

Database Management System

Additional Group Activity report

On

Blood Bank Management System

Submitted for the partial fulfillment of Bachelor of Engineering

By

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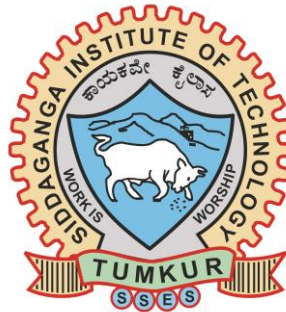
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(An autonomous institution affiliated to VTU, Belagavi, Approved by AICTE, New Delhi,
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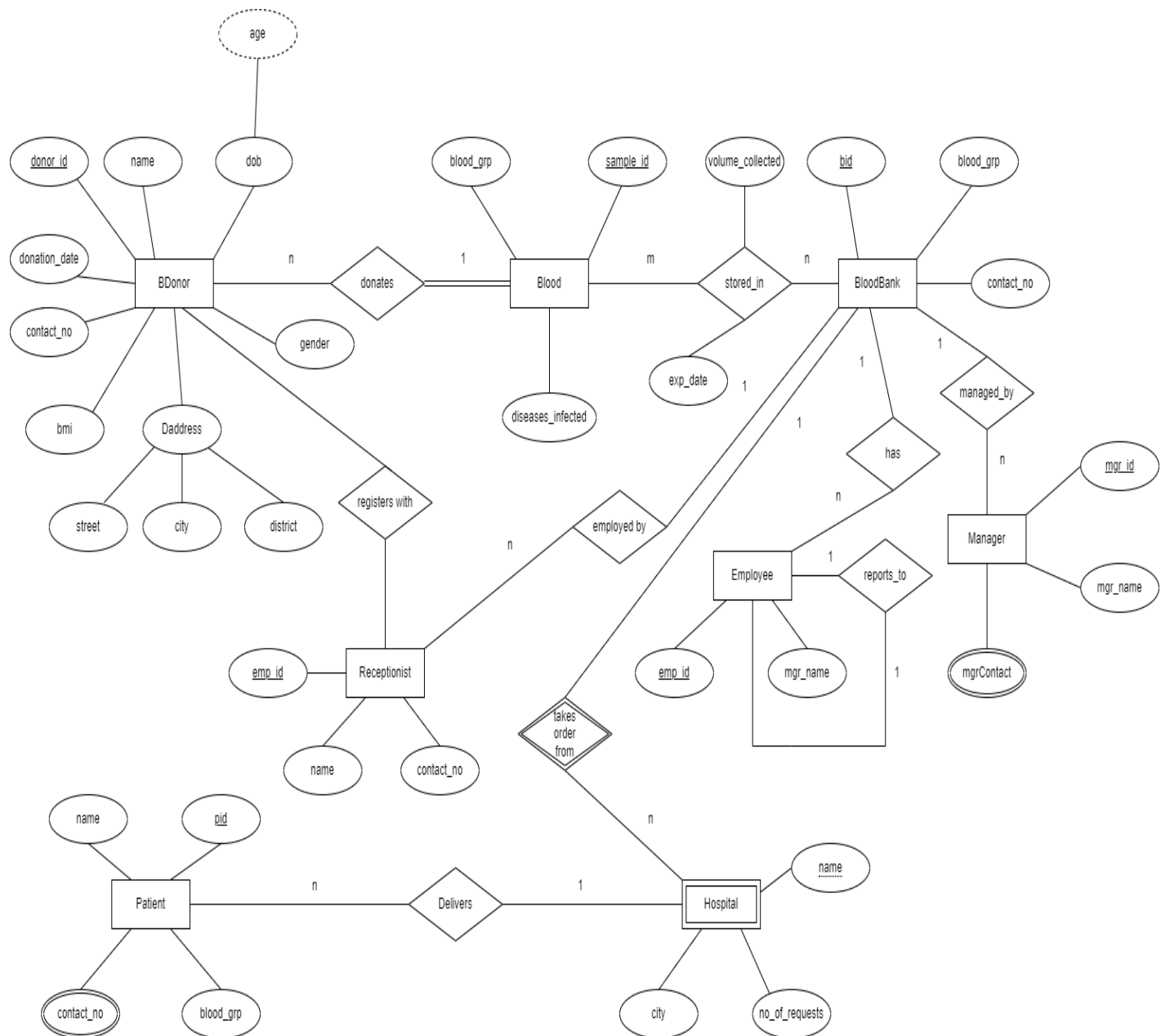
2022-2023

Problem Title- “*Blood Bank Management System*”

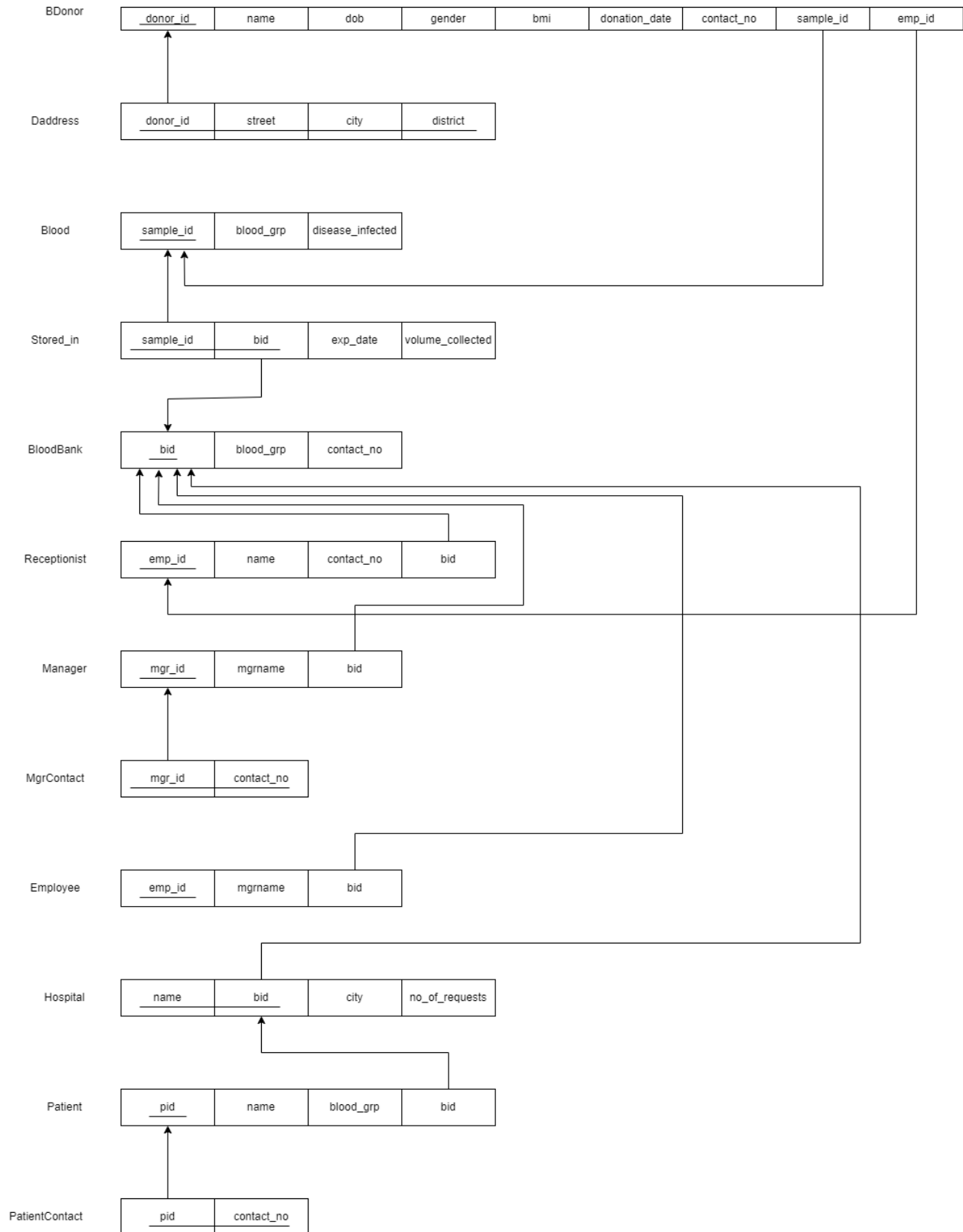
Requirement Collection

The main purpose of the blood bank management system is to provide the blood bank with an easier way to store and retrieve data and keep a record of the availability of blood in the blood bank. Every blood bank has the following attributes - unique id, the blood groups currently available, contact details. It is managed by a manager whose details - name, employee id, contact number are stored. Every blood bank has multiple employees. Each employee holds the following information - empID, designated manager. Also, the blood bank appoints a receptionist and hence, stores their information - empID, name, contact details. The manager, who himself is an employee, is responsible for supervising other employees. Every blood donor needs to register himself in the blood bank through the receptionist. We store every donor's name, date of birth, gender, age, contact number, BMI, donation dates. A donor can have multiple addresses. Every blood sample details are stored. The following details are maintained - blood group and sample id. The blood collected is tested for various diseases and the number of diseases infected, if any, are also stored, to make sure they are not delivered to the patients. Also, the expiration date of the sample and volume collected in the respective blood bank is stored. Blood bank takes orders from the hospital along with the hospital name, city and contact number. Hospital delivers the blood to the requesting patient. The patient details that are collected include - name, respective blood group, patient id and contact details.

ER Model



Relational Mapping



Normalisation

The relational mapping for the ER diagram is in 3NF form since there is no transitive dependency on the primary key for any of the non-prime attributes. Further, in every functional dependency that is found in each of the relations, $X \rightarrow Y$, X is the super key of the table, mostly only the primary key.

DDL statements

S

```
create table BloodBank
```

```
(  
  bid varchar(25) primary key,  
  blood_grp varchar(6),  
  contact_no number(10) );
```

```
create table Blood
```

```
(  
  sample_id varchar(10) primary key,  
  blood_grp varchar(6),  
  diseases_infected int );
```

```
create table Manager
```

```
(  
  mgr_id varchar(10) primary key,  
  mgrname varchar(25),  
  bid varchar(20),  
  foreign key (bid) references BloodBank(bid));
```

```
create table Employee
```

```
(  
  emp_id varchar(10) primary key,  
  mgrname varchar(25),  
  bid varchar(20),  
  foreign key (bid) references BloodBank(bid));
```

```
create table MgrContact
```

```
(  
  mgr_id varchar(10),  
  contact_no number(10),  
  primary key(mgr_id,contact_no),  
  foreign key(mgr_id) references Manager(mgr_id) );
```

```
create table Receptionist
```

```
(
```

```
emp_id varchar(10) primary key,  
name varchar(25),  
contact_no number(10),  
bid varchar(10),  
foreign key(bid) references BloodBank(bid) );
```

```
create table bDonor  
(  
    donor_id varchar(10) primary key,  
    name varchar(25),  
    dob date not null,  
    gender varchar(10),  
    bmi number(5),  
    donation_date date not null,  
    contact_no number(10),  
    emp_id varchar(10),  
    sample_id varchar(10),  
    foreign key(emp_id) references receptionist(emp_id),  
    foreign key(sample_id) references Blood(sample_id) );
```

```
create table DAddress  
(  
    donor_id varchar(10),  
    street varchar(25),  
    city varchar(25),  
    district varchar(25),  
    primary key (donor_id,street,city,district),  
    foreign key(donor_id) references bDonor(donor_id) );
```

```
create table stored_in  
(  
    sample_id varchar(10),  
    bid varchar(10),  
    exp_date date,  
    volume_collected int,  
    foreign key(sample_id) references Blood(sample_id),  
    foreign key(bid) references BloodBank(bid) );
```

```
create table Hospital  
(  
    name varchar(25),  
    bid varchar(10),  
    city varchar(25),  
    no_of_requests int,  
    primary key(name,bid),  
    foreign key(bid) references BloodBank(bid) );
```

```
create table Patient
(
  pid varchar(10) primary key,
  name varchar(25),
  blood_grp varchar(10),
  bid varchar(10),
  foreign key (bid) references BloodBank(bid) );
```

```
create table PatientContact
(
  pid varchar(10),
  contact_no number(10),
  primary key(pid,contact_no) );
```

Insert statements

```
INSERT INTO BloodBank VALUES ('BB1', 'A+', 9876543210);
```

```
INSERT INTO BloodBank VALUES ('BB2', 'B-', 9876543211);
```

```
INSERT INTO Blood VALUES ('S1', 'A+', 0);
```

```
INSERT INTO Blood VALUES ('S2', 'B-', 1);
```

```
INSERT INTO Manager VALUES ('M1', 'John Doe', 'BB1');
```

```
INSERT INTO Manager VALUES ('M2', 'Jane Doe', 'BB2');
```

```
INSERT INTO Employee VALUES ('E1', 'Alice', 'BB1');
```

```
INSERT INTO Employee VALUES ('E2', 'Bob', 'BB2');
```

```
INSERT INTO MgrContact VALUES ('M1', 1234567890);
```

```
INSERT INTO MgrContact VALUES ('M2', 1234567891);
```

```
INSERT INTO Receptionist VALUES ('R1', 'Alice', 9876543213, 'BB1');
```

INSERT INTO Receptionist VALUES ('R2', 'Bob', 9876543214, 'BB2');

INSERT INTO bdonor VALUES ('D1', 'John Doe', '10-jan-1998', 'male', 19, '10-feb-2022', 9188752327, 'R1', 'S1');

INSERT INTO bdonor VALUES ('D2', 'Alicia', '22-jan-1998', 'female', 18, '10-feb-2022', 9168752327, 'R1', 'S2');

INSERT INTO DAddress VALUES ('D1', '12 Main St', 'abc', 'def');

INSERT INTO DAddress VALUES ('D2', '20 Pine Ave', 'ghi', 'def');

INSERT INTO stored_in VALUES ('S1', 'BB1', '2023-03-15', 100);

INSERT INTO stored_in VALUES ('S4', 'BB1', '20-mar-2023', 200);

INSERT INTO Hospital VALUES ('Hospital A', 'BB1', 'Tumkur', 20);

INSERT INTO Hospital VALUES ('Hospital B', 'BB2', 'Tumkur', 10);

INSERT INTO Patient VALUES ('P1', 'John Doe', 'A+', 'BB1');

INSERT INTO Patient VALUES ('P2', 'Jane Doe', 'B-', 'BB1');

INSERT INTO PatientContact VALUES ('P1', '1234567890');

INSERT INTO PatientContact VALUES ('P2', '2345678901');

Queries,Stored procedures,Triggers

SIMPLE QUERIES:

1.> List the names of the donors who belong to the AB+ blood group and are female.

```
SELECT d.name
```



```
FROM bdonor d,blood b
WHERE b.blood_grp='b-' AND d.gender='female' AND b.sample_id=d.sample_id;
```

2.> Show the donors having the same blood groups required by the Patient.

```
SELECT d.name
FROM bDonor d,Patient p,Blood b
WHERE p.blood_grp=b.blood_grp AND b.sample_id=d.sample_id ;
```

3.> List the names of registered donors who donated blood aged 18-28 years.

```
SELECT name,age
FROM donor
WHERE age BETWEEN 18 AND 28 ;
```

AGGREGATE:

4.> SUM-Find the total number of blood samples collected till date.

```
SELECT COUNT(bid)
FROM BloodBank;
```

5.> MIN-Find the youngest blood donor(donor with minimum age).

```
SELECT name
FROM Donor
WHERE age = ( SELECT MIN(age) FROM Donor );
```

6.> MAX-Find the names of donors who has donated max amount of blood.

```
SELECT d.name,s.volume_collected
FROM stored_in s,bDonor d
WHERE s.sample_id=d.sample_id AND volume_collected IN
(SELECT MAX(volume_collected) FROM stored_in);
```

7.> AVG-Find average amount of blood donated per blood group.

```
SELECT b.blood_grp, AVG(s.volume_collected)
FROM stored_in s,Blood b
WHERE s.sample_id=b.sample_id
```

```
GROUP BY b.blood_grp;
```

GROUPBY and ORDERBY:

8.> Find the most common blood type among donors and display in descending order.

```
SELECT blood_grp, COUNT(*) AS frequency
FROM Blood
GROUP BY blood_grp
ORDER BY frequency DESC;
```

UNION:

9.> List the name, dob and id of donor who is registered by registration staff 'Bob' or who have B- blood group.

```
SELECT d.name,d.dob,d.donor_id
FROM bDonor d,Receptionist r
WHERE r.name='Bob' AND r.emp_id=d.emp_id
UNION
SELECT d.name,d.dob,d.donor_id
FROM bDonor d,Blood b
WHERE b.blood_grp='B-' AND b.sample_id=d.sample_id;
```

LIKE:

10.> Find all the donors who donated on particular month.

```
SELECT *
FROM bDonor
WHERE donor_id IN
(SELECT donor_id FROM bDonor WHERE donation_date LIKE '%FEB%');
```

NESTED:

11.> list the name of employees who are not managers.

```
SELECT mgrname
FROM Employee
WHERE emp_id NOT IN(SELECT mgr_id FROM Manager );
```

VIEWS:

12.> Create a View of recipients and donors names having the same blood group registered on the same date.

```
CREATE VIEW Blood_Recipient_SameBGrp;
AS
SELECT Blood_Donor.bd_name, Recipient.reci_name, reco_Name FROM
Recording_Staff
INNER JOIN Blood_Donor ON Recording_Staff.reco_ID = Blood_Donor.reco_ID
INNER JOIN Recipient ON Recording_Staff.reco_ID = Recipient.reco_ID
WHERE Blood_Donor.bd_Bgroup = Recipient.reci_Bgrp AND
Blood_Donor.bd_reg_date = Recipient.reci_reg_date;
```

TRIGGER:

13.> A trigger that checks the volume of the donation before inserting it.

```
CREATE TRIGGER check_volume
BEFORE INSERT ON stored_in
FOR EACH ROW
BEGIN
IF :NEW.volume_collected < 150 THEN
raise_application_error(-20009, 'Donation volume must be at least 150');
END IF;
END;
/
```

PROCEDURES:

14.> A procedure that retrieves the blood group of corresponding sample id.

```
CREATE OR REPLACE PROCEDURE bgroup(id VARCHAR)
IS
X blood%ROWTYPE;
CURSOR c IS
SELECT b.* FROM blood b
WHERE b.sample_id=id;
BEGIN
FOR X IN c LOOP
SYS.DBMS_OUTPUT.PUT_LINE(X.sample_id||' : '||X.blood_grp);
end loop;
END;
/
```

CORELATED NESTED:

15.> Find the names of donors who have made at least one AB+ blood type Donation.

```
SELECT name FROM bdonor
WHERE name IN (SELECT name FROM blood b, bdonor d
WHERE d.sample_id = b.sample_id AND blood_grp = 'AB+');
```


16.> Find the number of donations made by donors who live in a specific district.

```
SELECT COUNT(*) FROM bdonor
WHERE donor_id IN
(SELECT donor_id FROM daddress WHERE district = 'def');
```

17.> Find the total number of donations made by donors of a specific blood Type.

```
SELECT COUNT(*) FROM bdonor
WHERE donor_id IN (SELECT donor_id FROM bdonor d, blood b
WHERE d.sample_id=b.sample_id AND blood_grp = 'O+');
```

Snapshots

 Run SQL Command Line

```
SQL> connect activity;
Enter password:
Connected.
SQL> set linesize 180;
SQL> select * from bloodBank;
```

BID	BLOOD_	CONTACT_NO
BB1	A+	9876543210
BB2	B-	9876543211
BB3	AB+	9876543212

```
SQL> select * from blood;
```

SAMPLE_ID	BLOOD_	DISEASES_INFECTED
S1	A+	0
S2	B-	1
S3	AB+	0
S4	O+	0
S5	O+	0
S6	AB+	0

6 rows selected.

```
SQL> select * from manager;
```

MGR_ID	MGRNAME	BID
M1	John Doe	BB1
M2	Jane Doe	BB2
M3	Bob Smith	BB3

```
SQL> select * from employee;
```

EMP_ID	MGRNAME	BID
E1	Alice	BB1
E2	Bob	BB2
E3	Charlie	BB3
M1	John Doe	BB1
M2	Jane Doe	BB2
M3	Bob Smith	BB3

6 rows selected.

```
SQL> select * from mgrcontact;
```

MGR_ID	CONTACT_NO
M1	1234567890
M2	1234567891
M3	1234567892

```
SQL> select * from receptionist;
```

EMP_ID	NAME	CONTACT_NO	BID
R1	Alice	9876543213	BB1
R2	Bob	9876543214	BB2
R3	Charlie	9876543215	BB3

```
SQL> select * from bdonor;
```

DONOR_ID	NAME	DOB	GENDER	BMI	DONATION_	CONTACT_NO	EMP_ID	SAMPLE_ID
D1	John Doe	10-JAN-98	male	19	10-FEB-22	9188752327	R1	S1
D2	Alicia	22-JAN-98	female	18	10-FEB-22	9168752527	R1	S2
D3	Rohan	10-MAR-98	male	24	10-MAR-22	9188733327	R2	S3
D4	Shyam	16-DEC-00	male	20	20-MAR-22	9223921299	R1	S4
D5	Rock	08-MAR-03	male	17	20-APR-22	9223925599	R2	S5

```
SQL> select * from daddress;
```

DONOR_ID	STREET	CITY	DISTRICT
D1	12 Main St	abc	def
D2	20 Pine Ave	ghi	def

```
SQL> select * from stored_in;
```

SAMPLE_ID	BID	EXP_DATE	VOLUME_COLLECTED
S1	BB1	15-MAR-23	100
S2	BB1	12-FEB-22	200
S4	BB1	20-MAR-23	200
S5	BB1	20-MAR-23	300
S6	BB1	20-FEB-23	200

Run SQL Command Line

```
SQL> select * from hospital;
```

NAME	BID	CITY	NO_OF_REQUESTS
Hospital A	BB1	Tumkur	20
Hospital B	BB1	Tumkur	10

```
SQL> select * from patient;
```

PID	NAME	BLOOD_GRP	BID
P1	John Doe	A+	BB1
P2	Jane Doe	B-	BB1

```
SQL> select * from patientcontact;
```

PID	CONTACT_NO
P1	1234567890
P2	2345678901

```
SQL> _
```

Run SQL Command Line

```
SQL> select d.name
  2   from bDonor d,Blood b
  3   where b.blood_grp='B-' and d.gender='female' and b.sample_id=d.sample_id;
```

NAME

Alicia

```
SQL> select d.name
  2   from bDonor d,Patient p,Blood b
  3   where p.blood_grp=b.blood_grp and b.sample_id=d.sample_id ;
```

NAME

John Doe
Alicia

```
SQL> SELECT name,age
  2         FROM donor
  3         WHERE age BETWEEN 18 AND 28 ;
```

NAME	AGE
John Doe	25
Alicia	25
Rohan	25
Shyam	22
Rock	20

```
SQL> select count(bid)
  2   from BloodBank;
```

COUNT(BID)

3

```
SQL> SELECT name
  2         FROM Donor
  3         WHERE age = ( SELECT MIN(age)
  4                       FROM Donor );
```

NAME

Rock

Run SQL Command Line

```
SQL> select d.name,s.volume_collected
  2  from stored_in s,bDonor d
  3  where s.sample_id=d.sample_id and volume_collected in(select max(volume_collected) from stored_in);
```

NAME	VOLUME_COLLECTED
Rock	300

```
SQL> select b.blood_grp, AVG(s.volume_collected)
  2  from stored_in s,Blood b
  3  where s.sample_id=b.sample_id
  4  GROUP BY b.blood_grp;
```

BLOOD_	AVG(S.VOLUME_COLLECTED)
B-	200
AB+	200
O+	250
A+	100

```
SQL> SELECT blood_grp, COUNT(*) as frequency
  2  FROM Blood
  3  GROUP BY blood_grp
  4  ORDER BY frequency DESC;
```

BLOOD_	FREQUENCY
AB+	2
O+	2
A+	1
B-	1

```
SQL> select d.name,d.dob,d.donor_id
  2  from bDonor d,Receptionist r
  3  where r.name='Bob' and r.emp_id=d.emp_id
  4  UNION
  5  select d.name,d.dob,d.donor_id
  6  from bDonor d,Blood b
  7  where b.blood_grp='B-' and b.sample_id=d.sample_id;
```

NAME	DOB	DONOR_ID
Alicia	22-JAN-98	D2
Rock	08-MAR-03	D5
Rohan	10-MAR-98	D3

```
SQL> SELECT *
  2 FROM bDonor
  3 WHERE donor_id IN (SELECT donor_id
  4   FROM bDonor
  5   WHERE donation_date like '%FEB%');
```

DONOR_ID	NAME	DOB	GENDER	BMI	DONATION_	CONTACT_NO	EMP_ID	SAMPLE_ID
D1	John Doe	10-JAN-98	male	19	10-FEB-22	9188752327	R1	S1
D2	Alicia	22-JAN-98	female	18	10-FEB-22	9168752527	R1	S2

```
SQL> select mgrname
  2 from Employee
  3 where emp_id NOT IN(select mgr_id from Manager );
```

MGRNAME

Alice

Bob

Charlie

```
SQL> insert into stored_in values('S1','BB2','11-mar-2023',120);
insert into stored_in values('S1','BB2','11-mar-2023',120)
      *
```

ERROR at line 1:

ORA-20009: Donation volume must be at least 150

ORA-06512: at "ACTIVITY.CHECK_VOLUME", line 3

ORA-04088: error during execution of trigger 'ACTIVITY.CHECK_VOLUME'

```
SQL> exec bgroup('S5');
```

PL/SQL procedure successfully completed.

```
SQL> set serveroutput on;
```

```
SQL> exec bgroup('S5');
```

S5 : 0+

PL/SQL procedure successfully completed.

```
SQL> SELECT name FROM bdonor
  2 WHERE name in (SELECT name FROM blood b,bdonor d
  3 WHERE d.sample_id = b.sample_id AND blood_grp = 'AB+');
```

NAME

Rohan

Run SQL Command Line

```
SQL> SELECT name FROM bdonor
  2 WHERE name in (SELECT name FROM blood b,bdonor d
  3 WHERE d.sample_id = b.sample_id AND blood_grp = 'AB+');

NAME
-----
Rohan

SQL> Find the number of donations made by donors who live in a specific district:
SP2-0734: unknown command beginning "Find the n..." - rest of line ignored.
SQL> SELECT COUNT(*) FROM bdonor
  2 WHERE donor_id IN (SELECT donor_id FROM daddress
  3 WHERE district = 'def');

COUNT(*)
-----
2

SQL> SELECT COUNT(*) FROM bdonor
  2 WHERE donor_id IN (SELECT donor_id FROM bdonor d,blood b
  3 WHERE d.sample_id=b.sample_id and blood_grp = 'O+');

COUNT(*)
-----
2

SQL>
```