NONE



BloodGroup

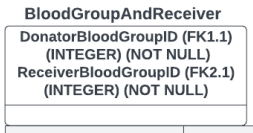
Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
BloodGroupID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
BloodGroupType	VARCHAR(3)	NOT NULL	NONE	ALTERNATE KEY	(AK1.1)
Description	VARCHAR(150)	NOT NULL	NONE	NONE	NONE
PatientID	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS PATIENT (FK1.1)

BloodGroupReceiver BloodGroupReceiver



BloodGroupReceiver

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
ReceiverbloodGroupID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
BloodGroupType	VARCHAR(3)	NOT NULL	NONE	ALTERNATE KEY	UNIQUE (AK1.1)
BloodgroupCompatibility	VARCHAR(3)	NOT NULL	NONE	NONE	NONE

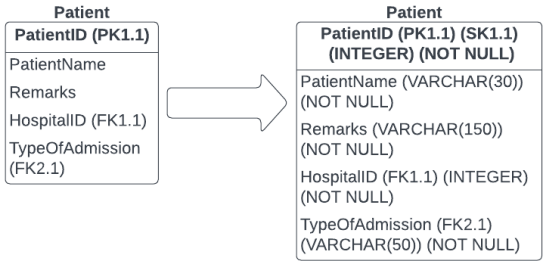


BloodGroupAndReceiver

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
DonatorBloodGroupID (FK1.1)	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS BLOODGROUP (FK1.1)
ReceiverBloodGroupID (FK2.1)	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS BLOODGROUPRECEIVER (FK2.1)

Patient Patient

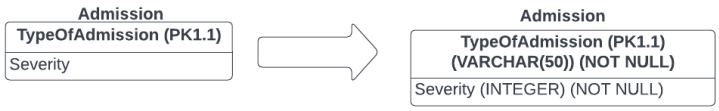
					(FK2.1)



Patient

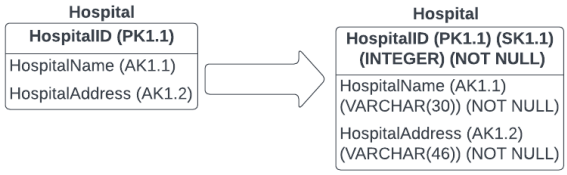
Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
PatientID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
PatientName	VARCHAR(30)	NOT NULL	None	NONE	NONE
Remarks	VARCHAR(150)	NOT NULL	NONE	NONE	NONE
HospitalID	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS HOSPITAL (FK1.1)
TypeOfAdmission	VARCHAR(50)	NOT NULL	NONE	FOREIGN KEY	REFERS ADMISSION (FK2.1)

Admission Admission



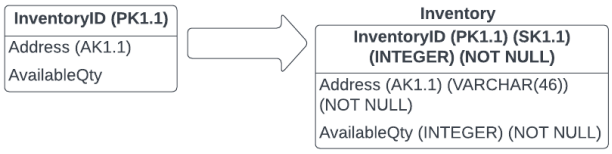
Admission

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
TypeOfAdmission	VARCHAR(50)	NOT NULL	NONE	PRIMARY KEY	UNIQUE (PK1.1)
Severity	INTEGER	NOT NULL	NONE	NONE	NONE



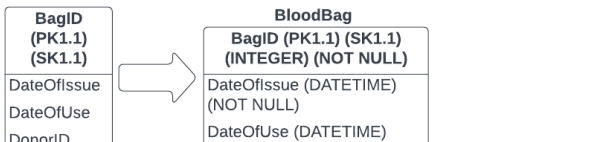
Hospital

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
HospitalID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
HospitalName	VARCHAR(30)	NOT NULL	NONE	ALTERNATE KEY	(AK1.1) UNIQUE
HospitalAddress	VARCHAR(46)	NOT NULL	NONE	ALTERNATE KEY	(AK1.2) UNIQUE



Inventory

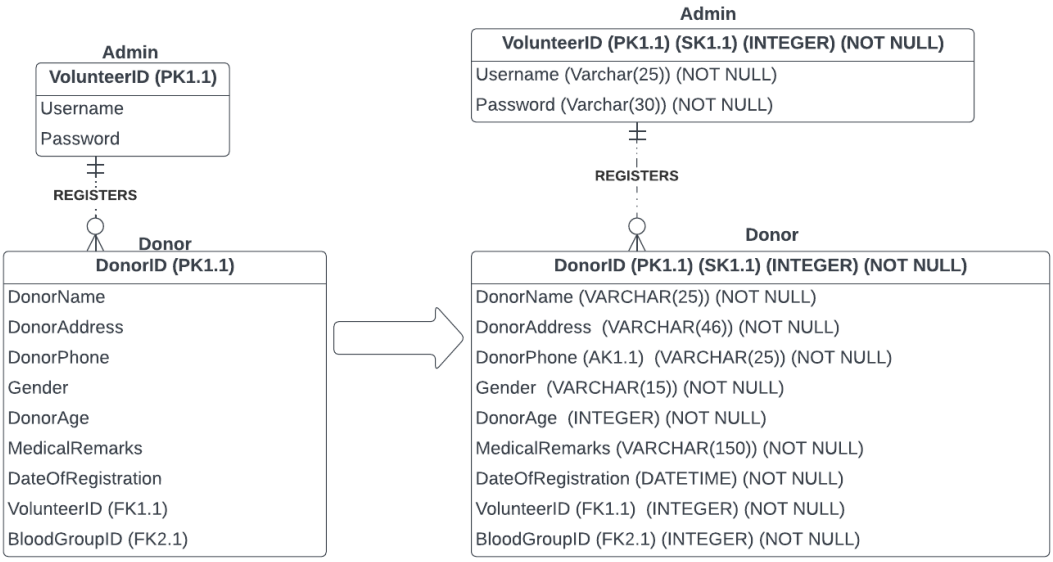
Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
InventoryID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
Address	VARCHAR(46)	NOT NULL	NONE	ALTERNATE KEY	(AK1.1) UNIQUE
AvailbleQty	INTEGER	NOT NULL	NONE	NONE	NONE



BloodBag

Column Name	Data Type	Null Status	Default Value	Key Constraint	Remarks
BagID	INTEGER	NOT NULL	1	PRIMARY KEY	SURROGATE KEY IDENTITY (1,1) (PK1.1)
DateOfIssue	DATETIME	NOT NULL	NONE	NONE	MUST SMALLER THAN/EQUAL TO DateOfUse
DateOfUse	DATETIME	NOT NULL	NONE	NONE	MUST LARGER THAN/EQUAL TO DateOfIssue
DonorID	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS DONOR (FK1.1)
InventoryID	INTEGER	NOT NULL	NONE	FOREIGN KEY	REFERS INVENTORY (FK2.1)

(20pt) For each relationship, 1) present a relationship between entities to a relationship between tables in the UML format and then



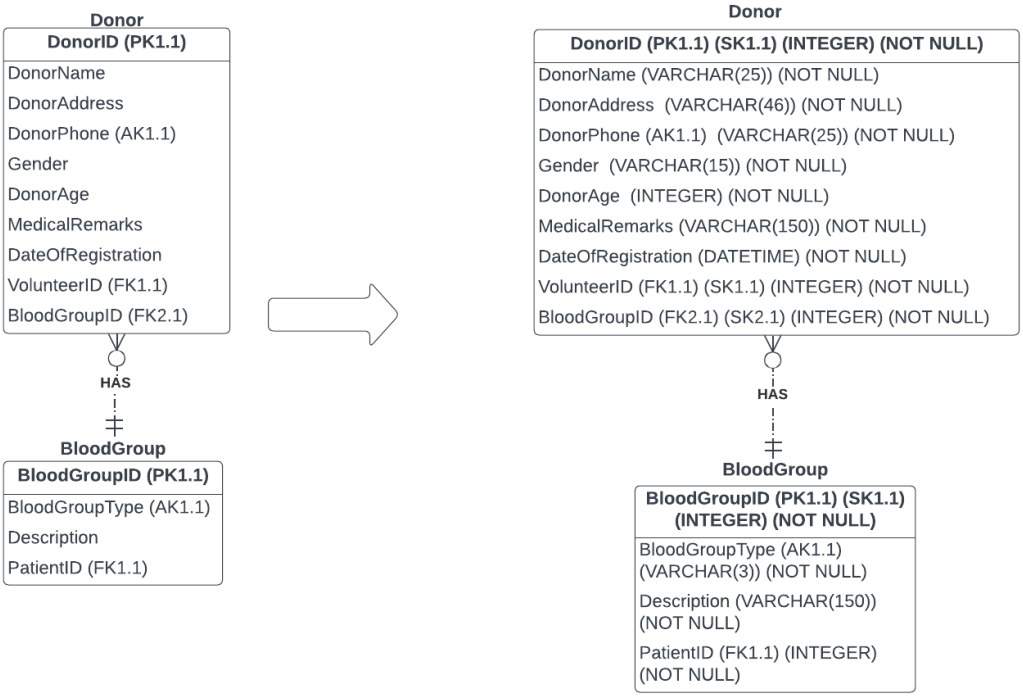
Registers: Admin-to-Donor Relationship

Donor Is Required Parent	Action on Admin (Parent)	Action on Donor (Child)
Insert	None	Get an Parent. Else, Prohibit
Modify Key OR Foreign Key	Prohibit. Admin used the sorrogate Key.	Prohibit. Admin used the surrogate key.
Delete	Prohibit. Admin should not be modified after being inserted	None

Donor

Donor

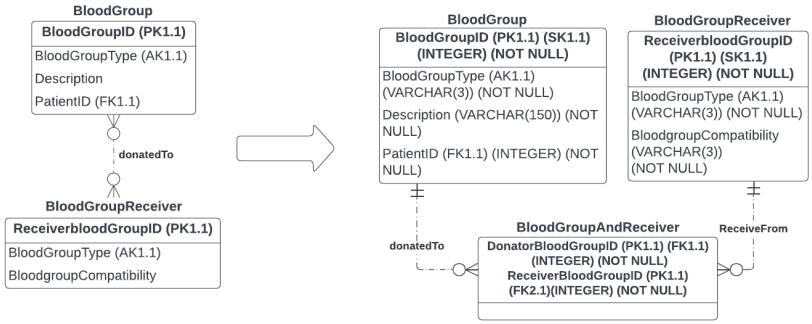
	after being inserted	



Has: Donor-to-BloodGroup Relationship

Donor Is Required Parent	Action on BloodGroup (Parent)	Action on Donor (Child)
Insert	None	Get a parent Else, Prohibit
Modify Key OR Foreign Key	Prohibit. BloodGroup used the surrogate key	Prohibit. BloodGroup used the surrogate key
Delete	Prohibit. BloodGroup will not change after be inserted	None

BloodGroup



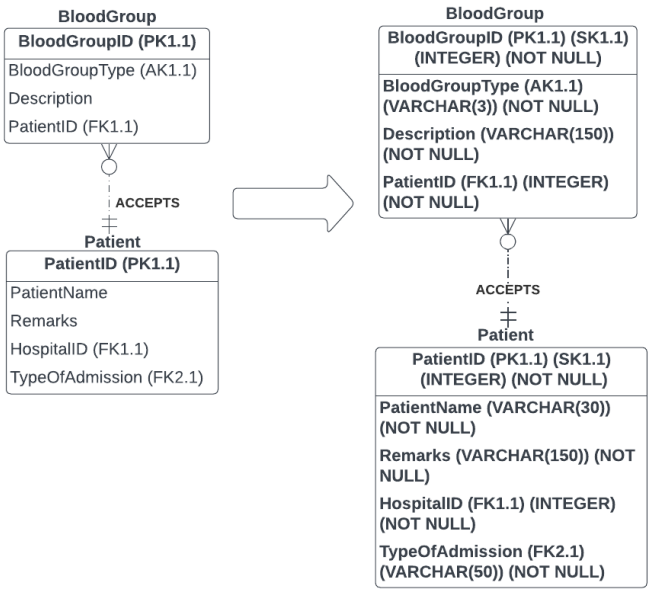
donatedTo: BloodGroup-to-BloodGroupAndReceiver Relationship

BloodGroupAndReceiver Is Required Parent	Action on BloodGroup	Action on BloodGroupAndReceiver
Insert	None	Get a parent Else, Prohibit
Modify Key OR Foreign Key	Prohibit. BloodGroup used the surrogate key	Prohibit. BloodGroup used the surrogate key
Delete	Prohibit if BloodGroup is refered in BloodGroupAndReceier. Else, Allow	None

ReceiveFrom: BloodGroupAndReceiver-to-BloodGroupReceiver Relationship

BloodGroupAndReceiver Is Required Parent	Action on BloodGroupReceiver	Action on BloodGroupAndReceiver
Insert	None	Get a parent Else, Prohibit
Modify Key OR Foreign Key	Prohibit. BloodGroupReceiver used the surrogate key	Prohibit. BloodGroupReceiver used the surrogate key
Delete	Prohibit if BloodGroupReceiver is refered in BloodGroupAndReceier. Else, Allow	None

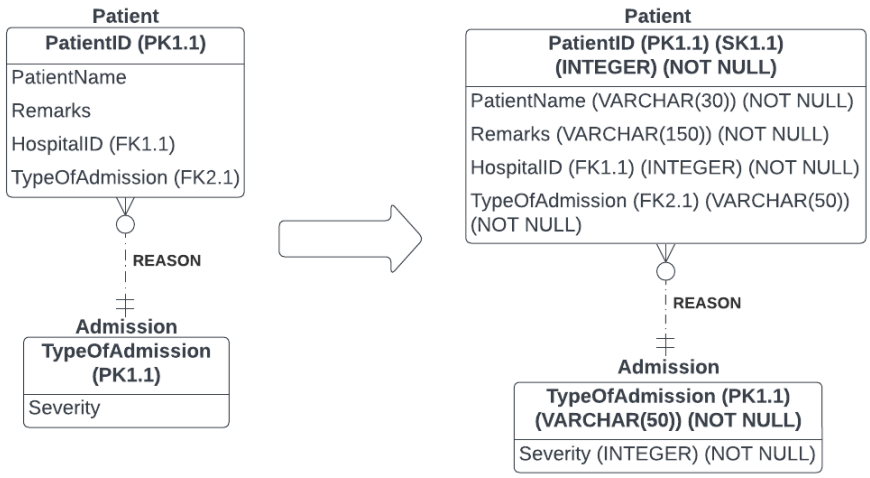
	Else, Allow			Else, Allow



Accepts: Patient-to-BloodGroupRelationship

Patient Is Required Parent	Action on Patient	Action on BloodGroup
Insert	INSERT trigger on Patient to create row in BloodGroup. BloodGroup will be given data for BloodGroupType and Description.Other columns will be null.	Will be created by INSERT trigger on Patient.
Modify Key OR Foreign Key	Prohibit. Patient used the surrogate key.	Prohibit. Patient used the surrogate key.
Delete	Prohibit. The medical history for each patient should never be deleted	Prohibit. The medical history for each patient should never be deleted

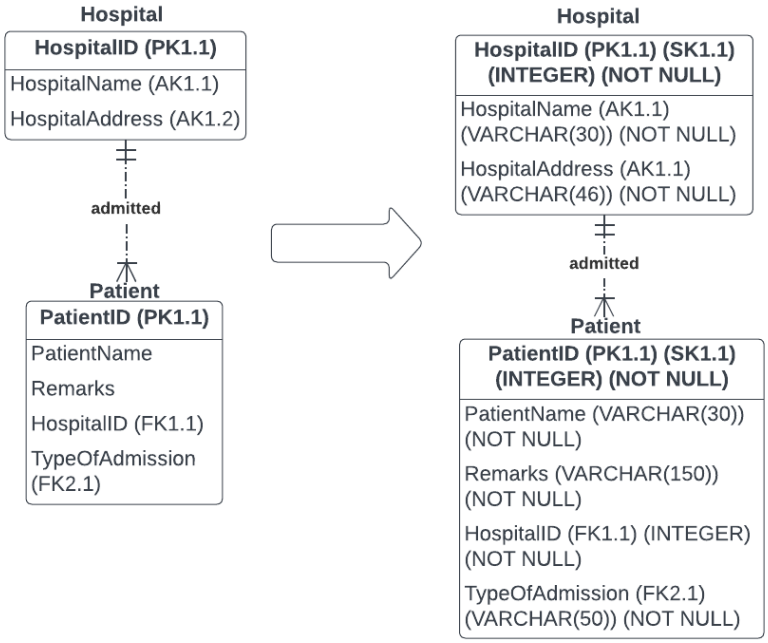
Patient **Patient**



Reason: Admission-to-Patient Relationship

Admission Is Required Parent	Action on Admission	Action on Patient
Insert	None	Get a parent
Modify Key OR Foreign Key	Prohibit. Admission used the surrogate key.	Prohibit. Admission used the surrogate key.
Delete	Prohibit. Admission should not be modified after being inserted	None

	modified after being inserted	

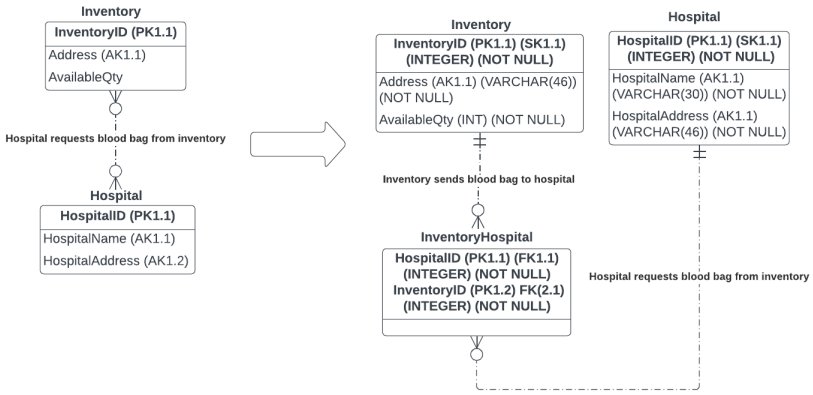


Admitted: Hospital-to-Patient Relationship

Hospital Is Required Parent	Action on Hospital	Action on Patient
Insert	INSERT trigger on Hospital to create row in Patient. Patient will be given data for PatientName and Remarks.Other columns will be null.	Will be created by INSERT trigger on Hospital.
Modify Key OR Foreign Key	Prohibit. Hospital used the surrogate key.	Prohibit. Hospital used the surrogate key.
Delete	Prohibit. The medical history for each patient should never be deleted	Prohibit. The medical history for each patient should never be deleted

Inventory

Hospital



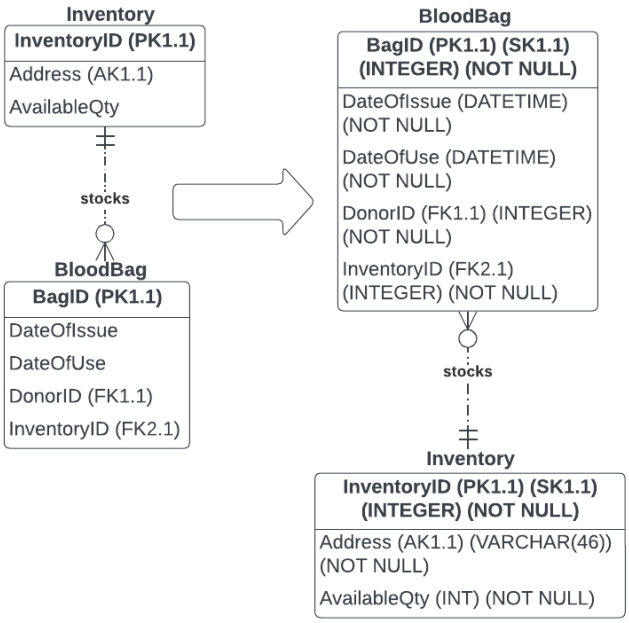
Inventory sends blood bag to hospital
Inventory-to-InventoryHospital Relationship

Inventory Is Required Parent	Action on Inventory	Action on InventoryHospital
Insert	None	Get a parent Else, Prohibit
Modify Key OR Foreign Key	Prohibit. Inventory used the surrogate key	Prohibit. Inventory used the surrogate key
Delete	Prohibit if Inventory is refered in InventoryHospital. Else, Allow	None

Hospital requests blood bag from inventory
Hospital-to-InventoryHospital Relationship

Hospital Is Required Parent	Action on Hospital	Action on InventoryHospital
Insert	None	Get a parent Else, Prohibit
Modify Key OR Foreign Key	Prohibit. Hospital used the sorrogate Key.	Prohibit. Hospital used the sorrogate Key.
Delete	Prohibit if Hospital is refered in InventoryHospital. Else, Allow	None

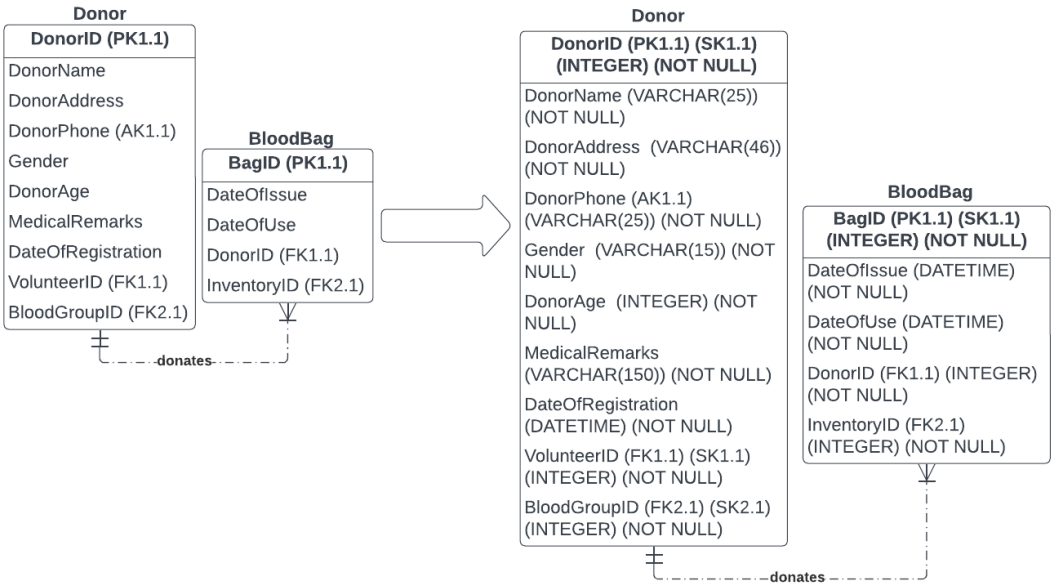
Delete	Refered in InventoryHospital. Else, Allow	None	Delete	In Inv



stocks: BloodBag-to-Inventory Relationship

Inventory Is Required Perent	Action on Inventory	Action on BloodBag
Insert	None	Get a parent
Modify Key OR Foreign Key	Prohibit. Inventory used the surrogate key.	Prohibit. Inventory used the surrogate key.
Delete	Prohibit. Inventory should not be modified after being inserted	None

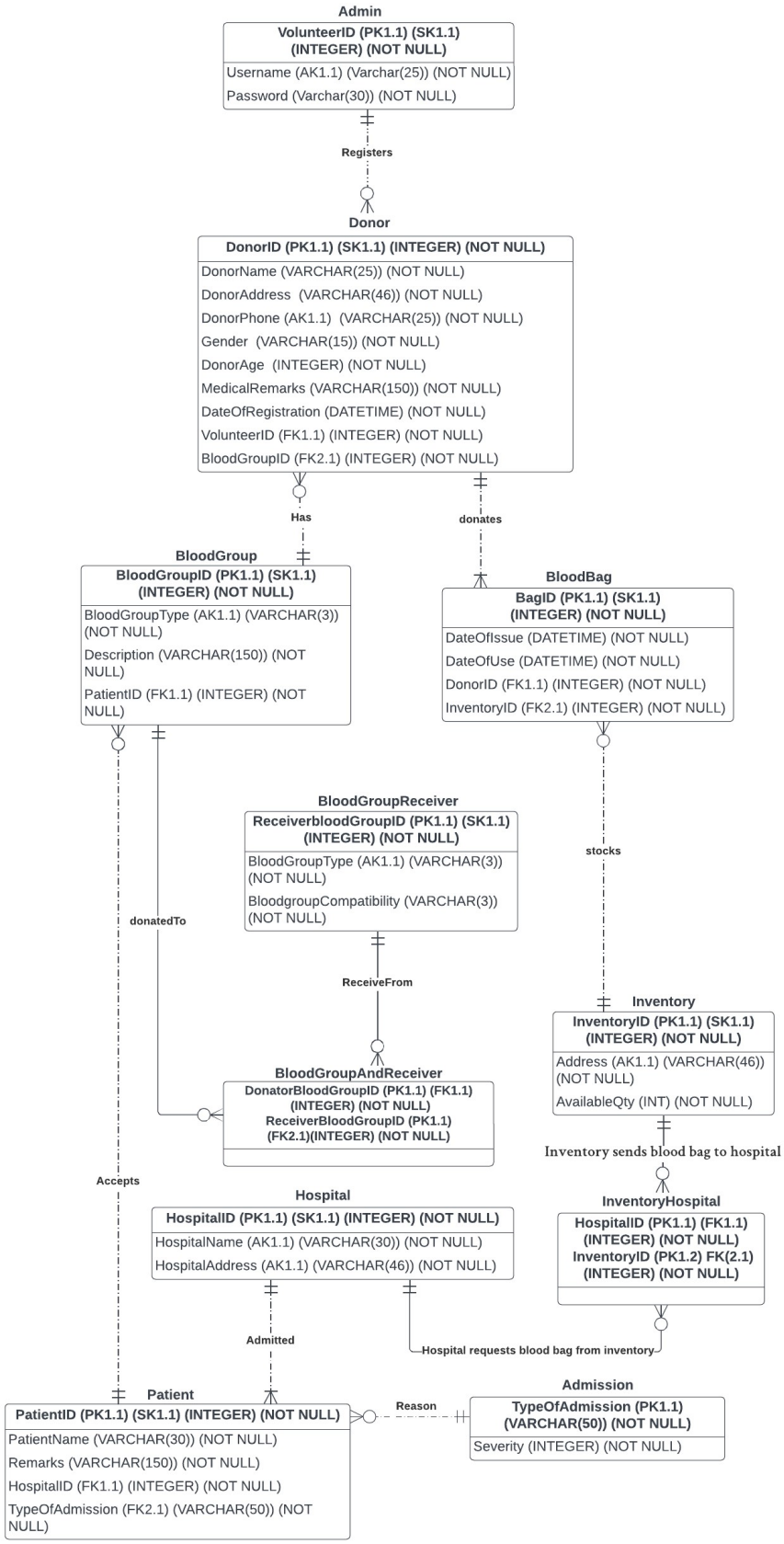
	modified after being inserted	



donates: Donor-to-BloodBag Relationship

Donor Is Required Parent	Action on Donor	Action on BloodBag
Insert	INSERT trigger on Donor to create row in BloodBag. BloodBag will be given data for DateOfIssue and DateOfUsee.Other columns will be null.	Will be created by INSERT trigger on Donor.
Modify Key OR Foreign Key	Prohibit. Donor used the sorrogate Key.	Prohibit. Donor used the sorrogate Key.
Delete	Prohibit. The medical history for each patient should never be deleted	Prohibit. The medical history for each patient should never be deleted

3. (10pt) Database Design


Admin
VolunteerID (PK1.1) (SK1.1) (INTEGER) (NOT NULL)
Username (AK1.1) (Varchar(25)) (NOT NULL)
Password (Varchar(30)) (NOT NULL)
Registers
Donor
DonorID (PK1.1) (SK1.1) (INTEGER) (NOT NULL)
DonorName (VARCHAR(25)) (NOT NULL)
DonorAddress (VARCHAR(46)) (NOT NULL)
DonorPhone (AK1.1) (VARCHAR(25)) (NOT NULL)
Gender (VARCHAR(15)) (NOT NULL)
DonorAge (INTEGER) (NOT NULL)
MedicalRemarks (VARCHAR(150)) (NOT NULL)
DateOfRegistration (DATETIME) (NOT NULL)
VolunteerID (FK1.1) (INTEGER) (NOT NULL)
BloodGroupID (FK2.1) (INTEGER) (NOT NULL)
Has
donates
BloodGroup
BloodGroupID (PK1.1) (SK1.1) (INTEGER) (NOT NULL)
BloodGroupType (AK1.1) (VARCHAR(3)) (NOT NULL)
Description (VARCHAR(150)) (NOT NULL)
PatientID (FK1.1) (INTEGER) (NOT NULL)
BloodBag
BagID (PK1.1) (SK1.1) (INTEGER) (NOT NULL)
DateOfIssue (DATETIME) (NOT NULL)
DateOfUse (DATETIME) (NOT NULL)
DonorID (FK1.1) (INTEGER) (NOT NULL)
InventoryID (FK2.1) (INTEGER) (NOT NULL)
BloodGroupReceiver
ReceiverbloodGroupID (PK1.1) (SK1.1) (INTEGER) (NOT NULL)
BloodGroupType (AK1.1) (VARCHAR(3)) (NOT NULL)
BloodgroupCompatibility (VARCHAR(3)) (NOT NULL)
stocks
donatedTo
ReceiveFrom
Inventory
InventoryID (PK1.1) (SK1.1) (INTEGER) (NOT NULL)
Address (AK1.1) (VARCHAR(46)) (NOT NULL)
AvailableQty (INT) (NOT NULL)
BloodGroupAndReceiver
DonatorBloodGroupID (PK1.1) (FK1.1) (INTEGER) (NOT NULL)
ReceiverBloodGroupID (PK1.1) (FK2.1)(INTEGER) (NOT NULL)
Inventory sends blood bag to hospital
Accepts
Hospital
HospitalID (PK1.1) (SK1.1) (INTEGER) (NOT NULL)
HospitalName (AK1.1) (VARCHAR(30)) (NOT NULL)
HospitalAddress (AK1.1) (VARCHAR(46)) (NOT NULL)
InventoryHospital
HospitalID (PK1.1) (FK1.1) (INTEGER) (NOT NULL)
InventoryID (PK1.2) FK(2.1) (INTEGER) (NOT NULL)
Admitted
Hospital requests blood bag from inventory
Patient
PatientID (PK1.1) (SK1.1) (INTEGER) (NOT NULL)
PatientName (VARCHAR(30)) (NOT NULL)
Remarks (VARCHAR(150)) (NOT NULL)
HospitalID (FK1.1) (INTEGER) (NOT NULL)
TypeOfAdmission (FK2.1) (VARCHAR(50)) (NOT NULL)
Reason
Admission
TypeOfAdmission (PK1.1) (VARCHAR(50)) (NOT NULL)
Severity (INTEGER) (NOT NULL)