**GATE MANAGEMENT SYSTEM**

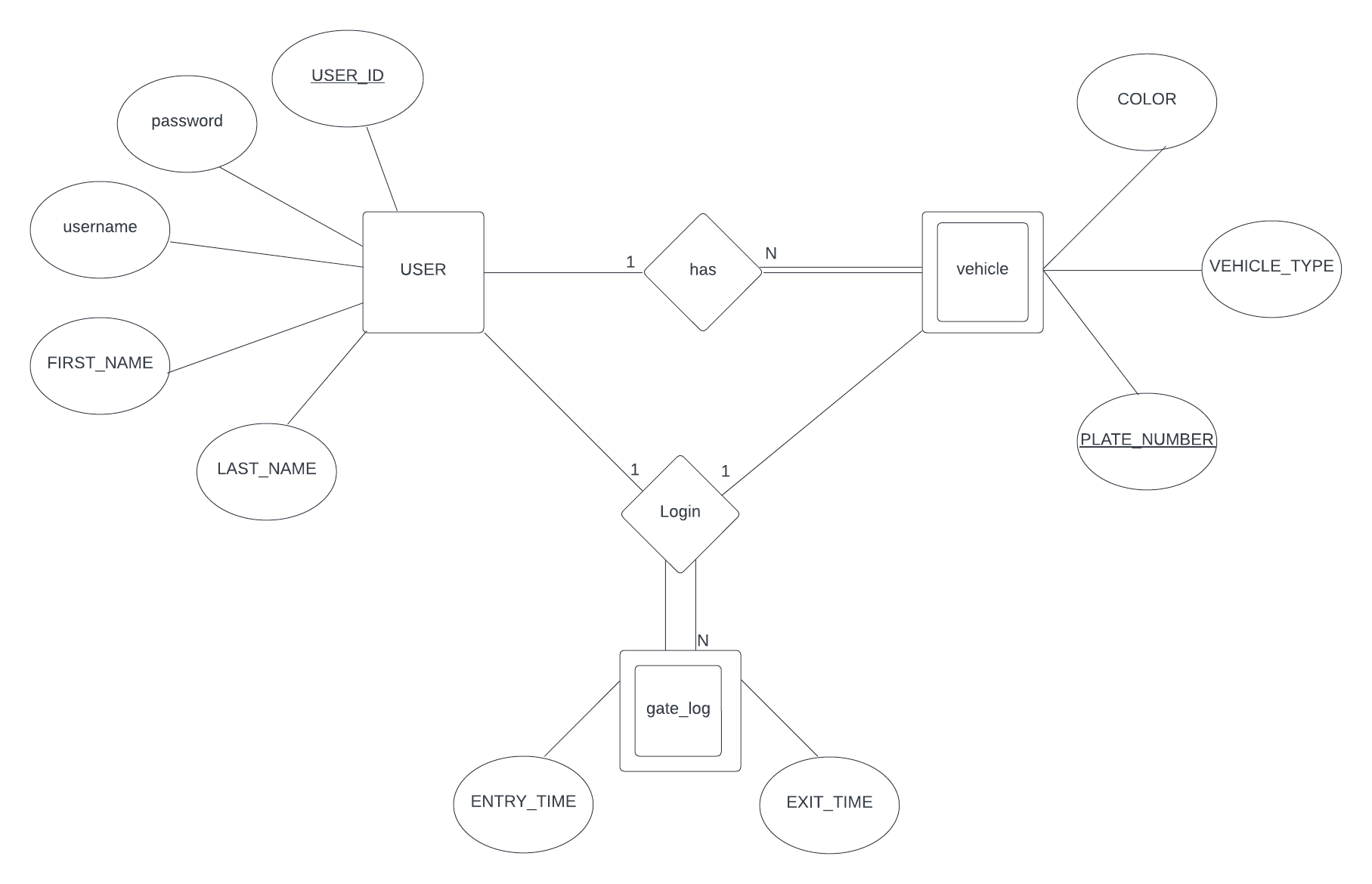
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**Video link :**

**https://drive.google.com/drive/folders/1tI84mOJTK1W5jW2\_4x74MLdSXRBDy1IM?usp=sharing**

# ENTITY RELATIONSHIP MODEL

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# Converting ER diagram to Relational

user (USER\_ID, FIRST\_NAME, LAST\_NAME, username,password)

PK: USER\_ID

vehicle(USER\_ID,PLATE\_NUMBER,COLOR,VEHICLE\_TYPE)

PK:(USER\_ID,PLATE\_NUMBER)

FK: USER\_ID REFERENCES user(USER\_ID)

gate\_log(USER\_ID,PLATE\_NUMBER,ENTRY\_TIME,EXIT\_TIME)

PK:(USER\_ID,PLATE\_NUMBER,ENTRY\_TIME)

FK: USER\_ID REFERENCES user(USER\_ID)

PLATE\_NUMBER REFERENCES vehicle( PLATE\_NUMBER)

# Converting it to 3rd Normal Form

1.user table

Functional Dependencies

1. USER\_ID -> FIRST\_NAME
2. USER\_ID -> LAST\_NAME
3. USER\_ID -> username
4. USER\_ID -> password

1NF

Table has no multivalued attribute therefore it is in 1st NF

2NF

USER\_ID is **Candidate Key** in above table and all other attributes fully functional dependent on USER\_ID therefore it is in 2NF

3NF

There is no Transitive relationship in the table therefore it is in 3NF.

2. Vehicle table

Functional Dependencies

a)PLATE\_NUMBER -> COLOR

b)PLATE\_NUMBER -> VEHICLE\_TYPE

1NF

Table has no multivalued attribute therefore it is in 1st NF

2NF

Candidate Key for the table is (USER\_ID,PLATE\_NUMBER) but COLOR and VEHICLE\_TYPE are partially dependent on the Candidate Key therefore **not in 2NF**

We divide the relation into two relations

i).vehicle(PLATE\_NUMBER,COLOR,VEHICLE\_TYPE)

PK: PLATE\_NUMBER

Functional Dependencies

a)PLATE\_NUMBER -> COLOR

b)PLATE\_NUMBER -> VEHICLE\_TYPE

Now it is in 2NF as COLOR and VEHICLE\_TYPE are fully dependent on PLATE\_NUMBER which is the Candidate Key

ii).owner(PLATE\_NUMBER,USER\_ID)

PK: (PLATE\_NUMBER,USER\_ID)

FK: USER\_ID REFERENCES user(USER\_ID)

PLATE\_NUMBER REFERENCES vehicle( PLATE\_NUMBER)

As there is no functional dependency in this relation therefore table is in 2NF

3NF

For vehicle table we do not have any transitive dependencies therefore it is in 3NF

For owner table we do not have any functional dependencies therefore by default it is in 3NF

3.gate\_log table

Functional Dependencies

ENTRY\_TIME,USER\_ID,PLATE\_NUMBER->EXIT\_TIME

1NF

Table has no multivalued attribute therefore it is in 1st NF

2NF

The Candidate Key is a combination of ENTRY\_TIME,PLATE\_NUMBER,USER\_ID which shows that the non prime attribute of EXIT\_TIME has full dependency. Hence it is in 2NF

3NF

There is no Transitive relationship in the table therefore it is in 3NF.

# Final Relational Table

**1.user (USER\_ID, FIRST\_NAME, LAST\_NAME, username,password)**

**2.vehicle(PLATE\_NUMBER,COLOR,VEHICLE\_TYPE)**

**3.owner(PLATE\_NUMBER,USER\_ID**

**4.gate\_log(USER\_ID,PLATE\_NUMBER,ENTRY\_TIME,EXIT\_TIME)**

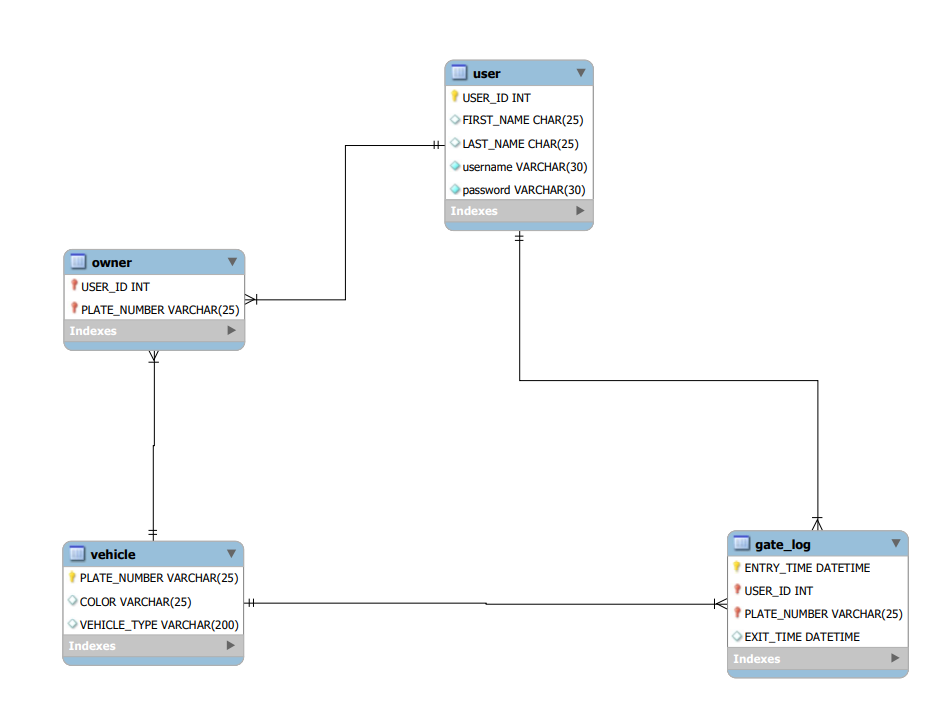


Fig 1: RELATIONAL MODE

# SQL Querries

## 1.DDL Querries

create Database gate\_management;

use gate\_management;

create table user(

USER\_ID INT NOT NULL PRIMARY KEY AUTO\_INCREMENT,

FIRST\_NAME CHAR(25),

LAST\_NAME CHAR(25),

username varchar(30) unique not null ,

password varchar(30) not null

);

CREATE TABLE vehicle(

PLATE\_NUMBER varchar(25) not null,

COLOR varchar(25),

VEHICLE\_TYPE varchar(200),

PRIMARY KEY(PLATE\_NUMBER)

);

CREATE TABLE owner(

USER\_ID int not null references user on delete cascade on update cascade,

PLATE\_NUMBER varchar(25) not null,

PRIMARY KEY(USER\_ID,PLATE\_NUMBER),

FOREIGN KEY (USER\_ID) REFERENCES user(USER\_ID) ON DELETE CASCADE ON UPDATE CASCADE,

FOREIGN KEY (PLATE\_NUMBER) REFERENCES vehicle(PLATE\_NUMBER) ON DELETE CASCADE ON UPDATE CASCADE

);

CREATE TABLE gate\_log(

ENTRY\_TIME datetime default current\_timestamp,

USER\_ID int not null ,

PLATE\_NUMBER varchar(25) ,

EXIT\_TIME datetime default NULL,

PRIMARY KEY(ENTRY\_TIME,USER\_ID,PLATE\_NUMBER),

FOREIGN KEY (PLATE\_NUMBER) REFERENCES vehicle(PLATE\_NUMBER ) ON UPDATE CASCADE,

FOREIGN KEY (USER\_ID) REFERENCES user(USER\_ID ) ON UPDATE CASCADE

);

## 2. Inserting records into the table

INSERT INTO user (FIRST\_NAME,LAST\_NAME,username,password) VALUES

('Amit','Kumar','hello','amitkumar'),

('Sumit','Wilson','heilo','sumitwilson'),

('Rajesh','Kumar','mathematicalmethods','rajeshkumar'),

('Trilok','Mathur','Topo','trilokmathur'),

('Krishan','Kumar','graphs','krishankumar'),

('Balram','Dubey','Funal','balramdubey'),

('Devendra','Kumar','pde','devendrakumar'),

('Sangeeta','Yadav','diffgeo','sangeetayadav'),

('Ankit','Sharma','arrays','ankitsharma'),

('Amita','Kumari','hell','amitakumari');

INSERT INTO vehicle (PLATE\_NUMBER,COLOR,VEHICLE\_TYPE) VALUES

('RJ15FD9951','black','Two-wheeler'),

('RJ65FD9051','red','Four-wheeler'),

('RJ61YD3251','blue','Two-wheeler'),

('RJ69HD5286','black','Four-wheeler'),

('RJ17FD5789','green','Two-wheeler'),

('RJ22FD5771','golden','Two-wheeler'),

('RJ17YD5251','black','Four-wheeler'),

('RJ35PP9251','grey','Four-wheeler'),

('RJ85KD5251','white','Two-wheeler'),

('RJ11SD5251','white','Four-wheeler');

INSERT INTO owner (USER\_ID,PLATE\_NUMBER) VALUES

(2,'RJ15FD9951'),

(1,'RJ65FD9051'),

(3,'RJ61YD3251'),

(4,'RJ69HD5286'),

(5,'RJ17FD5789'),

(6,'RJ22FD5771'),

(7,'RJ17YD5251'),

(8,'RJ35PP9251'),

(9,'RJ85KD5251'),

(10,'RJ11SD5251');

INSERT INTO gate\_log (USER\_ID,PLATE\_NUMBER) VALUES

(2,'RJ15FD9951'),

(1,'RJ65FD9051'),

(3,'RJ61YD3251'),

(4,'RJ69HD5286'),

(5,'RJ17FD5789'),

(6,'RJ22FD5771'),

(7,'RJ17YD5251'),

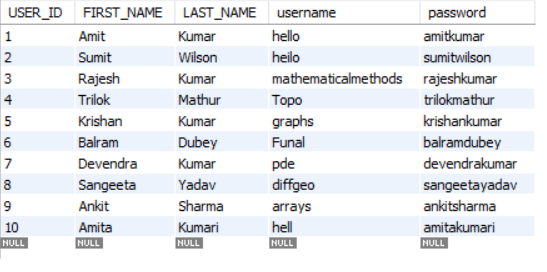
(8,'RJ35PP9251'),

(9,'RJ85KD5251'),

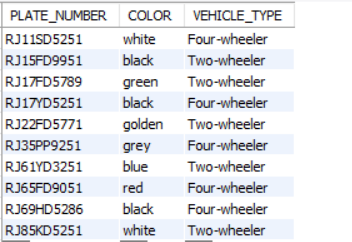
(10,'RJ11SD5251');

OUTPUT

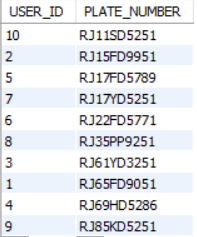
User table



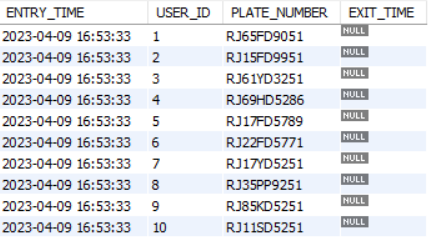
Vehicle table



Owner table



Gate\_log table



select \* from user;

select \* from vehicle;

select \* from owner;

select \* from gate\_log;

use gate\_management;

## 

## 3. Functionalities

-- user authentication

DELIMITER $$

CREATE DEFINER=`root`@`localhost` FUNCTION

`password\_auth`(username varchar(25),password varchar(25)) RETURNS varchar(50)

DETERMINISTIC

begin

declare result varchar(30);

IF EXISTS (SELECT \* FROM user WHERE password=password AND username=username)

THEN SET result = 'User Authenticated';

ELSEIF NOT EXISTS (SELECT \* FROM user WHERE password=password AND username=username)

THEN SET result = 'User not Authenticated';

END IF;

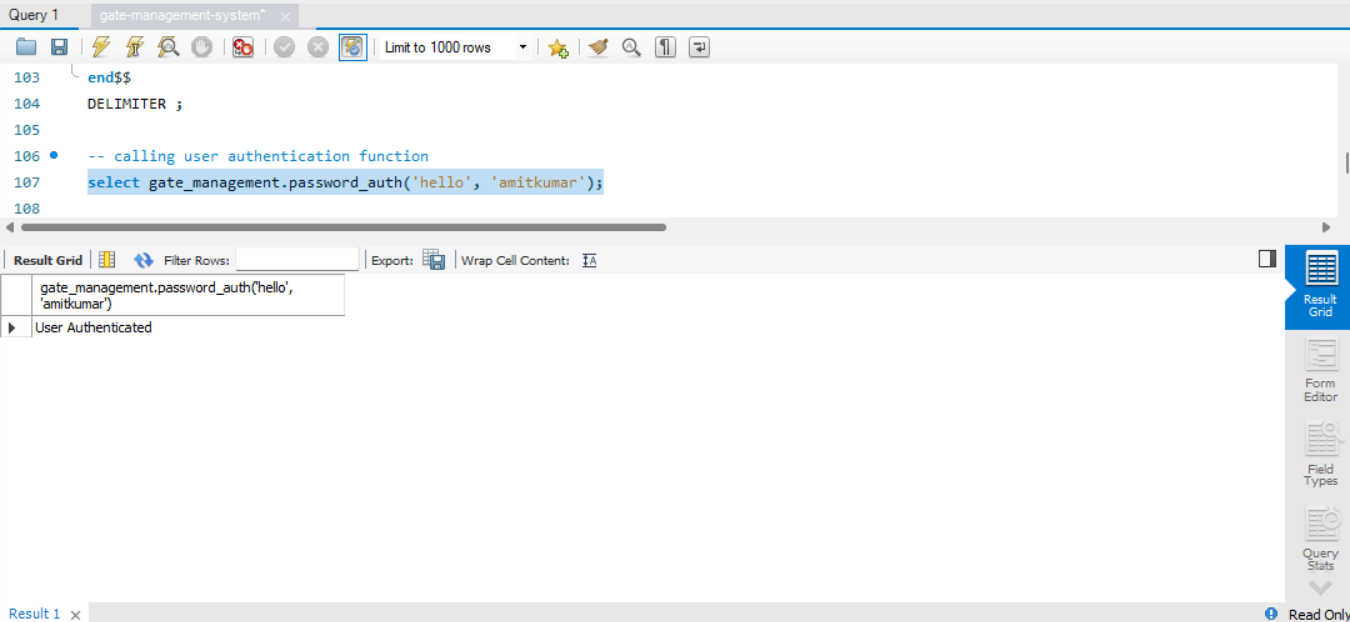
return result;

end$$

DELIMITER ;

-- calling user authentication function

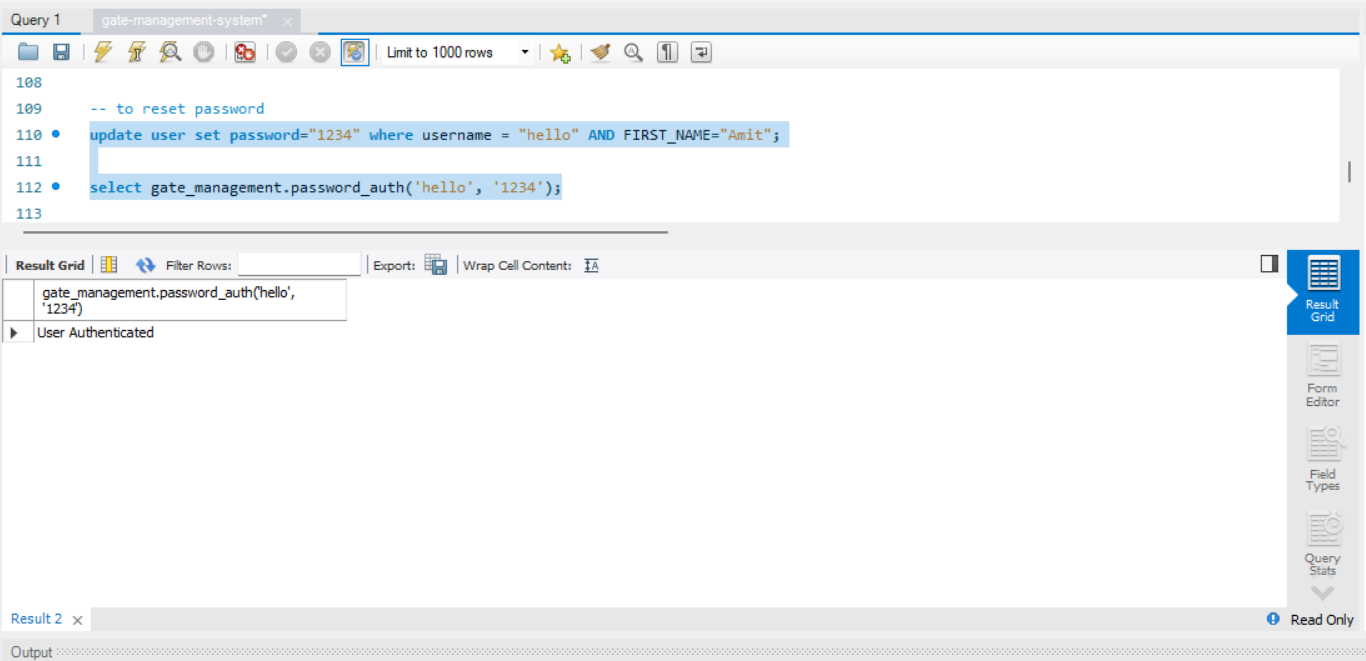
select gate\_management.password\_auth('hello', 'amitkumar');



-- to reset password

update user set password="1234" where username = "hello" AND FIRST\_NAME="Amit";

select gate\_management.password\_auth('hello', '1234');



-- to register vehicle by user

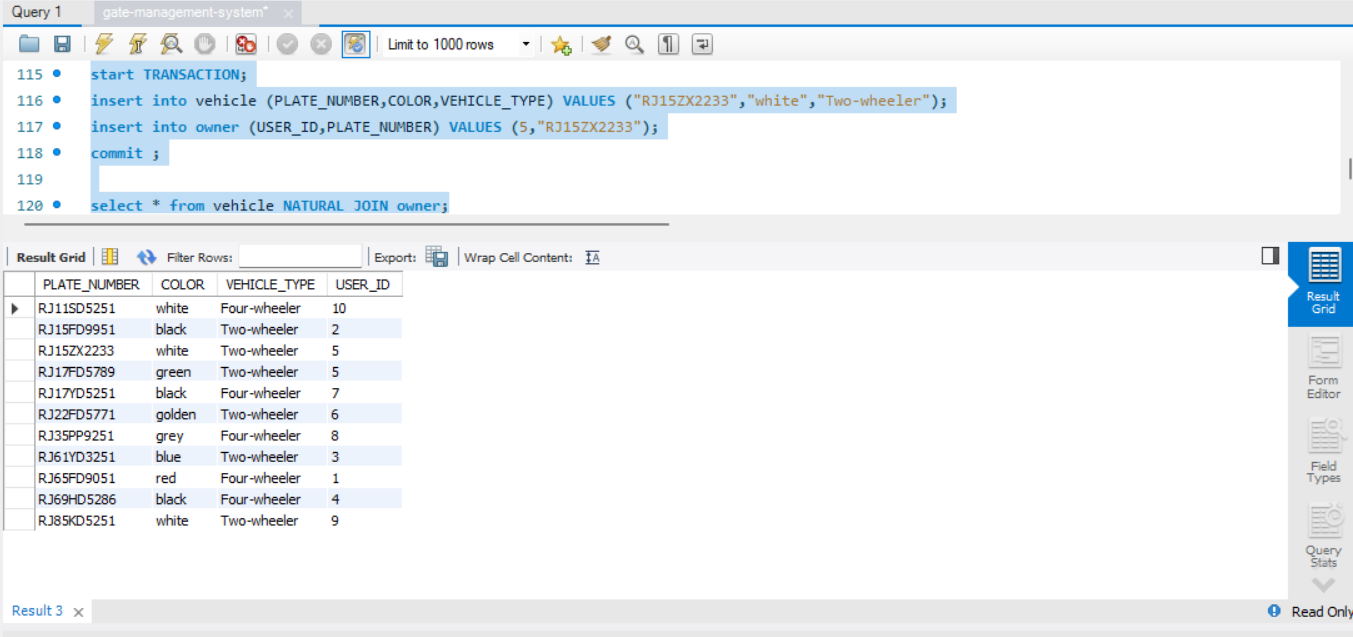
start TRANSACTION;

insert into vehicle (PLATE\_NUMBER,COLOR,VEHICLE\_TYPE) VALUES ("RJ15ZX2233","white","Two-wheeler");

insert into owner (USER\_ID,PLATE\_NUMBER) VALUES (5,"RJ15ZX2233");

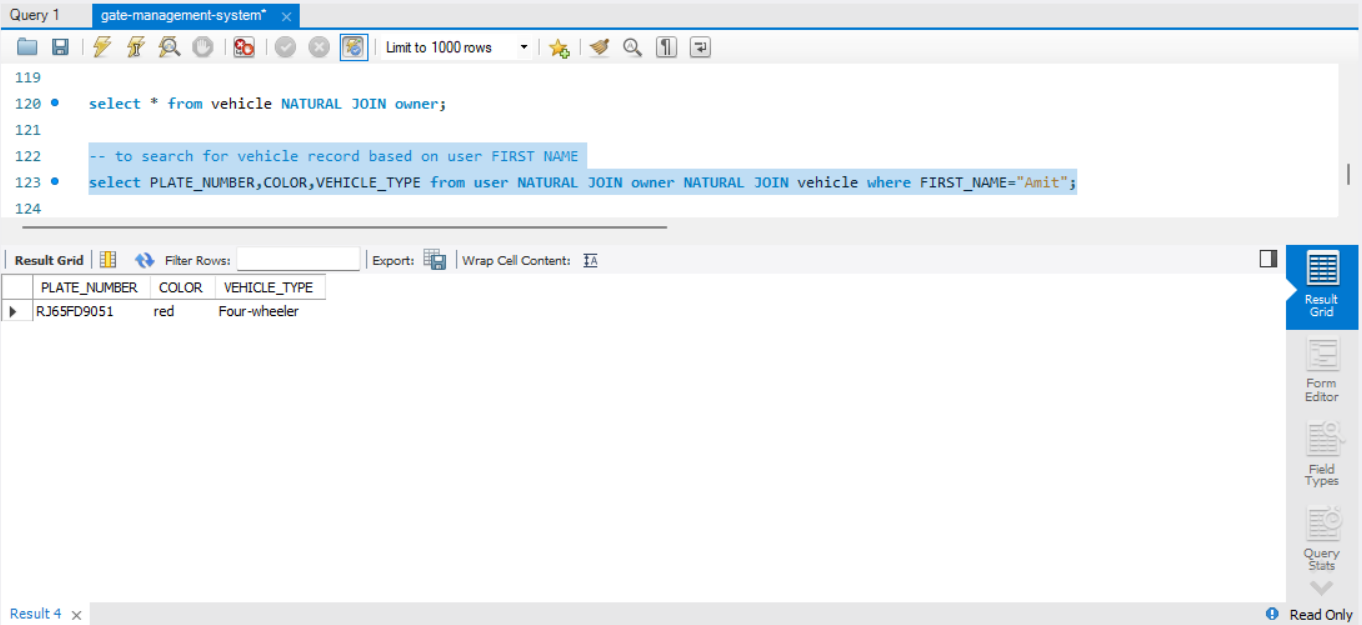
commit ;

select \* from vehicle NATURAL JOIN owner;



-- to search for vehicle record based on user FIRST NAME

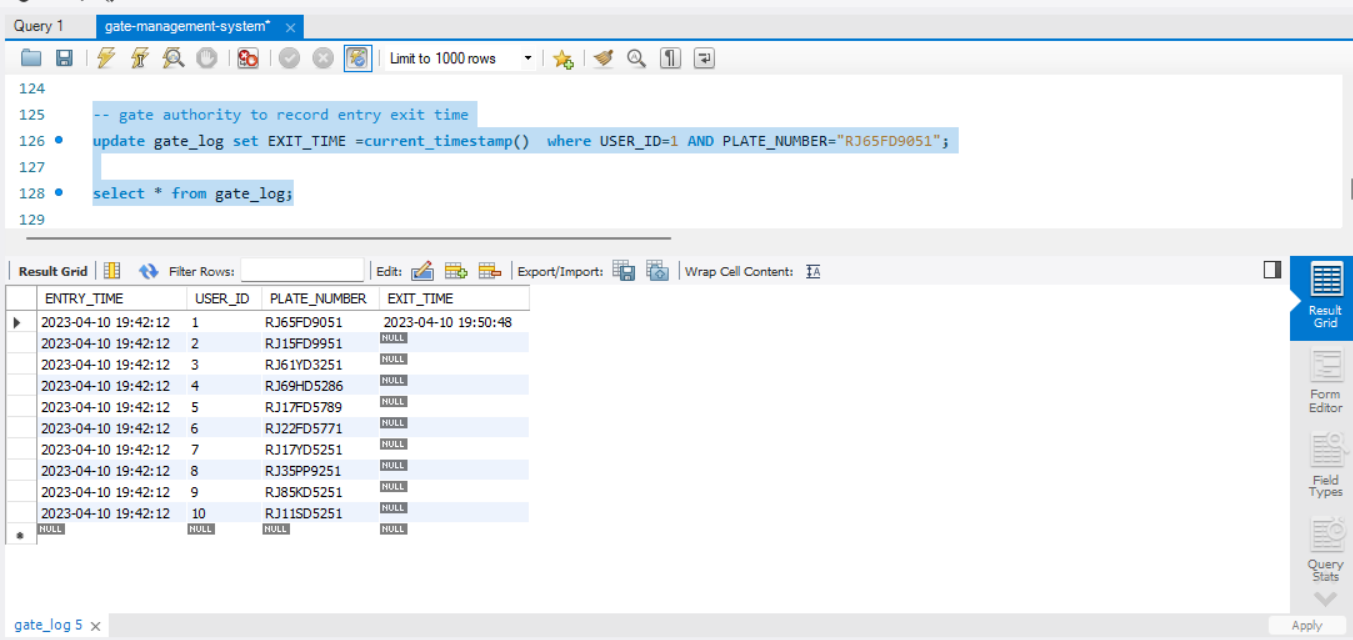
select PLATE\_NUMBER,COLOR,VEHICLE\_TYPE from user NATURAL JOIN owner NATURAL JOIN vehicle where FIRST\_NAME="Amit";



-- gate authority to record entry exit time

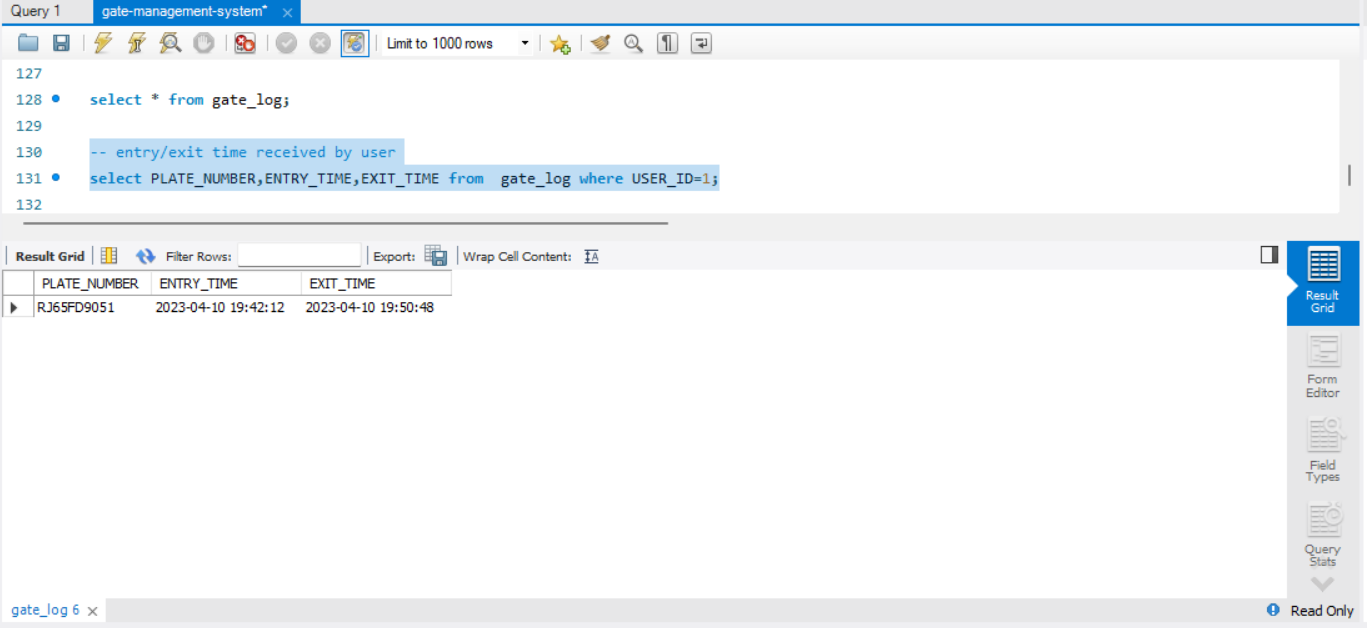
update gate\_log set EXIT\_TIME =current\_timestamp() where USER\_ID=1 AND PLATE\_NUMBER="RJ65FD9051";

select \* from gate\_log;



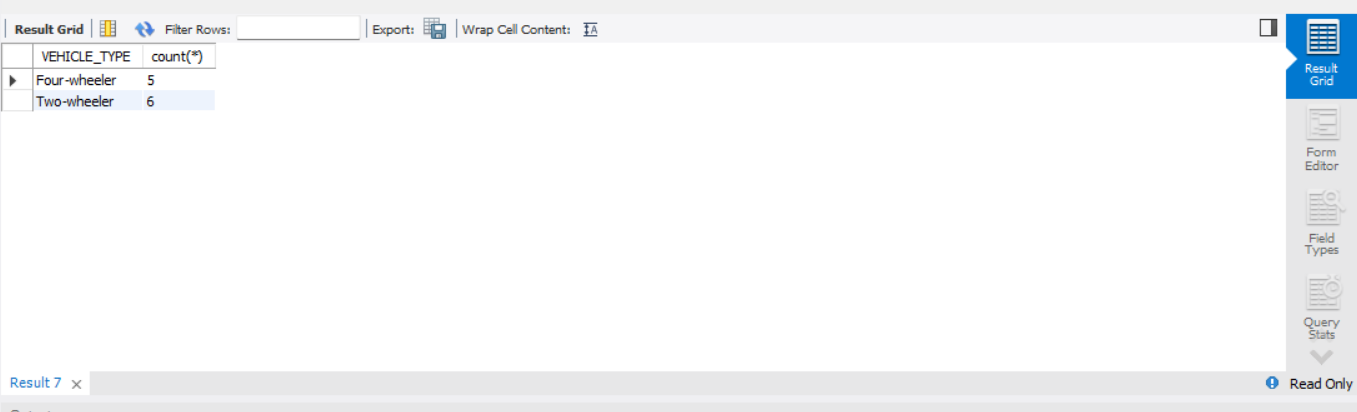
-- entry/exit time received by user

select PLATE\_NUMBER,ENTRY\_TIME,EXIT\_TIME from gate\_log where USER\_ID=1;



-- vehicle types

select VEHICLE\_TYPE,count(\*) from vehicle group by VEHICLE\_TYPE;



-- peak hour wise

select extract(hour from ENTRY\_TIME) as hr,count(\*) from gate\_log group by extract(hour from ENTRY\_TIME)order by 1;

