DBMS PROJECT :- BLOOD BANK

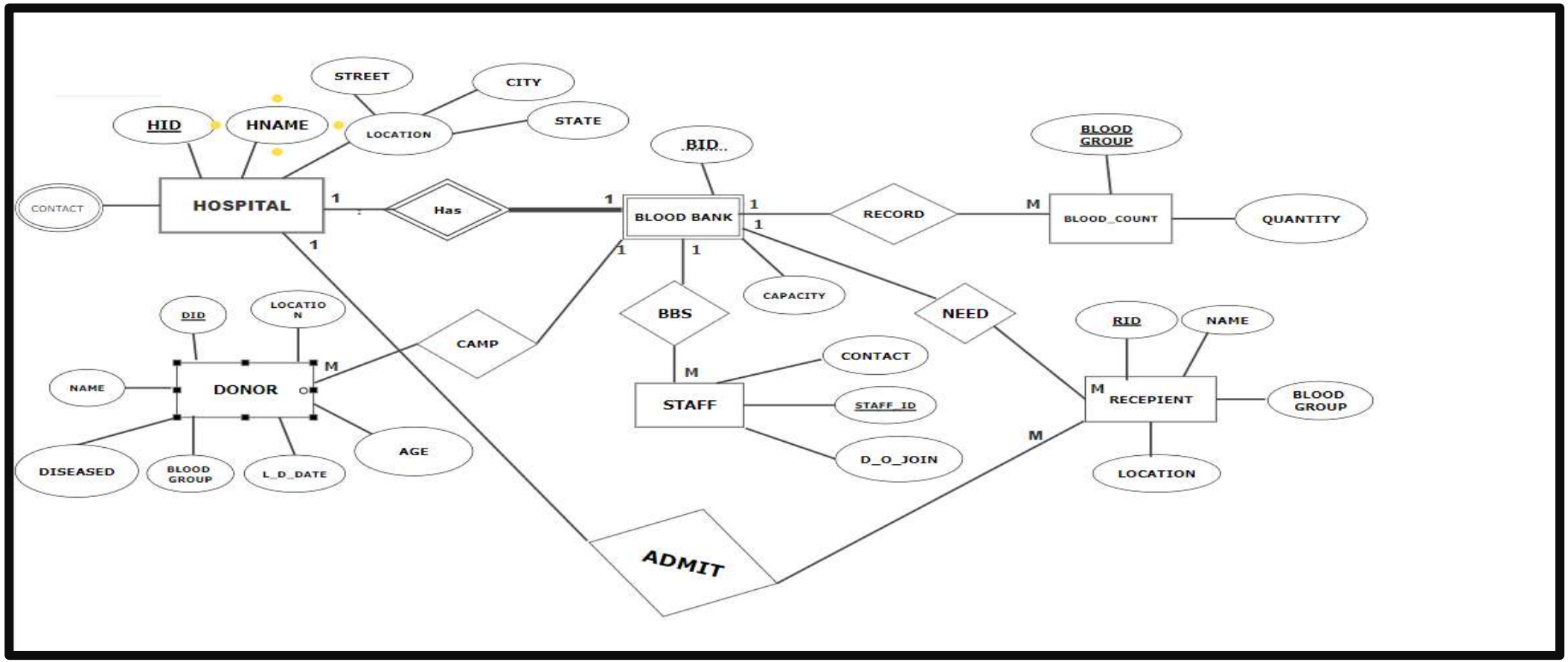
PROBLEM STATEMENT

- In our society, unprecedented accidents and emergencies occur without warning, often leaving individuals in critical need of blood transfusions to sustain their lives. Unfortunately, the demand for blood often surpasses the available resources, leading to critical shortages and putting lives at risk. Addressing this challenge, our team has come up with a database design which aims to provide immediate donation of blood , and takes care of blood compatibility.

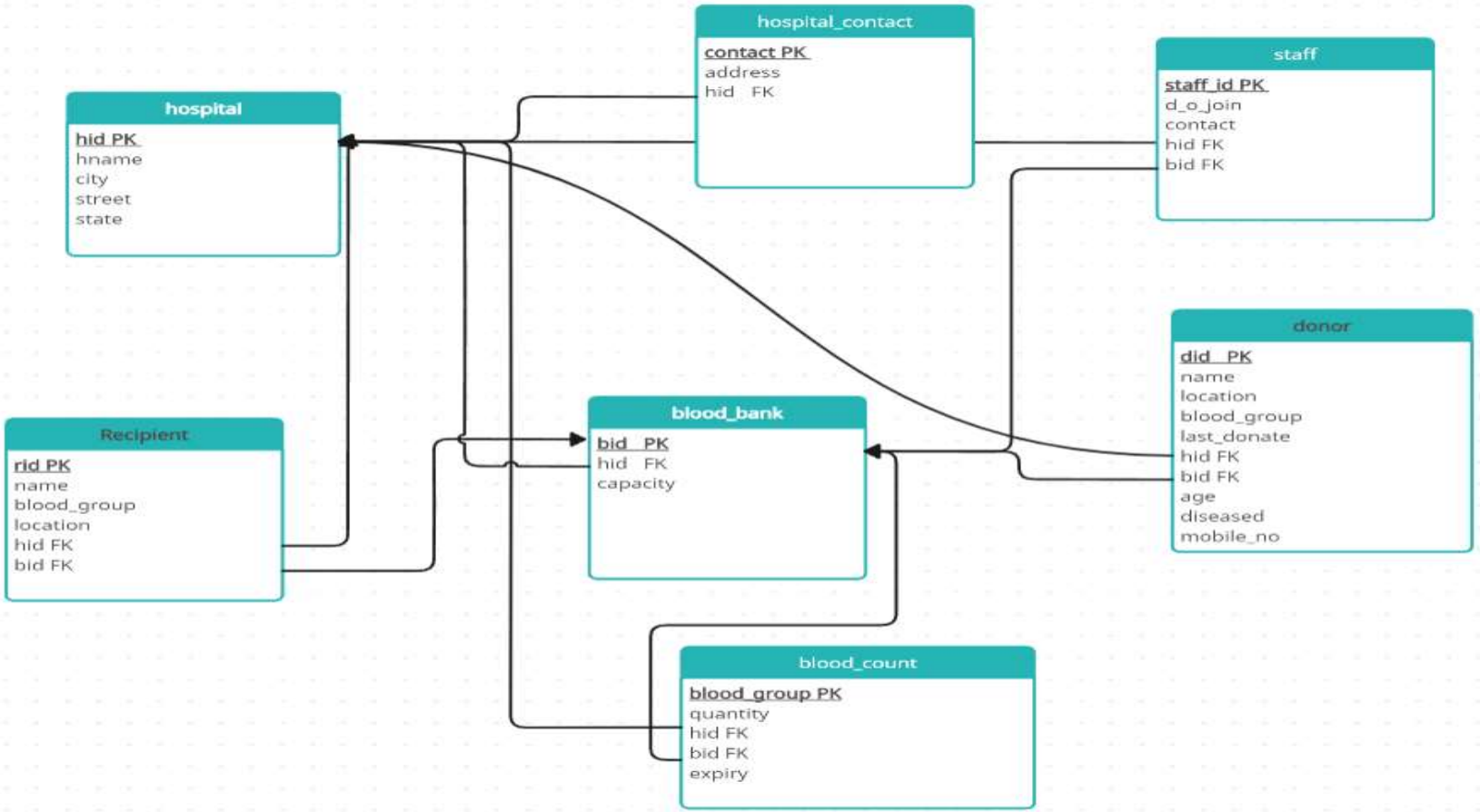
ENTITY SET OF OUR DATABASE

- **1) Blood bank (weak entity)**
- **2) Donor**
- **3) Recipient**
- **4) Hospital**
- **5) Staff**
- **6) Blood_count**

ER MODEL


STREET
CITY
HID
HNAME
LOCATION
STATE
BID
BLOOD GROUP
CONTACT
HOSPITAL
1
Has
1
BLOOD BANK
1
1
RECORD
M
BLOOD_COUNT
QUANTITY
1
1
1
CAPACITY
DID
LOCATIO N
BBS
NEED
RID
NAME
CAMP
CONTACT
M
M
NAME
DONOR
STAFF
STAFF_ID
M
RECEPIENT
BLOOD GROUP
AGE
D_O_JOIN
M
DISEASED
BLOOD GROUP
L_D_DATE
LOCATION
ADMIT

RELATIONAL DIAGRAM



ASSUMPTIONS MADE:

- Each hospital ,will have only one blood bank.
- Recipient can receive blood either from the hospital he/she is admitted in or directly from the blood bank.
- Each donor will donate 1 L blood.

RELATIONAL TABLE CREATION

```
create database blood_donation;

use  blood_donation;

1)create table hospital(hid int,hname varchar(30),city varchar(30),street
varchar(30),state varchar(30),  primary key (hid));

2)create table blood_bank(hid int,bid int,capacity int,primary key(hid,bid));

3)create table hospital_contact(contact numeric, address varchar(50), hid int,
primary key(hid,contact),

                                    foreign key (hid) references hospital(hid));
```

4)create table donor(did int,name_ varchar(30),location varchar(30), blood_group varchar(5),last_donate date, hid int,bid int, age int, check(age>=18),diseased bool ,check (diseased=FALSE or diseased=0), mobile_no numeric(10), primary key(did,hid,bid),foreign key(hid,bid) references blood_bank(hid,bid));

5)create table blood_count(blood_group varchar(5),quantity int,hid int,bid int, expiry date, primary key(hid,bid,blood_group),foreign key (hid,bid) references blood_bank(hid,bid));

6)create table staff(staff_id int,d_o_join date,contact int,hid int,bid int,

primary key(hid,bid,staff_id),foreign key(hid,bid) references blood_bank(hid,bid));

7)CREATE TABLE COMPAT(dbg varchar(5),rbg varchar(5),primary key (dbg,rbg));

8)create table recepient(rid int,name_ varchar(30),blood_group varchar(5),location varchar(30),

hid int,bid int, primary key(hid,bid,rid),foreign key(hid,bid) references blood_bank(hid,bid));

DATA INSERTION

- INSERT INTO HOSPITAL VALUES(1,'HIRANANDANI','THANE','ESTATE','MAHARASHTRA');
- INSERT INTO HOSPITAL VALUES(2,'JUPITER','THANE','LBS','MAHARASHTRA');
- INSERT INTO HOSPITAL VALUES(3,'LOVELY','mumbai','RGL','MAHARASHTRA');
- insert into hospital values(4,'GMCH','Jalore','Ring_road','Rajasthan');
- insert into hospital values(5,'SMS','Jaipur','Moti_road','Rajasthan');
- insert into hospital values(6,'GOVT_hospital','Jaipur','Rambagh_street','Rajasthan');
- insert into hospital values(7,'AIIMS_Jodhpur','Jodhpur','Pal_road','Rajasthan');
- select *from hospital;
- insert into blood_bank values(1,1,100);
- insert into blood_bank values(2,2,120);
- insert into blood_bank values(3,3,125);
- insert into blood_bank values(4,4,110);
- insert into blood_bank values(5,5,115);

- insert into hospital_contact values(4924114141,'01_ESTATE_THANE',1);
- insert into hospital_contact values(4254114141,'21_LBS_THANE',2);
- insert into hospital_contact values(9824114141,'12_RGL_MUMBAI',3);
- insert into hospital_contact values(7384114141,'1_RINGROAD_JALORE_RJ',4);
- insert into hospital_contact values(1924114141,'11_MOTIROAD_JAIPUR',5);
- insert into hospital_contact values(9824114741,'112_RAMBAGH_PALACE_JAIPUR',6);
- insert into hospital_contact values(9924114141,'1_PALROAD_JODHPUR',7);
- INSERT INTO donor VALUES (1, 'HERAMB', 'THANE', 'AB+', '2023-03-27', 1, 1,20,FALSE,423456789);
- INSERT INTO DONOR values(2,'PRANAV','THANE','B+','2022-02-24',1,1,22,FALSE,3434567890);
- INSERT INTO DONOR values(3,'SIDDH','THANE','A-','2022-02-24',1,1,21,FALSE,2534567890);
- INSERT INTO DONOR values(4,'SHIRISH','THANE','AB+','2020-02-24',1,1,23,FALSE,3434567890);
- INSERT INTO DONOR values(5,'HARSH','THANE','O-','2018-02-24',2,2,43,FALSE,5634567890);
- INSERT INTO DONOR values(6,'PARTH','THANE','O+','2017-01-30',2,2,40,FALSE,9434567890);

- INSERT INTO DONOR values(7,'RONIT','THANE','AB-','2019-06-05',2,2,54,FALSE,1334567890);
- INSERT INTO DONOR values(8,'BHUSHAN','THANE','B-','2011-06-05',2,2,45,FALSE,9234567890);
- INSERT INTO donor VALUES (11, 'Abhishek', 'Jaipur', 'A+', '2023-10-15', 7, 7, 20, 0, 1234567890);
- INSERT INTO donor VALUES (12, 'Priya_Sharma', 'Mumbai', 'B-', '2023-11-20', 4, 4, 30, 0, 9876543210);
- INSERT INTO donor VALUES (13, 'Ramesh_Patel', 'Jodhpur', 'O+', '2023-09-05', 7, 7, 34, 0, 8765432109);
- INSERT INTO donor VALUES (14, 'Sunita_Singh', 'Jalore', 'AB+', '2023-12-18', 5, 5, 24, 0, 7654321098);
- INSERT INTO donor VALUES (15, 'Amit_Gupta', 'Jaipur', 'A-', '2023-08-30', 7, 7, 43, 0, 6543210987);
- INSERT INTO donor VALUES (16, 'Anjali_Devi', 'Mumbai', 'B+', '2023-10-25', 7, 7, 21, 0, 5432109876);
- INSERT INTO donor VALUES (17, 'Sandeep_Mishra', 'Jodhpur', 'O-', '2023-11-12', 4, 4, 55, 0, 4321098765);
- INSERT INTO donor VALUES (18, 'Muskan_Tiwari', 'Mumbai', 'AB-', '2023-09-28', 4, 4, 23, 0, 3210987654);
- INSERT INTO donor VALUES (19, 'Rajesh_Kumar', 'Jaipur', 'A+', '2023-11-05', 5, 5, 29, 0, 2109876543);
- INSERT INTO donor VALUES (20, 'Meera_Singh', 'Jalore', 'B-', '2023-10-10', 5, 5, 41, 0, 1098765432);

- INSERT INTO donor VALUES (21, 'Arun_Sharma', 'Mumbai', 'O+', '2023-12-22', 6, 6, 62, 0, 987654321);
- INSERT INTO donor VALUES (22, 'Kavita_Reddy', 'Jodhpur', 'AB+', '2023-09-15', 6, 6, 36, 0, 9876543210);
- INSERT INTO donor VALUES (23, 'Sanjay_Kumar', 'Jaipur', 'A-', '2023-11-18', 6, 6, 27, 0, 8765432109);
- INSERT INTO donor VALUES (24, 'Pooja_Patel', 'Mumbai', 'B+', '2023-10-05', 5, 5, 71, 0, 7654321098);
- INSERT INTO donor VALUES (25, 'Durgesh_Mishra', 'Jodhpur', 'O-', '2023-08-20', 6, 6, 18, 0, 6543210987);
- INSERT INTO donor VALUES (26, 'Anita_Verma', 'Jaipur', 'AB-', '2023-12-28', 4, 4, 19, 0, 5432109876);
- INSERT INTO donor VALUES (27, 'Raj_Kumar', 'Mumbai', 'A+', '2023-09-02', 5, 5, 18, 0, 4321098765);
- INSERT INTO donor VALUES (28, 'Radha_Gupta', 'Jodhpur', 'B-', '2023-10-30', 7, 7, 29, 0, 3210987654);
- INSERT INTO donor VALUES (29, 'Suresh_Yadav', 'Jaipur', 'O+', '2023-11-15', 5, 5, 31, 0, 2109876543);
- INSERT INTO donor VALUES (30, 'Kiran_Singh', 'Mumbai', 'AB+', '2023-09-08', 6, 6, 19, 0, 1098765432);
- INSERT INTO donor VALUES (31, 'Kp_Singh', 'Mumbai', 'AB+', '2023-09-08', 5, 5, 19, 0, 1098765432);

- insert into blood_count values('AB+',0,1,1);
- insert into blood_count values('AB-',0,1,1);
- insert into blood_count values('B+',0,1,1);
- insert into blood_count values('B-',0,1,1);
- insert into blood_count values('A+',0,1,1);
- insert into blood_count values('A-',0,1,1);
- insert into blood_count values('O+',0,1,1);
- insert into blood_count values('O-',0,1,1);
- insert into blood_count values('AB+',0,2,2);
- insert into blood_count values('AB-',0,2,2);
- insert into blood_count values('B+',0,2,2);
- insert into blood_count values('B-',0,2,2);
- insert into blood_count values('A+',0,2,2);
- insert into blood_count values('A-',0,2,2);
- insert into blood_count values('O+',0,2,2);
- insert into blood_count values('O-',0,2,2);

- insert into blood_count values('AB+',0,4,4);
- insert into blood_count values('AB-',0,4,4);
- insert into blood_count values('B+',0,4,4);
- insert into blood_count values('B-',0,4,4);
- insert into blood_count values('A+',0,4,4);
- insert into blood_count values('A-',0,4,4);
- insert into blood_count values('O+',0,4,4);
- insert into blood_count values('O-',0,4,4);
- insert into blood_count values('AB+',0,5,5);
- insert into blood_count values('AB-',0,5,5);
- insert into blood_count values('B+',0,5,5);
- insert into blood_count values('B-',0,5,5);
- insert into blood_count values('A+',0,5,5);
- insert into blood_count values('A-',0,5,5);

- insert into blood_count values('O+',0,5,5);
- insert into blood_count values('O-',0,5,5);
- INSERT INTO blood_count VALUES ('A+', 42, 7, 7, '2024-01-05');
- INSERT INTO blood_count VALUES ('A+', 75, 4, 4, '2024-01-07');
- INSERT INTO blood_count VALUES ('A+', 18, 5, 5, '2024-02-10');
- INSERT INTO blood_count VALUES ('A+', 93, 6, 6, '2024-03-15');
-
- INSERT INTO blood_count VALUES ('A-', 65, 7, 7, '2024-01-08');
- INSERT INTO blood_count VALUES ('A-', 30, 4, 4, '2024-01-09');
- INSERT INTO blood_count VALUES ('A-', 88, 5, 5, '2024-02-12');
- INSERT INTO blood_count VALUES ('A-', 12, 6, 6, '2024-03-18');

- INSERT INTO blood_count VALUES ('B+', 82, 7, 7, '2024-01-11');
- INSERT INTO blood_count VALUES ('B+', 47, 4, 4, '2024-01-14');
- INSERT INTO blood_count VALUES ('B+', 55, 5, 5, '2024-02-16');
- INSERT INTO blood_count VALUES ('B+', 39, 6, 6, '2024-03-20');
-
- INSERT INTO blood_count VALUES ('B-', 23, 7, 7, '2024-01-13');
- INSERT INTO blood_count VALUES ('B-', 81, 4, 4, '2024-01-17');
- INSERT INTO blood_count VALUES ('B-', 44, 5, 5, '2024-02-19');
- INSERT INTO blood_count VALUES ('B-', 69, 6, 6, '2024-03-22');
-
- INSERT INTO blood_count VALUES ('AB+', 90, 7, 7, '2024-01-21');
- INSERT INTO blood_count VALUES ('AB+', 15, 4, 4, '2024-01-23');
- INSERT INTO blood_count VALUES ('AB+', 37, 5, 5, '2024-02-25');
- INSERT INTO blood_count VALUES ('AB+', 58, 6, 6, '2024-03-27');

- INSERT INTO blood_count VALUES ('AB-', 50, 7, 7, '2024-03-29');
- INSERT INTO blood_count VALUES ('AB-', 64, 4, 4, '2024-01-29');
- INSERT INTO blood_count VALUES ('AB-', 78, 5, 5, '2024-02-20');
- INSERT INTO blood_count VALUES ('AB-', 26, 6, 6, '2024-03-01');
-
- INSERT INTO blood_count VALUES ('O+', 77, 3, 3, '2024-01-02');
- INSERT INTO blood_count VALUES ('O+', 9, 4, 4, '2024-01-03');
- INSERT INTO blood_count VALUES ('O+', 71, 5, 5, '2024-02-04');
- INSERT INTO blood_count VALUES ('O+', 33, 6, 6, '2024-03-29');
-
- INSERT INTO blood_count VALUES ('O-', 22, 7, 7, '2024-01-06');
- INSERT INTO blood_count VALUES ('O-', 85, 4, 4, '2024-01-07');
- INSERT INTO blood_count VALUES ('O-', 56, 5, 5, '2024-02-08');
- INSERT INTO blood_count VALUES ('O-', 41, 6, 6, '2024-03-09');

- INSERT INTO STAFF VALUES(101,'2020-07-18',12345,1,1);
- INSERT INTO STAFF VALUES(102,'2021-05-10',54321,1,1);
- INSERT INTO STAFF VALUES(103,'2022-02-18',21435,1,1);
- INSERT INTO STAFF VALUES(104,'2013-07-18',12346,1,1);
- INSERT INTO STAFF VALUES(105,'2022-01-07',12543,1,1);
-
- INSERT INTO STAFF VALUES(201,'2021-07-18',98765,2,2);
- INSERT INTO STAFF VALUES(202,'2021-05-10',56789,2,2);
- INSERT INTO STAFF VALUES(203,'2012-02-18',56879,2,2);
- INSERT INTO STAFF VALUES(204,'2014-07-18',57969,2,2);
- INSERT INTO STAFF VALUES(205,'2015-01-07',76985,2,2);

- INSERT INTO staff VALUES (10, '2022-05-15', 9123456780, 7, 7);
- INSERT INTO staff VALUES (11, '2022-06-20', 9876543210, 7, 7);
- INSERT INTO staff VALUES (12, '2022-07-25', 8765432109, 4, 4);
- INSERT INTO staff VALUES (13, '2022-08-30', 9345678901, 4, 4);
- INSERT INTO staff VALUES (14, '2022-09-10', 8456789012, 5, 5);
- INSERT INTO staff VALUES (15, '2022-10-15', 9567890123, 5, 5);
- INSERT INTO staff VALUES (16, '2022-11-20', 5678901234, 6, 6);
- INSERT INTO staff VALUES (17, '2022-12-25', 6789012345, 6, 6);
- INSERT INTO staff VALUES (18, '2023-01-30', 7890123456, 7, 7);
- INSERT INTO staff VALUES (19, '2023-02-05', 8901234567, 7, 7);

- insert into COMPAT values('O-','AB+');
- insert into COMPAT values('O-','AB-');
- insert into COMPAT values('O-','B+');
- insert into COMPAT values('O-','B-');
- insert into COMPAT values('O-','A+');
- insert into COMPAT values('O-','A-');
- insert into COMPAT values('O-','O+');
- insert into COMPAT values('O-','O-');

- insert into COMPAT values('O+','AB+');
- insert into COMPAT values('O+','B+');

- insert into COMPAT values('O+','A+');
- insert into COMPAT values('O+','O+');
- insert into COMPAT values('A-','AB+');
- insert into COMPAT values('A-','AB-');
- insert into COMPAT values('A-','A+');
- insert into COMPAT values('A-','A-');
- insert into COMPAT values('A+','AB+');
- insert into COMPAT values('A+','A+');
- insert into COMPAT values('B-','AB+');
- insert into COMPAT values('B-','AB-');
- insert into COMPAT values('B-','B+');
- insert into COMPAT values('B-','B-');

- insert into COMPAT values('B+','AB+');
- insert into COMPAT values('B+','B+');
- insert into COMPAT values('AB-','AB+');
- insert into COMPAT values('AB-','AB-');
- insert into COMPAT values('AB+','AB+');

- INSERT INTO recepient VALUES (1, 'Rahul', 'A+', 'Jaipur', 7, 7);
- INSERT INTO recepient VALUES (2, 'Priya', 'B-', 'Jodhpur', 7, 7);
- INSERT INTO recepient VALUES (3, 'Raja_Singh', 'O+', 'Jaipur', 4, 4);
- INSERT INTO recepient VALUES (4, 'Sunita', 'AB+', 'Jodhpur', 5, 5);
- INSERT INTO recepient VALUES (5, 'Ayush_Gupta', 'A-', 'Jaipur', 6, 6);
- INSERT INTO recepient VALUES (7, 'Sudeep', 'O-', 'Jalore', 4, 4);
- INSERT INTO recepient VALUES (8, 'Sneha', 'AB-', 'Jaipur', 5, 5);
- INSERT INTO recepient VALUES (9, 'Rahul', 'A+', 'Jaipur', 6, 6);
- INSERT INTO recepient VALUES (10, 'Mika_Singh', 'B-', 'Jalore', 7, 7);
- INSERT INTO recepient VALUES (11, 'Aditi', 'O+', 'Jodhpur', 4, 4);
- INSERT INTO recepient VALUES (12, 'Venkat_Reddy', 'AB+', 'Jaipur', 5, 5);
- INSERT INTO recepient VALUES (13, 'Sanjay_Goyal', 'A-', 'Jodhpur', 6, 6);
- INSERT INTO recepient VALUES (14, 'Akshar_Patel', 'B+', 'Jaipur', 7, 7);
- INSERT INTO recepient VALUES (15, 'Rohit_Sharma', 'O-', 'Jalore', 4, 4);

OUR MODEL SAMPLE QUERIES

1)**UPDATION OF BLOOD COUNT IN A PARTICULAR BLOOD BANK OF A BLOOD GROUP**

```
update blood_count
set quantity=quantity+1
WHERE (blood_group ='A+' and hid=1 and bid=1);
```

2)FOR FINDING DONOR FROM A NEAREST OR SPECIFIC LOCATION OF A BLOOD GROUP

```
select *from donor where location='mumbai' and blood_group='B+';
```

3) **IF A PATIENT IS ADMITTED IN HOSPITAL AND HE/SHE NEEDS BLOOD THEN WE CAN SEARCH COMPATIBLE BLOOD IN A BLOOD BANK**

```
select * from blood_count where (hid,bid)=(select hid,bid from recepient where rid=1) and blood_group IN
(select rbg from compat where dbg='A+');
```

4)IF A PATIENT IS ADMITTED IN HOSPITAL,TO RECEIVE COMPATIABLE AND MAXIMUM AVAILABLE BLOOD GROUP OF A PERSON

```
select blood_group,hid,bid from blood_count where quantity=(select max(quantity) as maxavail from blood_count where (blood_group) in ((select dbg from compat where (rbg) in (select blood_group from recepient where name_='RAHUL'))));
```

5)TO UPDATE THE BLOOD COUNT OF A BLOOD BANK OF THE GROUP DONATED TO THAT PERSON

```
set @bd=(select blood_group from (select blood_group,hid,bid from blood_count where quantity=(select max(quantity) as maxavail from blood_count where (blood_group) in ((select dbg from compat where (rbg) in (select blood_group from recepient where name_='RAHUL')))))as kl);

set @hd=(select blood_group from (select blood_group,hid,bid from blood_count where quantity=(select max(quantity) as maxavail from blood_count where (blood_group) in ((select dbg from compat where (rbg) in (select blood_group from recepient where name_='RAHUL')))))as kl);

update blood_countset quantity=quantity-1where blood_group=@bd and hid=@hd and bid=@hd;
```

6) finding the blood which gonna expire today or on a specific date related to a hospital

```
SELECT * FROM blood_count WHERE expiry = DATE_FORMAT(NOW(), '%Y-%m-%d') and hid=7;
```

7)**IF HOSPITAL /BANK WILL ALLOW TO DONATE ONLY WHEN DONOR HAS LAST DONATED ATLEAST 4 MONTHS BEFORE**

```
select *from donor where location='THANE' and blood_group='AB+' and (extract(month from
last_donate)+4<=extract(month from sysdate())or extract(year from last_donate)+1<=extract(year from sysdate()))
and diseased=0;
```

8) **IF blood bank has deficiency of blood of a blood group then it can contact other blood bank**

```
select contact,hid from hospital_contact where (hid) in (select hid from blood_count where blood_group='AB+' and
quantity>0 ) and hid!=1;
```

9) **LISTING BLOOD GROUP ALONG WITH ITS TOTAL QUANITITY**

```
select blood_group,sum(quantity) as amount_ltr from blood_count group by blood_group;
```

NORMALIZATION

- In every relation , which we have defined all the functional dependencies ,hold in a such a way that the primary key always determines all the other attributes.
- Super key->(All attributes),this is the typical situation of a relation to be in BCNF.
- Hence , all our relations are in BCNF. We have made sure to minimize the anomalies as far as possible!