

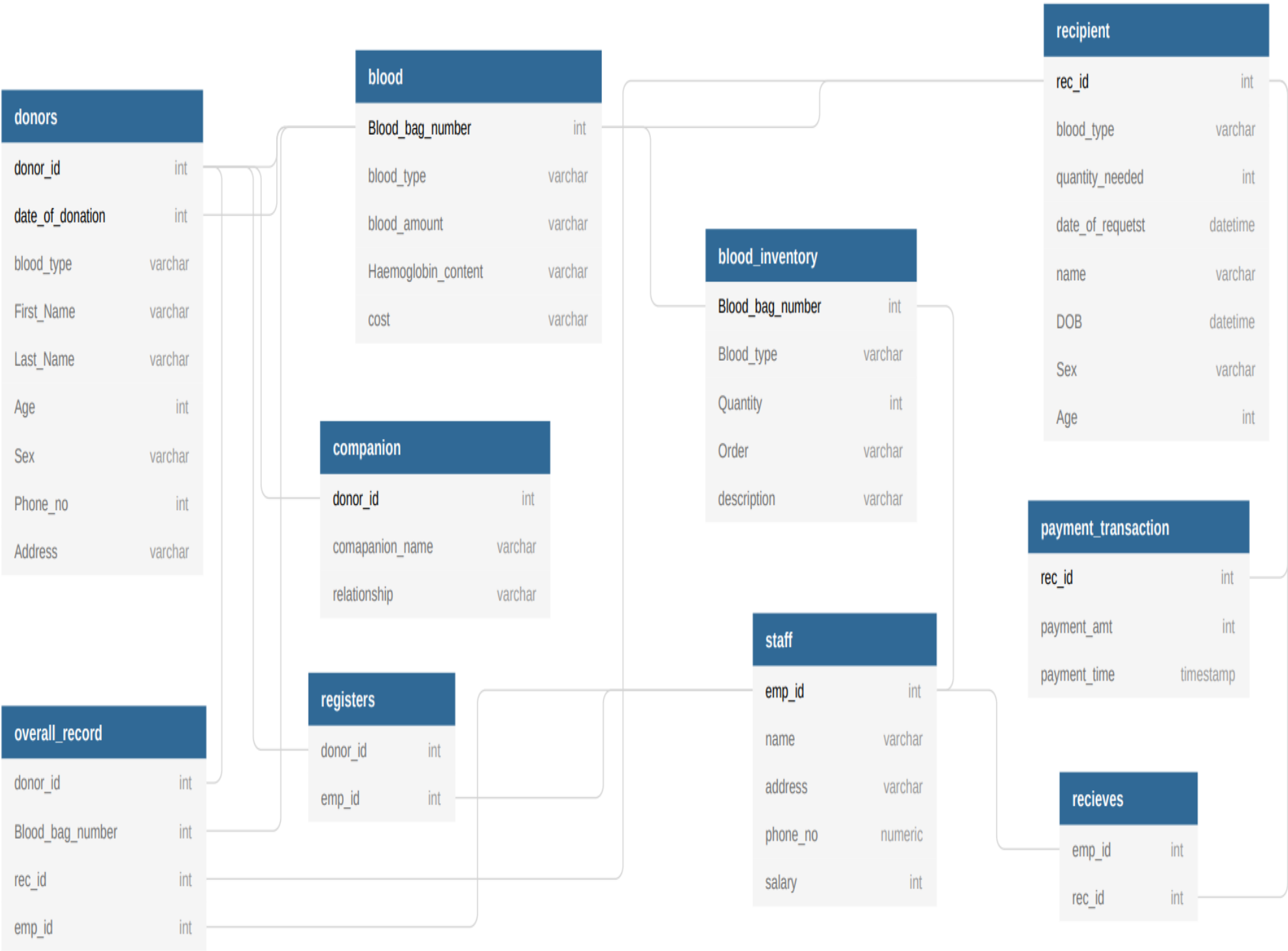
I Normal Form :

Donor entity -> Name attribute :

The name attribute in the donor entity is a composite attribute consisting of First Name and Last Name.

Since 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.

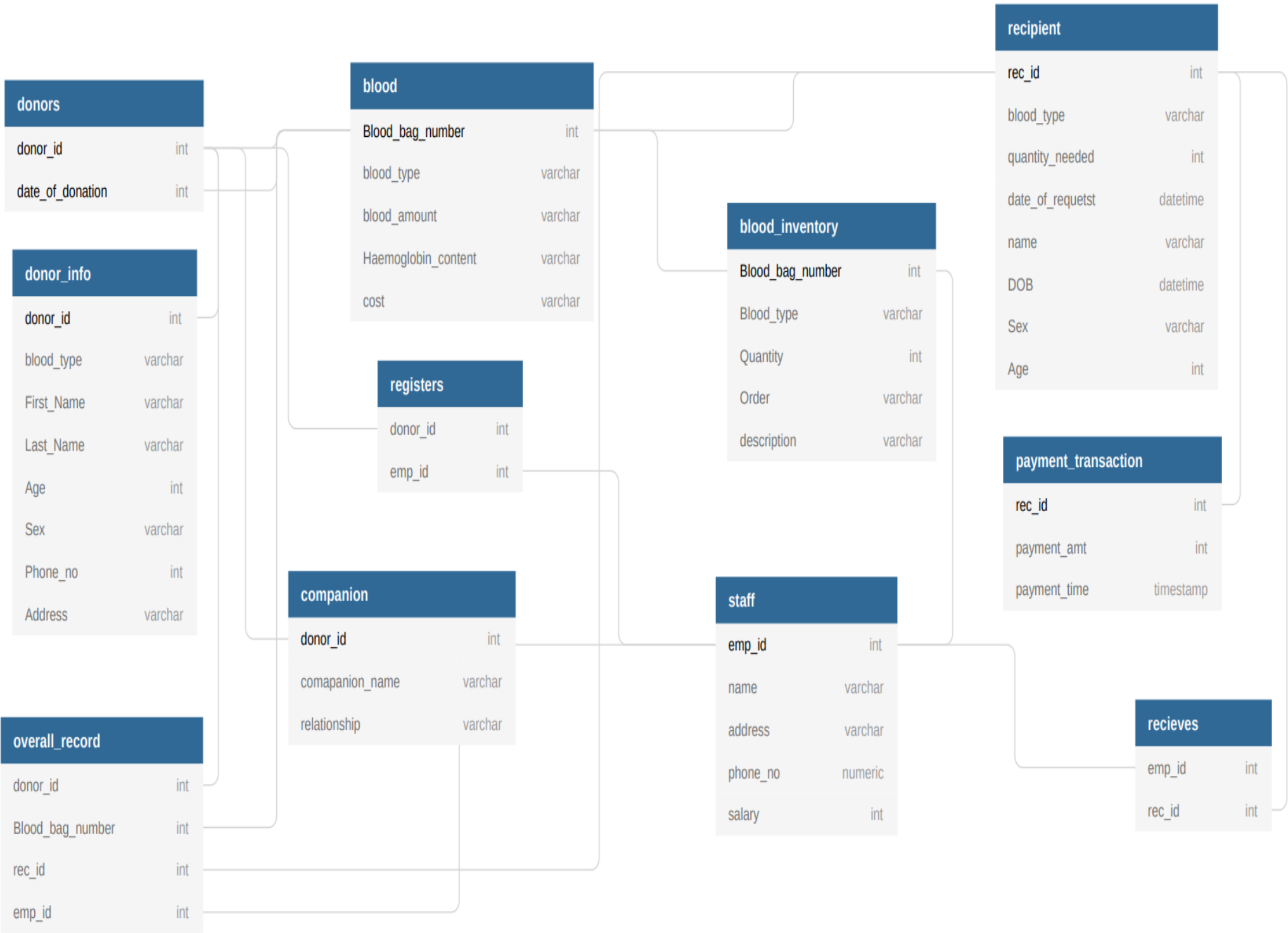
We have attributes phone number, address, sex,blood_type, name, dob that depend only on the donorID and are independent of the date_of_donation.

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.

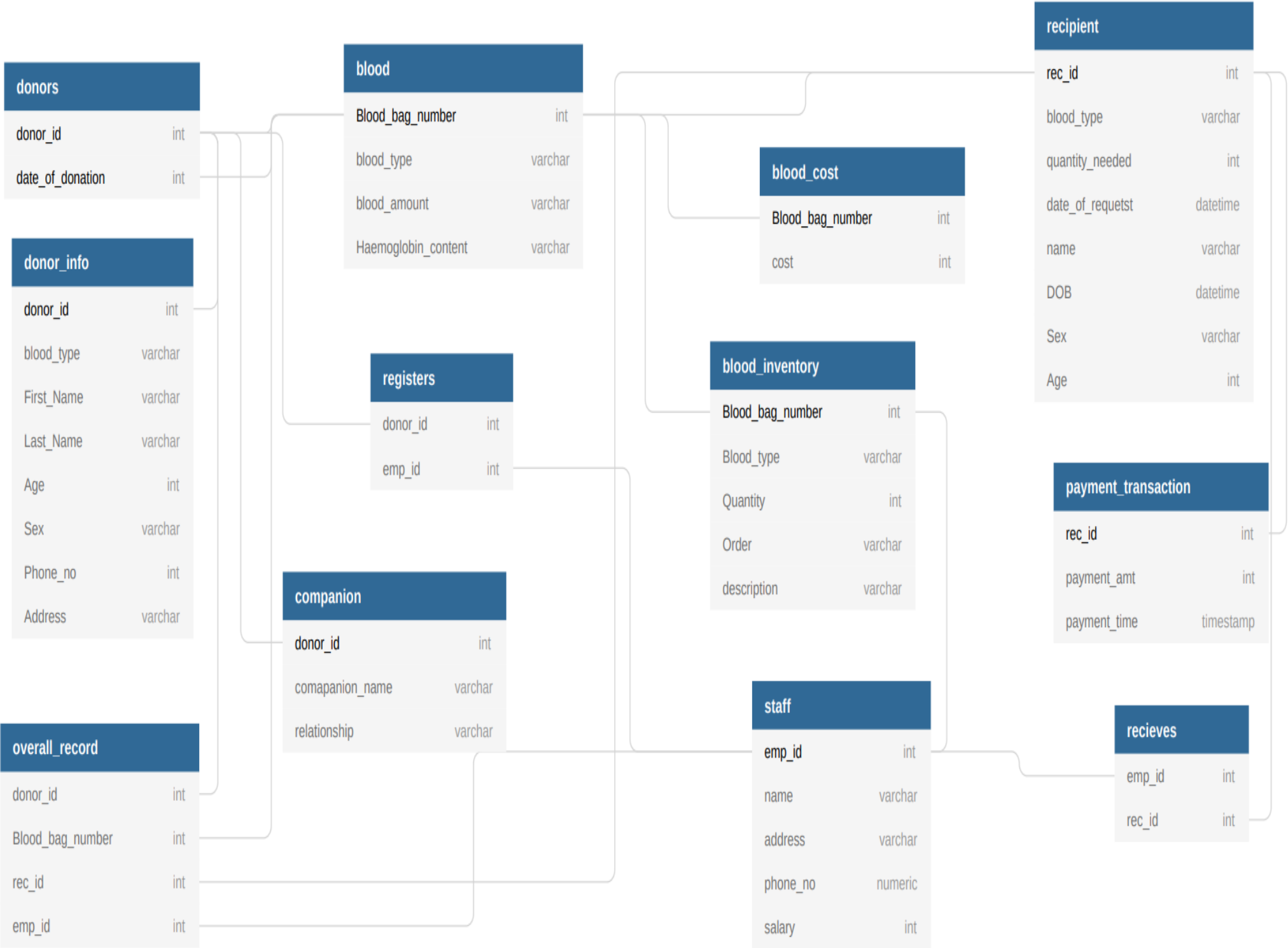
Since this is a case where a non-primary attribute depends on other non-primary attributes, this is a transitive dependency.

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 donor 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 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.

Example :

Donor_Info :

donor_id	blood_type	first_name	last_name	age	sex	phone_no	Address
1200	A+	Raghu	Rajan	51	M	9008887765	23/3,A-5

Donors:

Donor_id	Date_of_donation
1200	24/10/2019

Blood :

Blood_bag_numbe r	blood_type	blood_amount	haemoglobin_content
110	A+	250ml	13.25

Blood_Cost :

Blood_bag_number	Cost
110	500

Companion:

Donor_Id	comapanion_name	relationship
1200	roshan	friend

Recipient:

rec_id	blood_type	quantity_needed	date_of_request	Name	DOB	sex	age
2100	A+	250 ml	29/10/2019	Sundar	12/10/1997	M	37

Blood_Inventory :

Blood_bag_number	blood_type	quantity	orders	description
110	A+	250	1	Patient having dengue.

Staff :

emp_id	Name	Phone_no	Address	Salary
122	Garvit	9001116667	54/23 B-block	50000

Overall_record:

donor_id	blood_bag_number	rec_id	emp_id
1200	110	2100	122

Registers :

Donor_Id	Emp_Id
1200	122

Payment_Transaction :

rec_id	Payment_amount	Payment_time
2100	500	12:34 29/10/2019

Receives:

emp_id	rec_id
122	2100