Functional Dependencies

1. Table Name: Payment

The functional dependencies are:

Tran_Id --> {Amount , Pay_Descr , Timestamp , User_Id, Dept_Id }

So, here we have Tran_Id as key which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** Tran_Id
II. **Foreign Key:** User_Id, Dept_Id
III. **Referential:** None
IV. **Domain:**
Payment(TRAN_ID VARCHAR(20),AMOUNT NUMERIC(6) NOT NULL,PAY_DESCR VARCHAR(20),TIME_STAMP TIMESTAMP)

2. Table Name: User_Details

The functional dependencies are:

User_Id --> {Fname , Lname , DOB , Mob_No , Email , Pan_No , City}

So, here we have User_Id as key which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** User_Id
II. **Foreign Key:** None
III. **Referential:** Payment Table, Appointment Table, Vehicle_Registration Table, E_Challan Table, Driving_License Table
IV. **Domain:** USER_DETAILS (USER_ID CHAR(10), FNAME VARCHAR(20) NOT NULL, LNAME VARCHAR(20) NOT NULL, DOB DATE, MOBILE_NO NUMERIC(10), EMAIL VARCHAR(30), PAN_NO CHAR(10) UNIQUE NOT NULL,CITY VARCHAR(50))

3. Table Name: Appointment

The functional dependencies are:

App_Id --> {App_status, Ap_Type,Timestamp,User_Id,Dept_Id }

So, here we have App_Id as key which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** App_Id
II. **Foreign Key:** User_Id,Dept_Id
III. **Referential:** Appointment_Reschedule Table, License_Result Table

IV. **Domain:** APPOINTMENT(APP_ID CHAR(9),APP_STATUS VARCHAR(10),APP_TYPE VARCHAR(20),TIME_STAMP TIMESTAMP)

4. Table Name: Appointment_Reschedule

The functional dependencies are:

App_id,Timestamp -> App_id

App_id,Timestamp -> Timestamp

So, here we have App_id,Timestamp as Composite key which also acts as a super key and determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Composite Key:** App_id,Timestamp
II. **Foreign Key:** App_id
III. **Referential:** None
IV. **Domain:** APPOINTMENT_RESECHEDULE(APP_ID CHAR(9),TIME_STAMP TIMESTAMP NOT NULL)

5. Table Name: Vehicle_Registration

The functional dependencies are:

License_Plate_no --> { Engine_No, Chasis_no, Veh_type, Timestamp , User_Id, Per_Id}

Engine_No --> { License_Plate_no, Chasis_no, Veh_type, Timestamp , User_Id, Per_Id}

Chasis_no --> { License_Plate_no ,Engine_No, Veh_type, Timestamp , User_Id, Per_Id}

So, here we have License_Plate_no and Engine_No and Chasis_no as candidate keys which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** License_Plate_no
II. **Foreign Key:** User_Id, Per_Id
III. **Referential:** None
IV. **Domain:** VEHICLE_REGISTRATION(LICENSE_PLATE_NO CHAR(10),ENGINE_NO VARCHAR(20) NOT NULL,CHASIS_NO CHAR(17) NOT NULL,VEH_TYPE VARCHAR(5), TIME_STAMP TIMESTAMP NOT NULL)

6. Table Name: Echallan

The functional dependencies are:

E_Challan_ID --> {E_Challan_Type, Time_Stamp,User_id}

So, here we have E_Challan_ID as key which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** E_Challan_ID

II. **Foreign Key:** User_Id
III. **Referential:** None
IV. **Domain:** ECHALLAN(E_CHALLAN_ID CHAR(10),E_CHALLAN_TYPE VARCHAR(200) NOT NULL,TIME_STAMP TIMESTAMP NOT NULL)

7. Table Name: Driving_License

The functional dependencies are:
L_ID --> {L_ID , D_Type,Issue_Date, Validity, User_id }
So, here we have L_Id as key which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** L_ID
II. **Foreign Key:** User_Id
III. **Referential:** None
IV. **Domain:** DRIVING_LICENSE(L_ID CHAR(15),D_TYPE VARCHAR(50),ISSUE_DATE DATE NOT NULL,VALIDITY DATE NOT NULL)

8. Table Name: License_Result

The functional dependencies are:
App_id, Test_Result -> App_id
App_id, Test_Result -> Test_Result
So, here we have App_id, Test_Result as Composite key which also acts as a super key and determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Composite Key:** App_id, Test_Result
II. **Foreign Key:** None
III. **Referential:** None
IV. **Domain:** LICENSE_RESULT(APP_ID CHAR(9),TEST_RESULT BOOLEAN);

9. Table Name: Permit

The functional dependencies are:
Per_Id --> {Per_type , Validity}
So, here we have Per_Id as key which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** Per_ID
II. **Foreign Key:** None

III. **Referential:** Vehicle_Registration Table
IV. **Domain:** PERMIT(PER_ID CHAR(10),PER_TYPE VARCHAR(3), VALIDITY DATE NOT NULL)

10. Table Name: Employee

The functional dependencies are:

Emp_Id --> {Fname,Lname,DOB,Email,Mob_no,Dept_id,Salary}

So, here we have Emp_Id as key which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** Emp_ID
II. **Foreign Key:** Dept_Id
III. **Referential:** None
IV. **Domain:** EMPLOYEE(EMP_ID CHAR(10),FNAME VARCHAR(20) NOT NULL,LNAME VARCHAR(20) NOT NULL,DOB DATE,MOBILE_NO NUMERIC(10),EMAIL VARCHAR(30),SALARY NUMERIC(5))

11. Table Name: Department

The functional dependencies are:

Dept_Id --> {Dept_name,Office_Id}

So, here we have Dept_Id as key which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** Dept_ID
II. **Foreign Key:** Office_Id
III. **Referential:** Employee Table, Appointment Table, Payment Table
IV. **Domain:** DEPARTMENT(DEPT_ID CHAR(10),DEPT_NAME VARCHAR(50))

12. Table Name: Office

The functional dependencies are:

Office_Id -> {city, pincode}

So, here we have Dept_Id as key which determines all the attributes, so our relation is in BCNF form.

Constraints:

I. **Primary Key:** Office_Id
II. **Foreign Key:** None
III. **Referential:** Department Table
IV. **Domain:** OFFICE(OFFICE_ID CHAR(10),CITY VARCHAR(20),PINCODE NUMERIC(6))