Team Django

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Mapping ER to Relational

Donor

f_name	l_name	donor_id	sex	blood_type	dob	date_of_donation	address

Staff

Name	emp_id	address	salary

Companion

donor_id	comp_name	relationship

Plasma

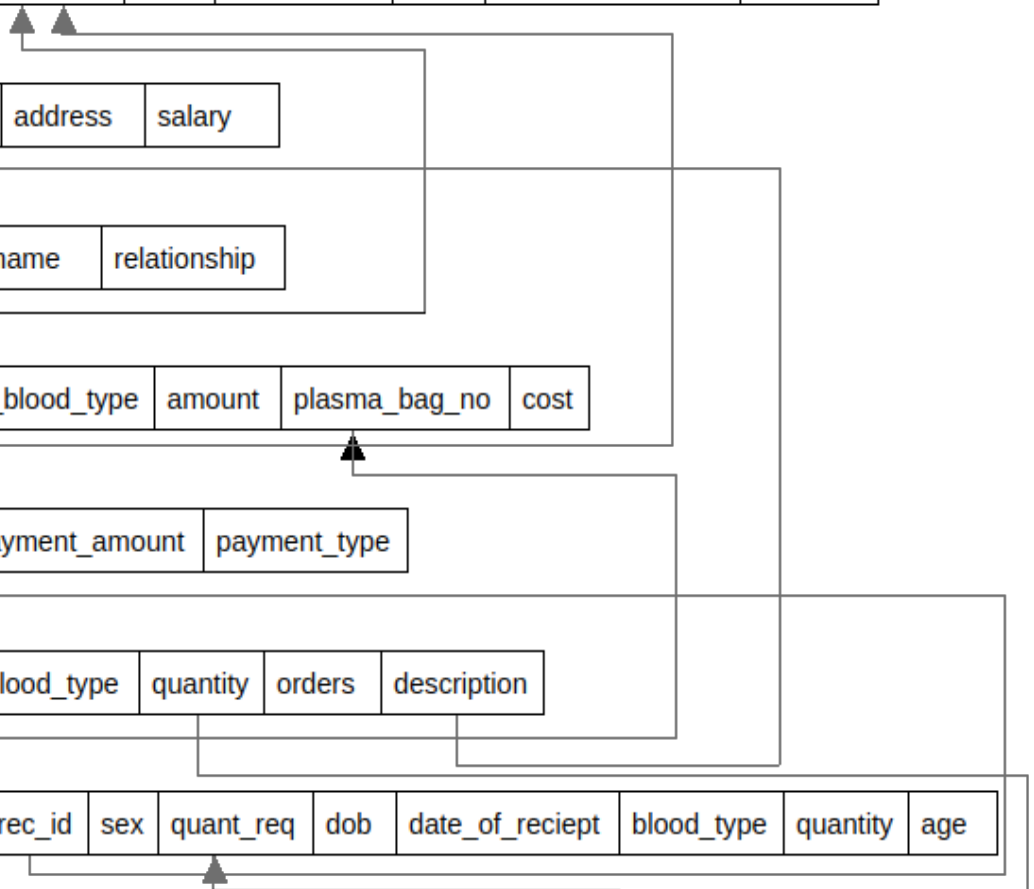| donor_id	plasma_blood_type	amount	plasma_bag_no	cost

Payment

txm_id	rec_id	payment_amount	payment_type

Plasma Inventory

| plasma_bag_no	blood_type	quantity	orders	description

Receiver

f_name	l_name	rec_id	sex	quant_req	dob	date_of_reciept	blood_type	quantity	age

I Normal Form

Donor entity => Name attribute :

The name attribute in the donor entity is a composite attribute consisting of First Name and Last Name. For a table, we need columns (which do not have further divisions), so while we convert the given ER diagram into first normal form we convert name attribute to multiple attributes in 1st normal form as : First_name and Last_name as shown in the relationship schema below.
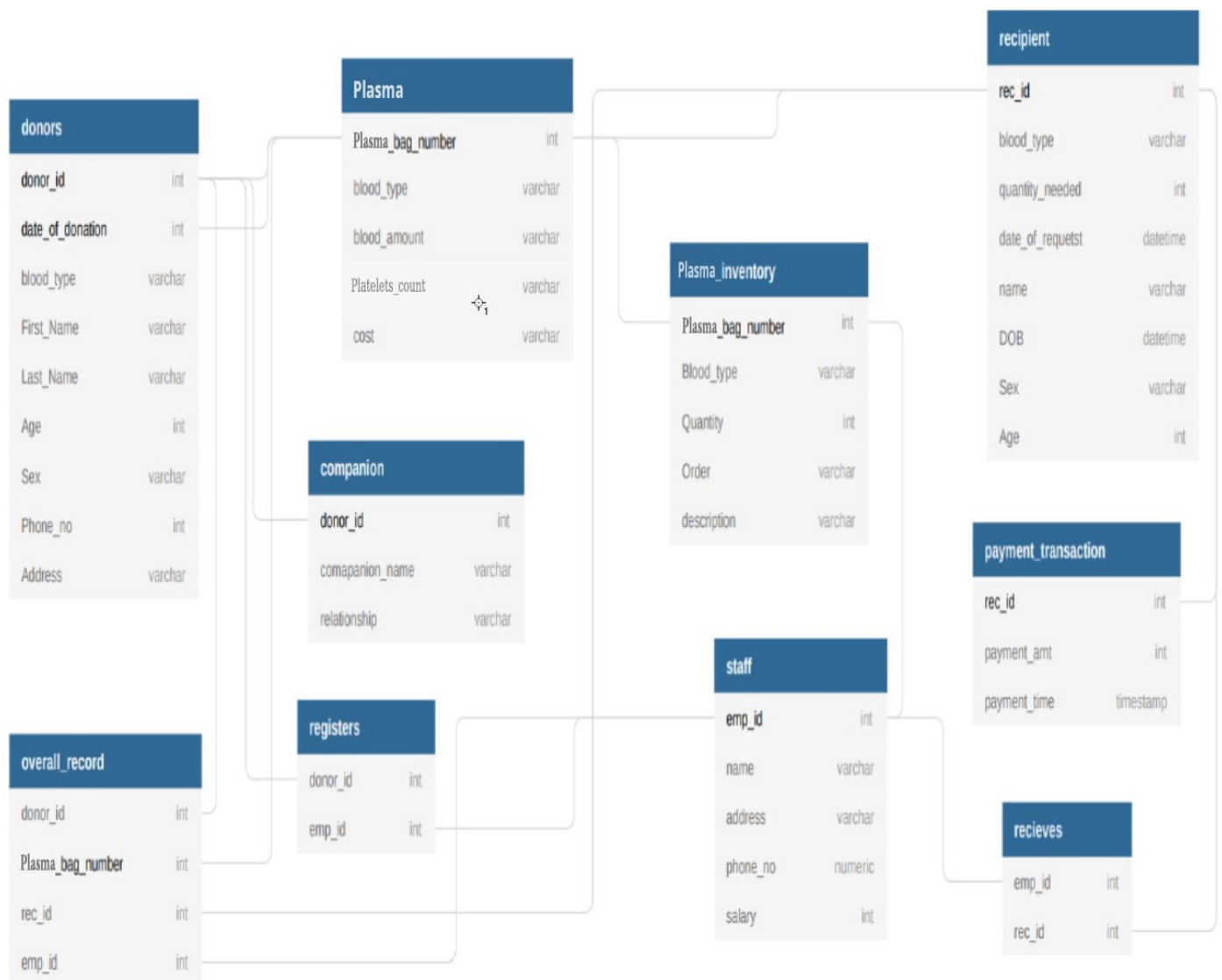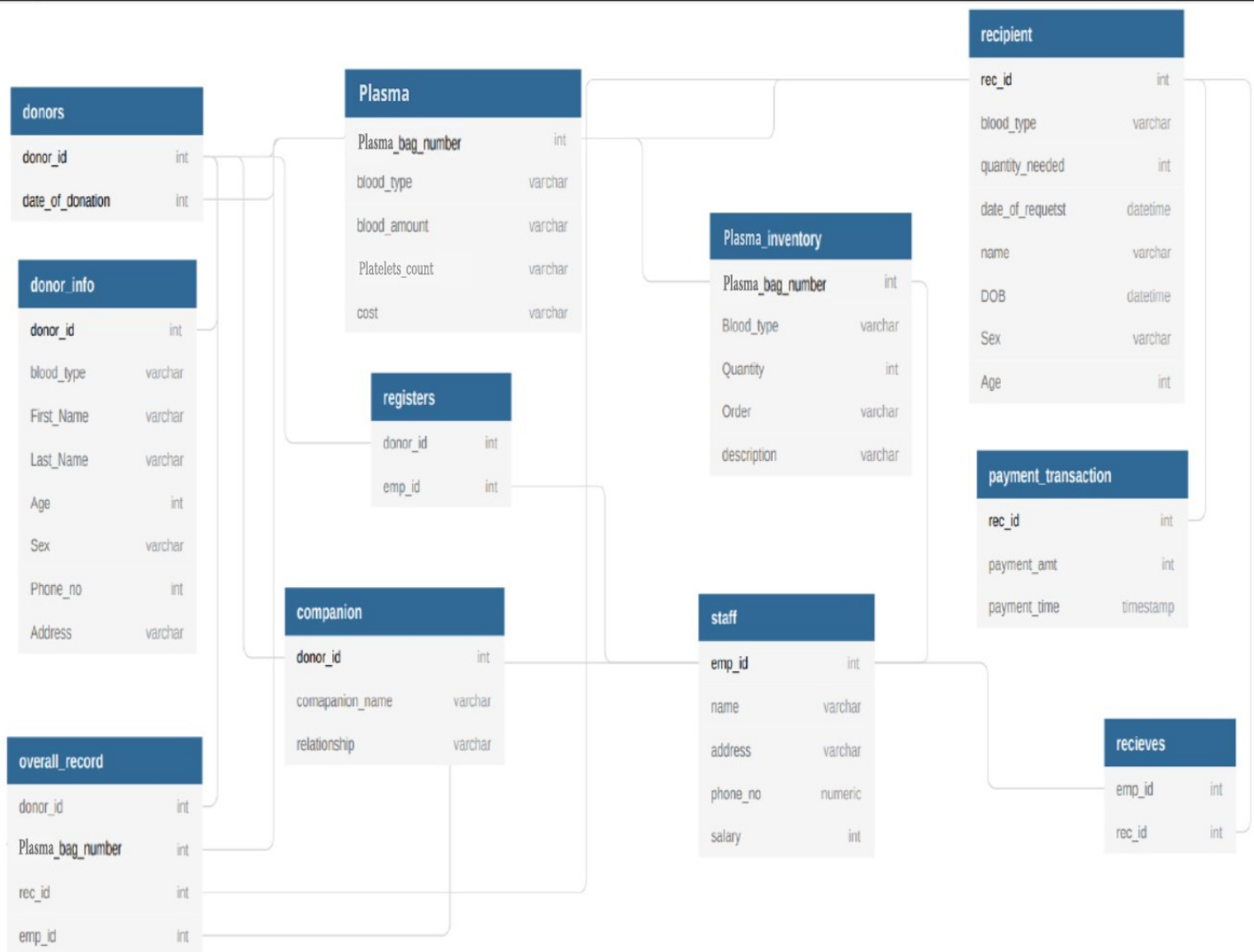
II Normal Form

Entity Donor :

For each entry in the table of this entity we will have a primary key made by two attributes, i.e DonorID, and date_of_donation. We have attributes phone number, address, sex, blood_type, name, dob that depend only on the donorID and are independent of the date_of_donation. This is a partial dependency and needs to be removed for the second normal form. So we create a new entity donor_info with primary key donor id and all these dependent attributes as attributes of donor info.

Also, the entity donor will now have only donorID and date of donation as attributes. So we have created the second normal form using the first normal form by removing all the partial dependencies that were present.

III Normal Form

Entity Blood :

The attribute cost depends on the non-primary attributes blood type and blood amount. Since this is a case where a non-primary attribute depends on other non-primary attributes, this is a transitive dependency. All transitive dependencies must be removed for the third normal form.

To remove this dependency we create a new entity blood_cost which has attributes blood_bag_number(primary key) and cost calculated.

Thus we have created the third normal form using the second normal form by removing all the transitive dependencies that were present. Below is a relationship schema for the corresponding third normal form thus created.
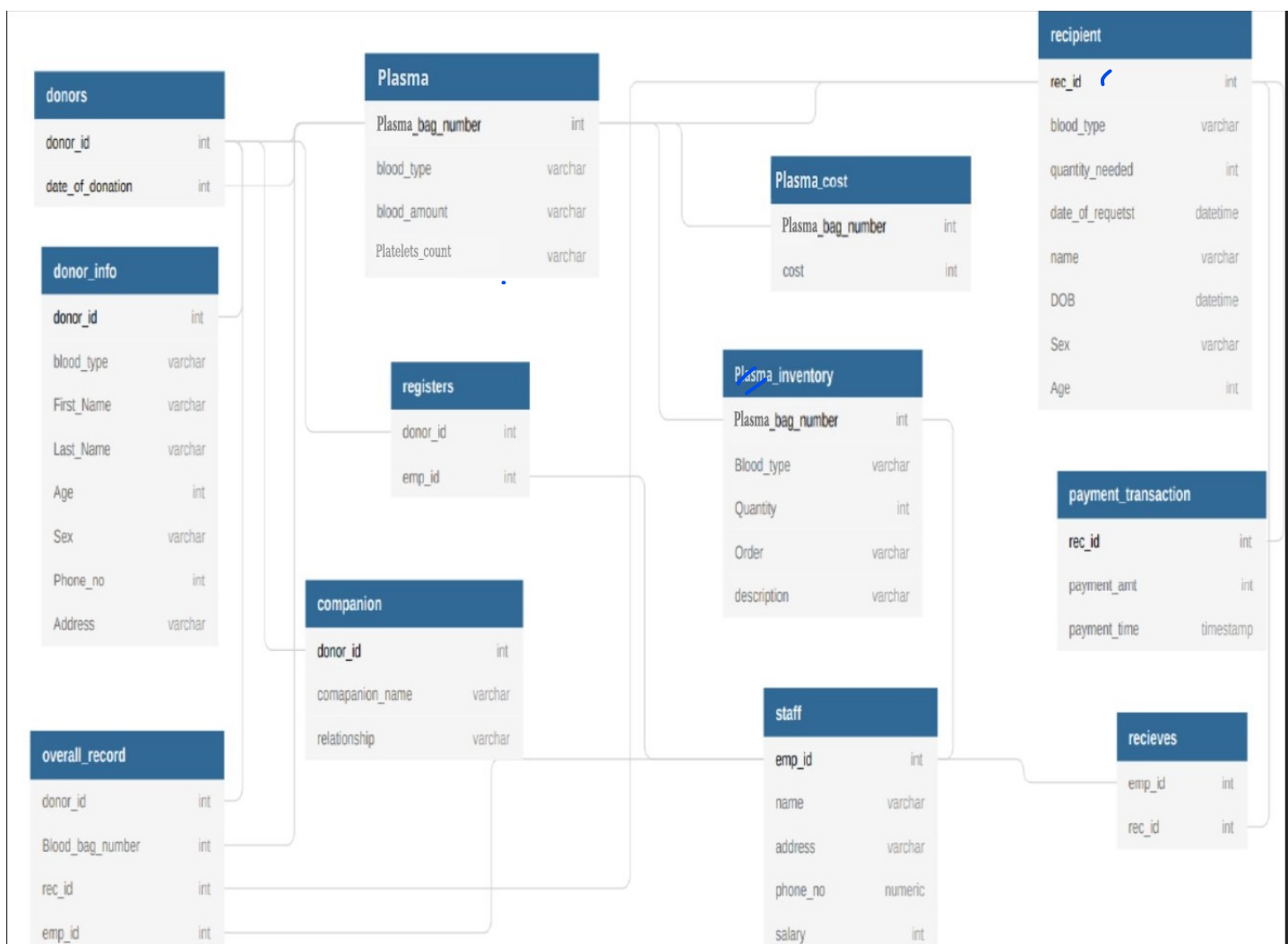
Relational Model:

- **Donates:** This is a 1:N relationship between donor and blood. In this DonorID of donors is the primary key which is used as a foreign key for Blood.
- **Receives:** This is a 1:N relationship between blood and recipient. In this rec_id of recipient is the primary key which is used as a foreign key for Blood.
- **Interacts:** This is an N: M relationship between staff and recipient. In this rec_id is primary key which is used as a foreign key for Staff.
- **Registers:** This is a N:M relationship between donor and staff. In this donor_ID is primary key which is used as a foreign key for Staff.
- **Payment:** This is a 1:1 relationship between recipient and payment transaction. In this rec_id is the primary key which is used as a foreign key for the payment transaction.
- **Overall record:** This is a relationship between donor, blood, staff, and recipient.
- **Visits:** This is a 1:1 relationship between donor and companion. In this donor_id is primary key which is used as a foreign key for Companion.

Examples:

- Donor_Info :

donor_id	plsma_blod_type	first_name	last_name	age	sex	phone_no	address
148	AB-	Sambit	Patra	40	M	987653210	C-103, Goa

- Donors :

donor_id	date_of_donation
148	19/09/2020

- Plasma :

plasma_bag_no	plasma_blood_type	blood_amount	platelet_count
110	AB-	200ml	200000

- Plasma_blood_cost :

plasma_bag_no	cost
110	400

- **Companion :**

donor_id	companion_name	relationship
148	Rajeev Kumar	Brother

- **Recipient :**

rec_id	blood_type	quant_req	date_of_req	DOB	Sex	Age
465	B+	300ml	17/06/2020	14/03/1973	F	47

- **Plasma_inventory :**

plasma_bag_no	blood_type	quantity	orders	description
762	O-	250ml	2	verified

- **Staff :**

emp_id	name	phone_no	address	salary
21	Raj Kumar	9638527410	A74, East Colony	25000

- **Overall record :**

donor_id	plasma_bag_no	rec_id	emp_id
448	744	814	14

- **Registers :**

donor_id	emp_id
249	15

- **Payment_transaction :**

txn_id	rec_id	payment_amount	payment_time
542154421544	704	400	14:37 14/08/2020

- **Recieves :**

emp_id	rec_id
12	753