

Level: 2nd Year Bachelor's in Computer Science (2025/2026)

Module: Databases

TP 5: SQL

Connect your **Blood-Donation** database to the RAT tool and execute the following queries using Relational **Algebra** based on the following schema:

Donor (**Donor_ID**, First_Name, Last_Name, Gender, Date_Of_Birth, Blood_Type, Phone)

Donation (**Donation_ID**, Donation_Date, Volume_ML, Donation_Type, #***Donor_ID***)

Blood_Inventory (**Unit_ID**, Blood_Type, Collection_Date, Expiration_Date, Status, #***Donation_ID***)

Recipient(**Recipient_ID**, First_Name, Last_Name, Gender, Date_Of_Birth, Blood_Type, Hospital_name, Town)

Transfusion (**Transfusion_ID**, Transfusion_Date, #***Recipient_ID***, #***Unit_ID***)

- 1- Display donor full names with blood type 'A+'

```
SELECT First_Name, Last_Name, Blood_Type
FROM Donor
WHERE Blood_Type = 'A+';
```

- 2- Display recipients from the city of 'Oran'.

```
SELECT First_Name, Last_Name, Town
FROM Recipient
WHERE Town = 'Oran';
```

- 3- Display the towns where recipients are located

```
SELECT DISTINCT Town
FROM Recipient;
```

- 4- Display donations made during the last 60 days.

```
SELECT *
FROM Donation
WHERE Donation_Date >Date()-60;
```

- 5- Display all donations made between January 1, 2025 and March 31, 2025.

```
SELECT * FROM Donation
WHERE Donation_Date BETWEEN #01/01/2025# AND #31/03/2025#;
```

6- List all donors who use the DJEEZY operator

```
SELECT * FROM donor where phone LIKE '07%'
```

7- Display all donors whose first name starts with 'Sam'

```
SELECT * FROM Donor WHERE first_name LIKE 'Sam%'
```

8- Using both the OR operator and the IN operator, write two queries to list all donors whose blood types are compatible with recipients with blood type A+

```
SELECT *  
FROM Donor  
WHERE Blood_Type = 'A+' OR Blood_Type = 'A-' OR Blood_Type = 'O+' OR Blood_Type = 'O-';
```

```
-----  
SELECT *  
FROM Donor  
WHERE Blood_Type IN ('A+', 'A-', 'O+', 'O-');
```

9- Display a combined list of first and last names of all donors and recipients

```
SELECT First_name, Last_name FROM Donor  
UNION  
SELECT First_name, Last_name FROM Recipient
```

10- Display the total blood volume donated for each donation type.

```
SELECT Donation_type, SUM (Volume_ML) AS Avg_Volume  
FROM Donation  
GROUP BY Donation_Type;
```

11- Display the number of donors for each blood type.

```
SELECT Blood_Type, COUNT(*) AS Num_Donors  
FROM Donor  
GROUP BY Blood_Type;
```

12- Show how many recipients live in each town.

```
SELECT Town, COUNT(*) AS Num_Recipients  
FROM Recipient  
GROUP BY Town
```

13- Who is the youngest donor?

```
SELECT * FROM Donor  
WHERE Date_Of_Birth = (  
SELECT MAX(Date_of_Birth) FROM Donor  
);
```

14- Display the oldest 30% of donors

```
SELECT TOP 30 Percent * from donor
ORDER BY Date_of_Birth ASC;
```

15- List the three towns with the highest number of recipients

```
SELECT TOP 3 Town, COUNT(*) AS Num_Recipients
FROM Recipient
GROUP BY Town
ORDER BY COUNT(*) DESC;
```

16- List donations that have a volume greater than the average donation volume

```
SELECT *
FROM Donation
WHERE Volume_ML > (
SELECT AVG(Volume_ML)
FROM Donation
);
```

17- List the most recent donation for each donor

```
SELECT first_name, last_name, (SELECT MAX(donation_Date)
FROM donation where donor.donor_id=donation.donor_id) from donor
```

18- Now, list donors who have donated more than the average donation volume

```
SELECT * FROM Donor WHERE Donor_Id IN
(SELECT Donor_Id FROM Donation
WHERE Volume_ML > (
SELECT AVG(Volume_ML) FROM Donation
));
```

19- List donors with more than 2 donations

```
SELECT Donor_ID, COUNT(*) AS Num_Donations
FROM Donation
GROUP BY Donor_ID
HAVING COUNT(*) > 2;
```

20- List donation types with total volume above 5000 ml

```
SELECT Donation_Type, SUM(Volume_ML) AS Total_Volume
FROM Donation
GROUP BY Donation_Type
HAVING SUM(Volume_ML) > 5000;
```

21- Find the hospitals that have patients with all available blood groups.

```
SELECT Hospital_Name, COUNT(*) AS NBR_GROUP
FROM
(SELECT DISTINCT Hospital_Name, Blood_Type
FROM Recipient) AS R
GROUP BY Hospital_Name
```

```
HAVING COUNT(*) =  
(SELECT COUNT(*)  
FROM (SELECT DISTINCT Blood_Type FROM Blood_Inventory) AS BT);
```

22- Display donors who made a donation this year.

```
SELECT DISTINCT donor.Donor_ID, first_name, last_name  
FROM Donation INNER JOIN donor ON donation.donor_id=donor.donor_id  
WHERE Year(Donation_Date) = Year(Date());
```

23- Calculate the number of days between each blood donation and its corresponding transfusion

```
SELECT Transfusion.Transfusion_ID ,  
DateDiff('d', Donation.Donation_Date , Transfusion.Transfusion_Date ) AS Delay_Days  
FROM (Donation INNER JOIN Blood_Inventory ON Donation.Donation_ID = Blood_Inventory.Donation_ID )  
INNER JOIN Transfusion ON Blood_Inventory.Unit_ID = Transfusion.Unit_ID ;
```

24- List donors with their ID, first_name and last names and the total amount of blood they have donated

```
SELECT d.Donor_ID, d.First_Name, d.Last_Name,  
SUM(do.Volume_ML) AS Total_Volume  
FROM Donor AS d  
INNER JOIN Donation AS do  
ON d.Donor_ID = do.Donor_ID  
GROUP BY d.Donor_ID, d.First_Name, d.Last_Name;
```

25- List donors who have donated more than 1000 ml.

```
SELECT d.Donor_ID, d.First_Name, d.Last_Name, SUM(do.Volume_ML) AS Total_Volume  
FROM Donor AS d  
INNER JOIN Donation AS do  
ON d.Donor_ID = do.Donor_ID  
GROUP BY d.Donor_ID, d.First_Name, d.Last_Name  
HAVING SUM(do.Volume_ML) > 1000;
```