

DATABASE SYSTEMS PROJECT REPORT



**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE,
PILANI (Rajasthan)**

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By:

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Project Number: 6

Project Title: Gate entry management

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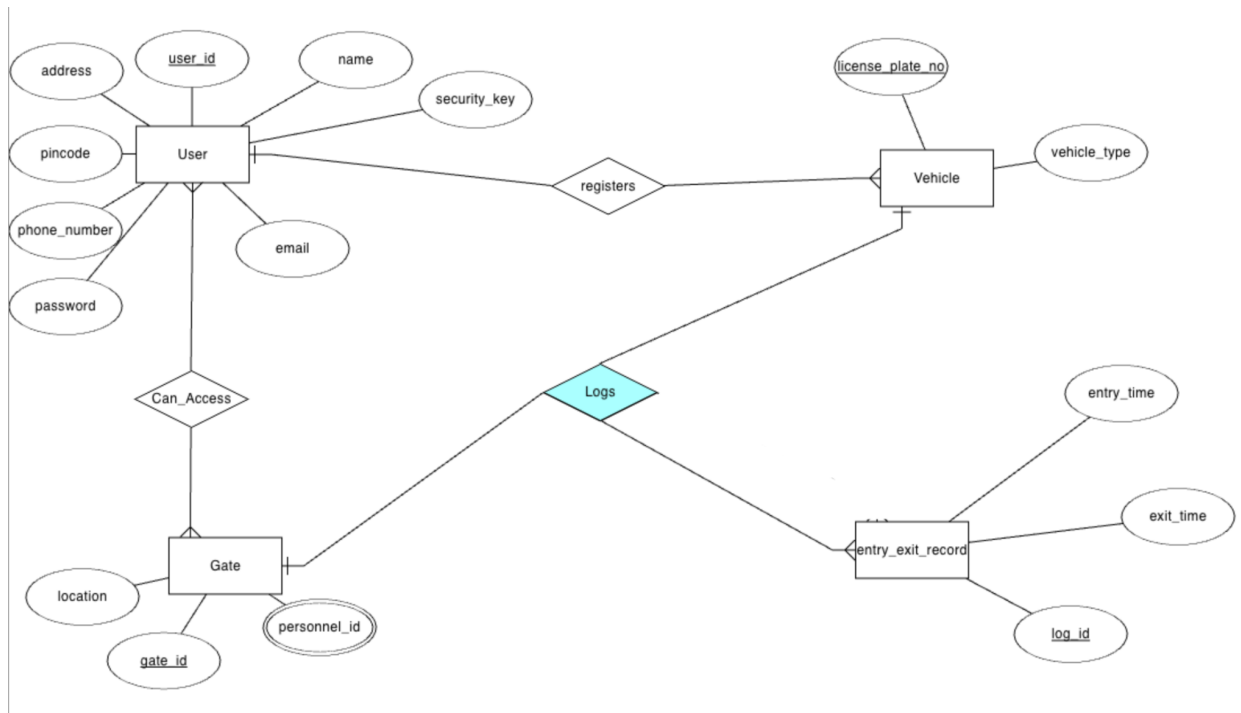
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We have made ER diagrams, Relational Schema, SQL queries for creating tables, SQL queries to perform the necessary functions and also created the whole project in a menu-driven terminal based python script.

Link to the

videos:https://docs.google.com/document/d/1W_269QbShRf6SFb4l_8twm6Sx0u0SvDYGJZbqasfmAU/edit?usp=sharing

ER Diagram



Entities and attributes:

- User: user_id, name, address, pincode, email, password, security_key, phone_no
- Vehicle: license_plate_no, vehicle_type
- Gate: gate_id, location
- Entry_exit_record: log_id, entry_time, exit_time

Relationships:

- Logs: 1 to 1 to N relationship between Gate, Vehicle, Entry_exit_record
- Can_access: N to N relationship between Gate, User
- Registers: 1 to N relationship between User, Vehicle

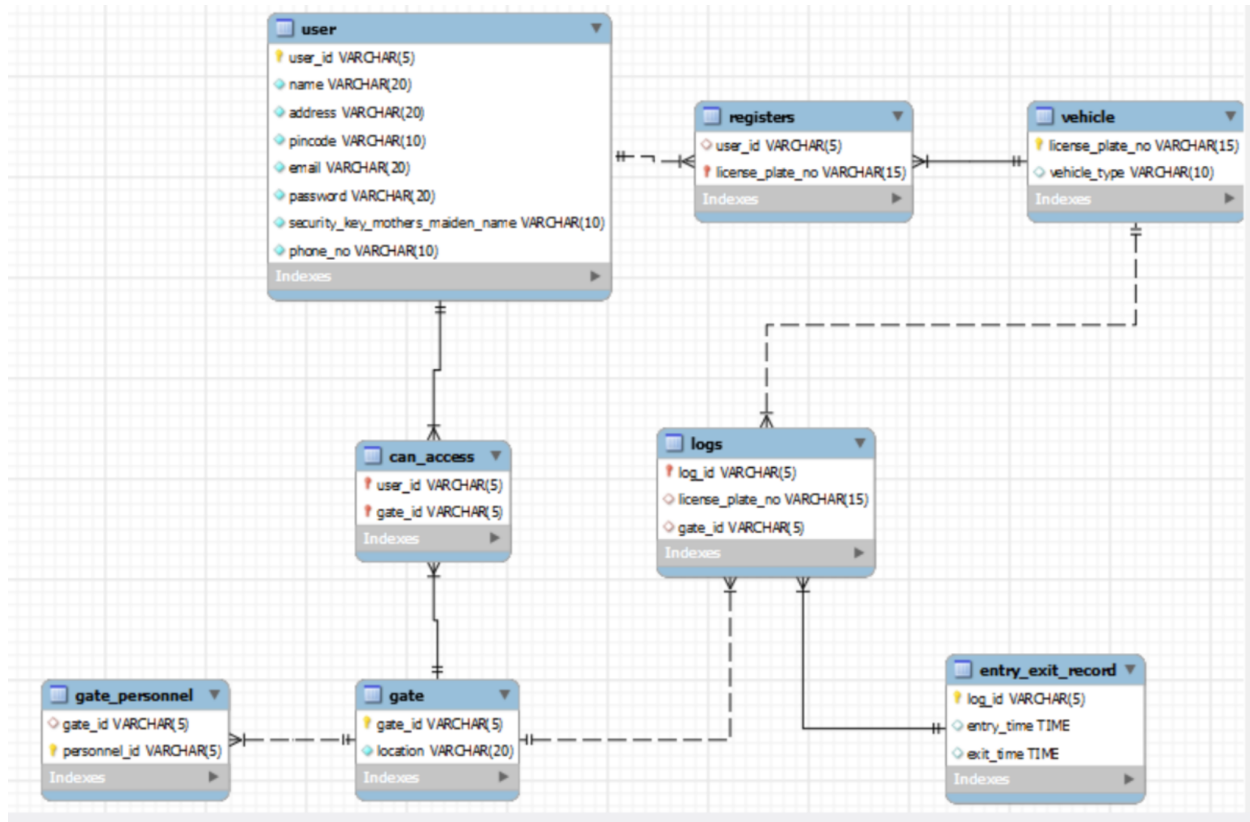
Normalisation

The personnel attribute in gate table is a multivalued attribute so 1NF normalization was required. Rest all the functional dependencies were already in 2NF and 3NF.

Functional Dependencies

- **User:** $\text{user_id} \rightarrow$
email,password,name,phone_no,address,pincode,security_key;
 $\text{email} \rightarrow \text{user_id}, \text{password}, \text{name}, \text{phone_no}, \text{address}, \text{pincode}, \text{security_key};$ $\text{phoneNumber} \rightarrow \text{userID}$
- **Registers:** $\text{licensePlateNumber} \rightarrow \text{userID}$
- **Vehicle:** $\text{licensePlateNumber} \rightarrow \text{vehicleType}, \text{userId}$
- **Logs:** $\text{logID} \rightarrow \text{gateID}, \text{licensePlateNumber}$
- **Gate:** $\text{gateID} \rightarrow \text{location}, \text{personnel}$
- **CanAccess:** $\text{userID}, \text{gateID} \rightarrow \text{userID}, \text{gateID}$
- **Entry/Exit Log:** $\text{logID} \rightarrow \text{entryTime}, \text{exitTime}$

Relation Schema



SQL queries

1. Creating tables

create table user

(

user_id varchar(5),

name varchar(20) not null,

address varchar(20) not null,

pincode varchar(10) not null,

email varchar(20) not null,

```
password varchar(20) not null,  
security_key varchar(10) not null,  
phone_no varchar(10) not null,  
primary key(user_id),  
unique key(email)  
);
```

```
create table vehicle  
(license_plate_no varchar(15),  
vehicle_type varchar(10),  
primary key(license_plate_no)  
);
```

```
create table gate  
(  
gate_id varchar(5),  
location varchar(20) not null,  
primary key(gate_id)  
);
```

```
create table gate_personnel  
(  
gate_id varchar(5),  
personnel_id varchar(5) not null,  
primary key(personnel_id),  
foreign key (gate_id) references gate(gate_id)  
on delete cascade  
);
```

```
create table entry_exit_record  
(
```

```
log_id varchar(5),  
entry_time time,  
exit_time time,  
primary key(log_id)  
);
```

```
create table registers  
(  
user_id varchar(5),  
license_plate_no varchar(15),  
primary key(license_plate_no),  
foreign key (user_id) references user(user_id)  
on delete cascade,  
foreign key (license_plate_no) references vehicle(license_plate_no)  
on delete cascade  
);
```

```
create table can_access  
(  
user_id varchar(5),  
gate_id varchar(5),  
primary key(user_id,gate_id),  
foreign key (user_id) references user(user_id)  
on delete cascade,  
foreign key (gate_id) references gate(gate_id)  
on delete cascade  
);
```

```
create table logs  
(  
log_id varchar(5),  
license_plate_no varchar(15),  
gate_id varchar(5),
```

```

primary key(log_id),
foreign key (gate_id) references gate(gate_id)
on delete cascade,
foreign key (log_id) references entry_exit_record(log_id)
on delete cascade,
foreign key (license_plate_no) references vehicle(license_plate_no)
on delete cascade
);

```

2. Generating records and reports

-- 1) Insert records for gate authority

```

INSERT INTO gate (gate_id, location)
VALUES ('gate_id', 'location');

```

-- 2)

```

insert into user(user_id,name,address,pincode,email,password,security_key,phone_no)
values('09390','Anish Taori','Chembur
Mumbai','400071','anishtaori@gmail.com','pass09390','sharma','8454071725');

```

-- 3)

```

SELECT user_id
FROM user
WHERE email = 'enter_email' AND password = 'enter_pass'; -- enter_email and enter_pass are inputs
-- if correct email and password is given,corresponding user_id is returned.Else no rows are returned.
-- This has been implemented in python such that it tells the user the login is incorrect

```

-- 4)

-- for pass reset,

```

SELECT user_id
FROM user
WHERE email = 'enter_email' AND security_key = 'enter_key'; -- enter_email and enter_key are inputs
-- similar to query 3, user_id is returned only if correct inputs given.

```



```
UPDATE user
SET password = 'new_password'-- new password is input
WHERE user_id='u_id'
;
-- password is updated to the user_id. Implemented in python.
```

-- 5) first user has logged in their profile. We are taking the user_id from their profile(implemented in python)

-- add vehicle

-- first add vehicle details

```
INSERT INTO vehicle (license_plate_no,vehicle_type)
VALUES ('enter_plate_no','enter_type'); -- inputs
-- now add into registers
INSERT INTO registers (user_id, license_plate_no)
VALUES ('u_id','enter_plate_no'); -- inputs
```

-- deleting vehicle

```
delete from vehicle
where license_plate_no='plate_no';
```

-- delete user

```
delete from user
where user_id='u_id';
```

-- update phone no,address,pincode,email

```
UPDATE user
SET phone_no = 'new_no',address='new_add',pincode='new_p',email='new_email'
WHERE user_id='u_id'
;
```

-- 6)

insert into registers values('u_id','plate_no');-- these are inputs

-- 7.1 searching by name

```
select phone_no,name,license_plate_no from
user natural join registers
where name='u_name';
```

-- 7.2 searching by phone number

```
select phone_no,name,license_plate_no from
user natural join registers
where phone_no='phone';
```

-- 8)

```
select pincode,name,license_plate_no from
user natural join registers
where pincode='pin_code';
```

-- 9)

```
insert into entry_exit_record values(113,"13:19:36","15:10:49");-- these are sample values. In python
implementation, input is asked
insert into logs values(113,'HR 26 DQ 5551','1');
```

-- 10)

```
select name,license_plate_no,gate_id,entry_time,exit_time from
(user natural join (registers natural join logs)) natural join entry_exit_record
where name='user_name';
```

-- 11.1 peak entry hour

```
SELECT HOUR(entry_time) AS entry_hour, COUNT(*) AS entry_count
FROM entry_exit_record
GROUP BY entry_hour
ORDER BY entry_count DESC
LIMIT 1;
```

-- 11.2 peak exit hour

```
SELECT HOUR(exit_time) AS exit_hour, COUNT(*) AS exit_count
FROM entry_exit_record
```

```
GROUP BY exit_hour  
ORDER BY exit_count DESC  
LIMIT 1;
```

-- 11.3 vehicle types

```
SELECT vehicle_type, COUNT(*) AS count  
FROM vehicle natural join logs  
GROUP BY vehicle_type  
ORDER BY count DESC  
;
```

-- 11.4 gate utilization

```
SELECT gate_id, COUNT(*) AS count  
FROM gate natural join logs  
GROUP BY gate_id  
ORDER BY count DESC  
;
```

Screenshots of SQL query results

```
Enter mysql username:-root
Enter mysql password:-yash2003
successfully connected
Sample Login instructions:
  Email: anishtaori@gmail.com
  Password: pass09390
Enter email :-anishtaori@gmail.com
Enter password :-pass09390
09390
Login successfull
```

```
Enter mysql username:-root
Enter mysql password:-yash2003
successfully connected
Sample Login instructions:
  Email: anishtaori@gmail.com
  Password: pass09390
Enter email :-anishtaori@gmail.com
Enter password :-pass09390
09390
Login successfull
```

Welcome to gateway management system.

```
Please enter 0 to reset password.
Please enter 1 to add user.
  Please enter 2 to delete user.
  Please enter 3 to add gates.
  Please enter 13 to delete gates.
  Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
  Please enter 12 to check authentication.
  Please enter 99 to exit.
Please enter your choice: 0
Enter security_key :-sharma
09390
Correct Credentials
```

```
Please enter your choice: 12
Enter email :-anishtaori@gmail.com
Enter password :-passpass
09390
Login successfull
```

Wrong choice. Choose again

```
Please enter 0 to reset password.
Please enter 1 to add user.
  Please enter 2 to delete user.
  Please enter 3 to add gates.
  Please enter 13 to delete gates.
  Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
  Please enter 12 to check authentication.
  Please enter 99 to exit.
Please enter your choice: 1
Enter user_id :-97777
Enter name :-yash
Enter address :-pilani
Enter pincode :-333031
Enter email :-yash@gmail.com
Enter password :-pass
Enter security_key :-root
Enter phone_no :-999997777
User added
```

```
Please enter your choice: 0
Enter security_key :-sharma
09390
Correct Credentials
```

```
Enter new password :-passpass
Password changed successfully
Wrong choice. Choose again
```

```
Please enter 0 to reset password.
Please enter 1 to add user.
  Please enter 2 to delete user.
  Please enter 3 to add gates.
  Please enter 13 to delete gates.
  Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
  Please enter 12 to check authentication.
  Please enter 99 to exit.
Please enter your choice: 12
Enter email :-anishtaori@gmail.com
Enter password :-passpass
09390
Login successfull
```

```
Please enter 0 to reset password.
Please enter 1 to add user.
  Please enter 2 to delete user.
  Please enter 3 to add gates.
  Please enter 13 to delete gates.
  Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
  Please enter 12 to check authentication.
  Please enter 99 to exit.
Please enter your choice: 2
Enter user_id :-88888
User not found
```

```
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 97777
Wrong choice. Choose again
```

```
Please enter 0 to reset password.
Please enter 1 to add user.
  Please enter 2 to delete user.
  Please enter 3 to add gates.
  Please enter 13 to delete gates.
  Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
  Please enter 12 to check authentication.
  Please enter 99 to exit.
Please enter your choice: 3
Sample input
  gate_id :-11 , location :-pilani
Enter gate_id :-12
Enter location :-pilani1
Details update successfully
```

```

Please enter 0 to reset password.
Please enter 1 to add user.
Please enter 2 to delete user.
Please enter 3 to add gates.
Please enter 13 to delete gates.
Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 13
Enter gate_id :-12
Gate deleted successfully

```

```

Please enter 0 to reset password.
Please enter 1 to add user.
Please enter 2 to delete user.
Please enter 3 to add gates.
Please enter 13 to delete gates.
Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 13
Enter gate_id :-12
Gate not found

```

```

Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 3
Sample input
gate_id :-11 , location :-pilani
Enter gate_id :-12
Enter location :-pilani1
Details update successfully

```

```

Please enter 0 to reset password.
Please enter 1 to add user.
Please enter 2 to delete user.
Please enter 3 to add gates.
Please enter 13 to delete gates.
Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 5
Sample Input:
Enter license_plate_no :-HR 26 DQ 5569
Enter vehicle_type ('sedan','xuv','suv'):-suv
Vehicle successfully added

```

```

Vehicle successfully registered

```

```

Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 4
Sample log:
log_id :- 122,entry_time :- 13:9:36,exit_time :- 14:10:45,license_plate_no :- HR 26 DQ 5458,gate_id :- 10
Enter log_id :-167
Enter entry_time :-13:9:23
Enter exit_time :-13:9:29
Enter license_plate_no :-HR 26 DQ 5569
Enter gate_id :-12

```

```

Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 6
Enter 0 to filter by name, 1 for phone number and 2 for pincode:-1
('8454071725', 'Anish Taori', 'HR 26 DQ 5291')
('8454071725', 'Anish Taori', 'HR 26 DQ 5458')
('8454071725', 'Anish Taori', 'HR 26 DQ 5551')
('8454071725', 'Anish Taori', 'HR 26 DQ 5569')
('8454071725', 'Anish Taori', 'HR 26 DQ 5581')
('8454071725', 'Anish Taori', 'MH 43 DQ 6265')
('8454071725', 'Anish Taori', 'MH 43 DQ 6349')

```

```

Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 6
Enter 0 to filter by name, 1 for phone number and 2 for pincode:-2
('400071', 'Anish Taori', 'HR 26 DQ 5291')
('400071', 'Anish Taori', 'HR 26 DQ 5458')
('400071', 'Anish Taori', 'HR 26 DQ 5551')
('400071', 'Anish Taori', 'HR 26 DQ 5569')
('400071', 'Anish Taori', 'HR 26 DQ 5581')
('400071', 'Anish Taori', 'MH 43 DQ 6265')
('400071', 'Anish Taori', 'MH 43 DQ 6349')

```



```
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 8
Hour: 13th, Vehicle Count: 4
```

```
Please enter 0 to reset password.
Please enter 1 to add user.
Please enter 2 to delete user.
Please enter 3 to add gates.
Please enter 13 to delete gates.
Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 9
Vehicle type: suv, Vehicle Count: 4
Vehicle type: sedan, Vehicle Count: 4
Vehicle type: xuv, Vehicle Count: 3
```

```
Please enter your choice: 6
Enter 0 to filter by name, 1 for phone number and 2 for pincode:-2
('400071', 'Anish Taori', 'HR 26 DQ 5291')
('400071', 'Anish Taori', 'HR 26 DQ 5458')
('400071', 'Anish Taori', 'HR 26 DQ 5551')
('400071', 'Anish Taori', 'HR 26 DQ 5569')
('400071', 'Anish Taori', 'HR 26 DQ 5581')
('400071', 'Anish Taori', 'MH 43 DQ 6265')
('400071', 'Anish Taori', 'MH 43 DQ 6349')
```

```
Please enter 0 to reset password.
Please enter 1 to add user.
Please enter 2 to delete user.
Please enter 3 to add gates.
Please enter 13 to delete gates.
Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 7
Enter new ph number :-6666677777
Enter new address :-pilani
Enter new pincode :-333032
Enter new email :-yashk@gmail.com
Changes executed successfully
```

```

Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 10
Gate ID: 1, Vehicle Count: 5
Gate ID: 2, Vehicle Count: 5
Gate ID: 12, Vehicle Count: 1

Please enter 0 to reset password.
Please enter 1 to add user.
Please enter 2 to delete user.
Please enter 3 to add gates.
Please enter 13 to delete gates.
Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 11
Name: Anish Taori, License plate no: HR 26 DQ 5291, GateID: 2, Entry Time: 15:09:36, Exit time: 20:17:45
Name: Anish Taori, License plate no: HR 26 DQ 5458, GateID: 1, Entry Time: 13:09:36, Exit time: 14:10:45
Name: Anish Taori, License plate no: HR 26 DQ 5551, GateID: 1, Entry Time: 13:19:36, Exit time: 15:10:49
Name: Anish Taori, License plate no: HR 26 DQ 5569, GateID: 12, Entry Time: 13:09:23, Exit time: 13:09:29
Name: Anish Taori, License plate no: HR 26 DQ 5581, GateID: 1, Entry Time: 14:09:36, Exit time: 15:11:45
Name: Anish Taori, License plate no: MH 43 DQ 6265, GateID: 2, Entry Time: 19:19:36, Exit time: 20:15:45
Name: Anish Taori, License plate no: MH 43 DQ 6349, GateID: 2, Entry Time: 15:09:36, Exit time: 18:12:45

```

```

Please enter your choice: 11
Name: Anish Taori, License plate no: HR 26 DQ 5291, GateID: 2, Entry Time: 15:09:36, Exit time: 20:17:45
Name: Anish Taori, License plate no: HR 26 DQ 5458, GateID: 1, Entry Time: 13:09:36, Exit time: 14:10:45
Name: Anish Taori, License plate no: HR 26 DQ 5551, GateID: 1, Entry Time: 13:19:36, Exit time: 15:10:49
Name: Anish Taori, License plate no: HR 26 DQ 5569, GateID: 12, Entry Time: 13:09:23, Exit time: 13:09:29
Name: Anish Taori, License plate no: HR 26 DQ 5581, GateID: 1, Entry Time: 14:09:36, Exit time: 15:11:45
Name: Anish Taori, License plate no: MH 43 DQ 6265, GateID: 2, Entry Time: 19:19:36, Exit time: 20:15:45
Name: Anish Taori, License plate no: MH 43 DQ 6349, GateID: 2, Entry Time: 15:09:36, Exit time: 18:12:45

```

```

Please enter 0 to reset password.
Please enter 1 to add user.
Please enter 2 to delete user.
Please enter 3 to add gates.
Please enter 13 to delete gates.
Please enter 4 to log entry/exit time for vehicle.
Please enter 5 to register vehicle.
Please enter 6 to search vehicle records.
Please enter 7 to manage user profile.
Please enter 8 to find peak hours.
Please enter 9 to find vehicle types.
Please enter 10 to show gate utilization.
Please enter 11 to show vehicle logs.
Please enter 12 to check authentication.
Please enter 99 to exit.
Please enter your choice: 99
Exit application

```