

Database Management System Project Report

Parking Management System

Team Details:

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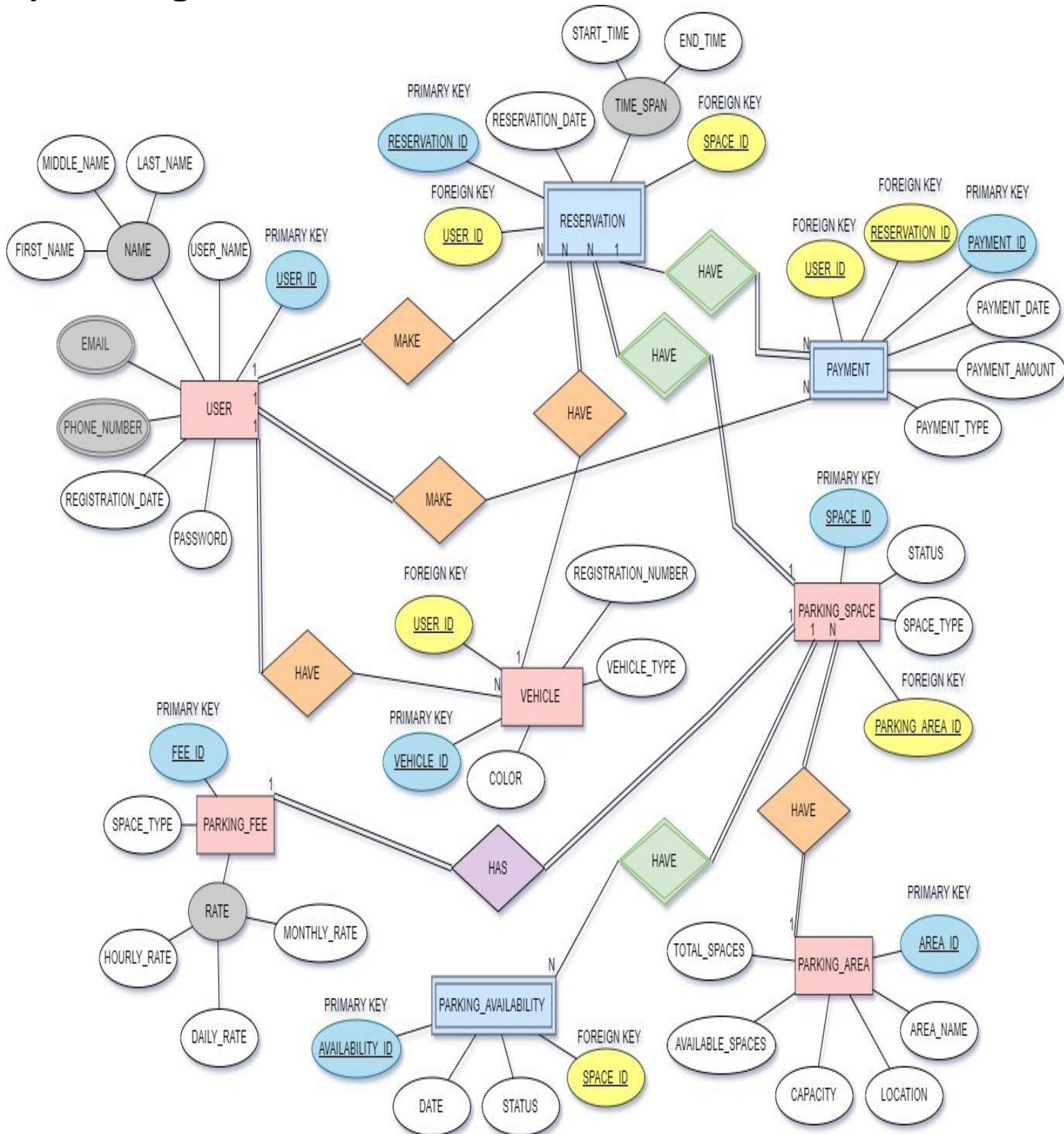
1) Short Abstract:

The Vehicle Parking Management System is a web-based application designed to streamline parking space allocation and management. This comprehensive system enables users to register, add vehicles, check real-time parking availability, make reservations, and process payments. With features such as user authentication, vehicle management, and parking fee calculation, the system caters to both users and parking attendants. Additionally, administrators benefit from CRUD tools provided on the website instead of the traditional mysql commands to monitor parking trends. The system aims to enhance efficiency in parking space utilization while providing a seamless experience for both users and administrators.

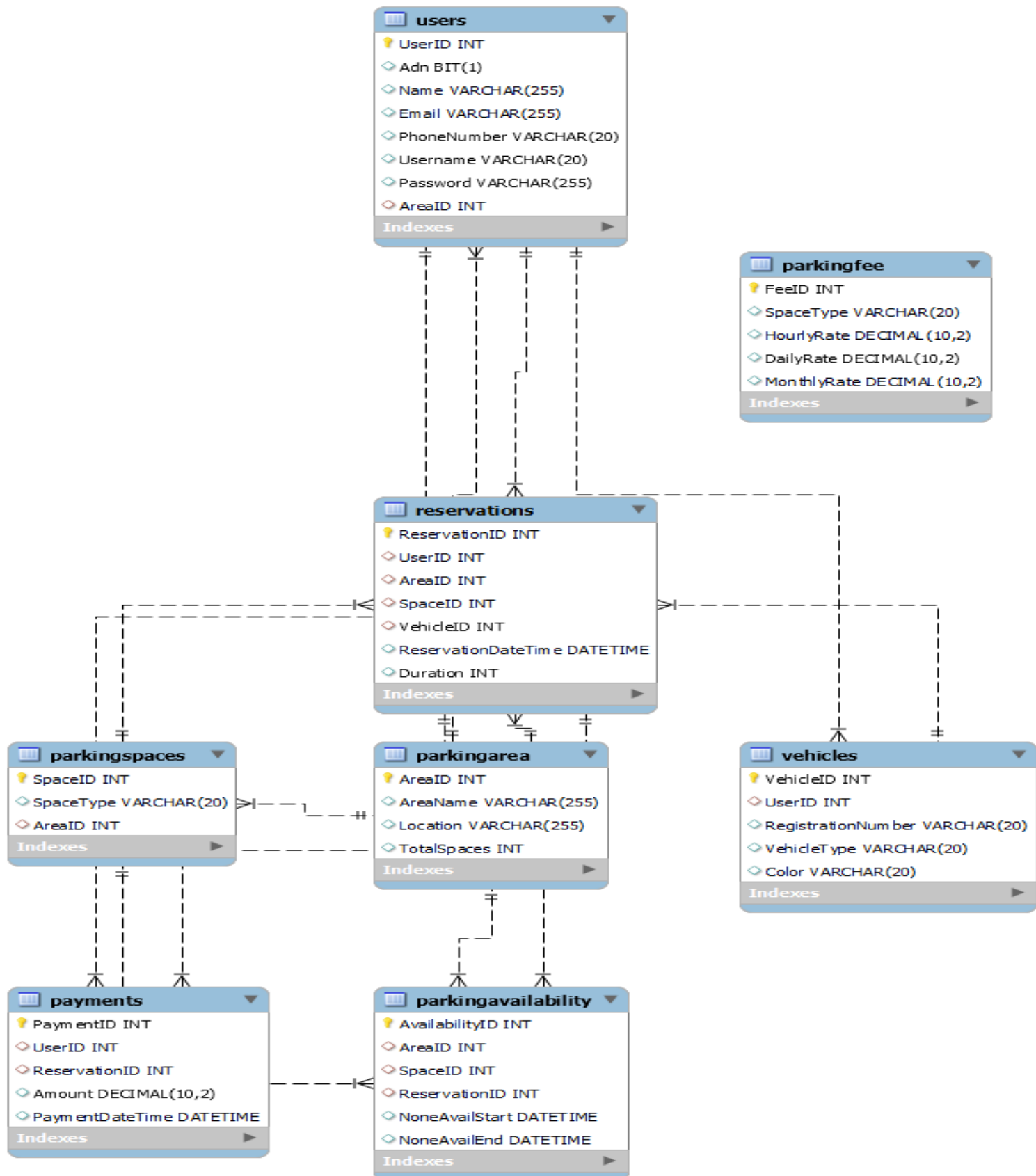
2) List of software's/Tools/Programming languages:

- Programming Languages:
 - Backend Development:
 - Python (Streamlit framework)
 - MySQL (for database queries)
 - Frontend Development:
 - Streamlit App (Python Web App)
- Database Management:
 - MySQL for relational database management
- Database Modeling:
 - Entity-Relationship Diagram (ERD) tools for database design
- Payment Processing:
 - Integration with Gmail for payment (OTP)
- Authentication:
 - **Smtplib** python library for Gmail Authentication.
- Deployment:
 - Streamlit App Run.

3) ER Diagram:



4) Relational Schema:



5) DDL SQL Commands:

Database:

create database parking;

use parking;

-- Create ParkingArea table

```
CREATE TABLE ParkingArea (  
    AreaID INT AUTO_INCREMENT PRIMARY KEY,  
    AreaName VARCHAR(255) UNIQUE,  
    Location VARCHAR(255),  
    TotalSpaces INT  
);
```

```
CREATE TABLE Users (  
    UserID INT AUTO_INCREMENT PRIMARY KEY,  
    Adn BIT,  
    Name VARCHAR(255),  
    Email VARCHAR(255) UNIQUE,  
    PhoneNumber VARCHAR(20),  
    Username VARCHAR(20) UNIQUE,  
    Password VARCHAR(255),  
    AreaID INT,  
    FOREIGN KEY (AreaID) REFERENCES ParkingArea(AreaID)  
        ON DELETE SET NULL  
        ON UPDATE CASCADE  
);
```

-- Create Vehicles table

```
CREATE TABLE Vehicles (  
    VehicleID INT AUTO_INCREMENT PRIMARY KEY,  
    UserID INT,  
    RegistrationNumber VARCHAR(20) UNIQUE,  
    VehicleType VARCHAR(20),  
    Color VARCHAR(20),  
    FOREIGN KEY (UserID) REFERENCES Users(UserID)
```

```

        ON DELETE CASCADE
        ON UPDATE CASCADE
    );

-- Create ParkingSpaces table
CREATE TABLE ParkingSpaces (
    SpaceID INT AUTO_INCREMENT PRIMARY KEY,
    SpaceType VARCHAR(20),
    AreaID INT,
    FOREIGN KEY (AreaID) REFERENCES ParkingArea(AreaID)
);

-- Create ParkingFee table
CREATE TABLE ParkingFee (
    FeeID INT AUTO_INCREMENT PRIMARY KEY,
    SpaceType VARCHAR(20),
    HourlyRate DECIMAL(10, 2),
    DailyRate DECIMAL(10, 2),
    MonthlyRate DECIMAL(10, 2)
);

-- Create Reservations table
CREATE TABLE Reservations (
    ReservationID INT AUTO_INCREMENT PRIMARY KEY,
    UserID INT,
    AreaID INT,
    SpaceID INT,
    VehicleID INT,
    ReservationDateTime DATETIME,
    Duration INT, -- in hours
    FOREIGN KEY (UserID) REFERENCES Users(UserID)
        ON DELETE SET NULL
        ON UPDATE CASCADE,
    FOREIGN KEY (SpaceID) REFERENCES ParkingSpaces(SpaceID)
        ON DELETE SET NULL

```

```

        ON UPDATE CASCADE,
FOREIGN KEY (VehicleID) REFERENCES Vehicles(VehicleID)
        ON DELETE SET NULL
        ON UPDATE CASCADE,
FOREIGN KEY (AreaID) REFERENCES ParkingArea(AreaID)
        ON DELETE SET NULL
        ON UPDATE CASCADE
);

-- Create Payments table
CREATE TABLE Payments (
    PaymentID INT AUTO_INCREMENT PRIMARY KEY,
    UserID INT,
    ReservationID INT,
    Amount DECIMAL(10, 2),
    PaymentDateTime DATETIME,
FOREIGN KEY (UserID) REFERENCES Users(UserID)
        ON DELETE SET NULL
        ON UPDATE CASCADE,
FOREIGN KEY (ReservationID) REFERENCES Reservations(ReservationID)
        ON DELETE SET NULL
        ON UPDATE CASCADE
);

-- Create ParkingAvailability table
CREATE TABLE ParkingAvailability (
    AvailabilityID INT AUTO_INCREMENT PRIMARY KEY,
    AreaID INT,
    SpaceID INT,
    ReservationID INT,
    NoneAvailStart DATETIME,
    NoneAvailEnd DATETIME,
FOREIGN KEY (AreaID) REFERENCES ParkingArea(AreaID)
        ON DELETE SET NULL
        ON UPDATE CASCADE,

```

```
FOREIGN KEY (SpaceID) REFERENCES ParkingSpaces(SpaceID)
    ON DELETE SET NULL
    ON UPDATE CASCADE,
FOREIGN KEY (ReservationID) REFERENCES Reservations(ReservationID)
    ON DELETE SET NULL
    ON UPDATE CASCADE
);
```

```
create role 'users'@'localhost';
create role 'admins'@'localhost';
```

```
grant select, insert, update on parking.users to 'users'@'localhost';
grant select on parking.parkingarea to 'users'@'localhost';
grant select, insert, update, delete on parking.vehicles to 'users'@'localhost';
grant select on parking.parkingspaces to 'users'@'localhost';
grant select on parking.parkingfee to 'users'@'localhost';
grant select, insert, update, delete on parking.reservations to 'users'@'localhost';
grant select, insert, update, delete on parking.payments to 'users'@'localhost';
grant select, insert, update, delete on parking.parkingavailability to
'users'@'localhost';
grant all privileges on parking.* to 'admins'@'localhost';
```

```
grant 'users'@'localhost' to 'root'@'localhost';
grant 'admins'@'localhost' to 'root'@'localhost';
set role 'users'@'localhost';
set role 'admins'@'localhost';
```

6) CRUD Operations Screenshots & List of Functionalities of the project and its associated Screenshots from front end:

Signup Page:

Signin / Signup

Select the required option to proceed!

- ☐ Signin / login
- ☒ Signup

Parking Management System 🚗

Sign Up to Create an Account now!


Enter your name

Enter your email

Enter your phone number

Enter your username

Enter your password

Signin / Signup

Select the required option to proceed!

- ☐ Signin / login
- ☒ Signup

Parking Area IDs:

	AreaID	AreaName	Location	Area Type
0	1	Frontgate	Campus Entrance	Two Wheeler
1	2	GJBC Parking Lot	Main Building	Four Wheeler
2	3	Backgate	Rear Entrance	Two Wheeler, Four Wheeler, Large Vehicles

Select your Area ID

- ☒ 1
- ☐ 2
- ☐ 3

Sign Up

Successful signup:

×

Signin / Signup

Select the required option to proceed!

☐ Signin / login

☒ Signup

Parking Area IDs:

	AreaID	AreaName	Location	Area Type
0	1	Frontgate	Campus Entrance	Two Wheeler
1	2	GJBC Parking Lot	Main Building	Four Wheeler
2	3	Backgate	Rear Entrance	Two Wheeler, Four Wheeler, Large Vehicles

Select your Area ID

☐ 1

☒ 2

☐ 3

Sign Up

Account created! You can now sign in.

Successful Sign in:

×

Signin / Signup

Select the required option to proceed!

☒ Signin / login

☐ Signup

Parking Management System 🚗

Sign In / Login to your Account

Enter your username

vaishnavi

Enter your password

Sign In

User's profile:

×

Welcome, vaishnavi!

Navigation Bar

Select the required option to proceed!

☒ User Profile

☐ Edit Profile

☐ Vehicle Details

☐ Add/Edit Vehicle Details

☐ Remove Vehicle

☐ Active Reservations

☐ Future Reservations


☐ Past Reservations

☐ Reserve a Parking Space

☐ Cancel Reservation

Logout

vaishnavi's Profile Page



Your ID is 22

Your Name is vaishnavi

Your Email is vaishnavi@gmail.com

Your Phone Number is 9008067943

Your Username is vaishnavi

Your Password is Vaishnavi12*

Your Area ID is 2

Edit Profile:

×

Welcome, vaishnavi!

Navigation Bar

Select the required option to proceed!

☐ User Profile

☒ Edit Profile

☐ Vehicle Details

☐ Add/Edit Vehicle Details

☐ Remove Vehicle

☐ Active Reservations

☐ Future Reservations


☐ Past Reservations

☐ Reserve a Parking Space

☐ Cancel Reservation

Logout

vaishnavi's Profile Editing Page



Edit Your Name

vaishnavi

Edit Your Email

vaishnavi@gmail.com

Edit Your Phone Number

9008067944

Edit Your Password

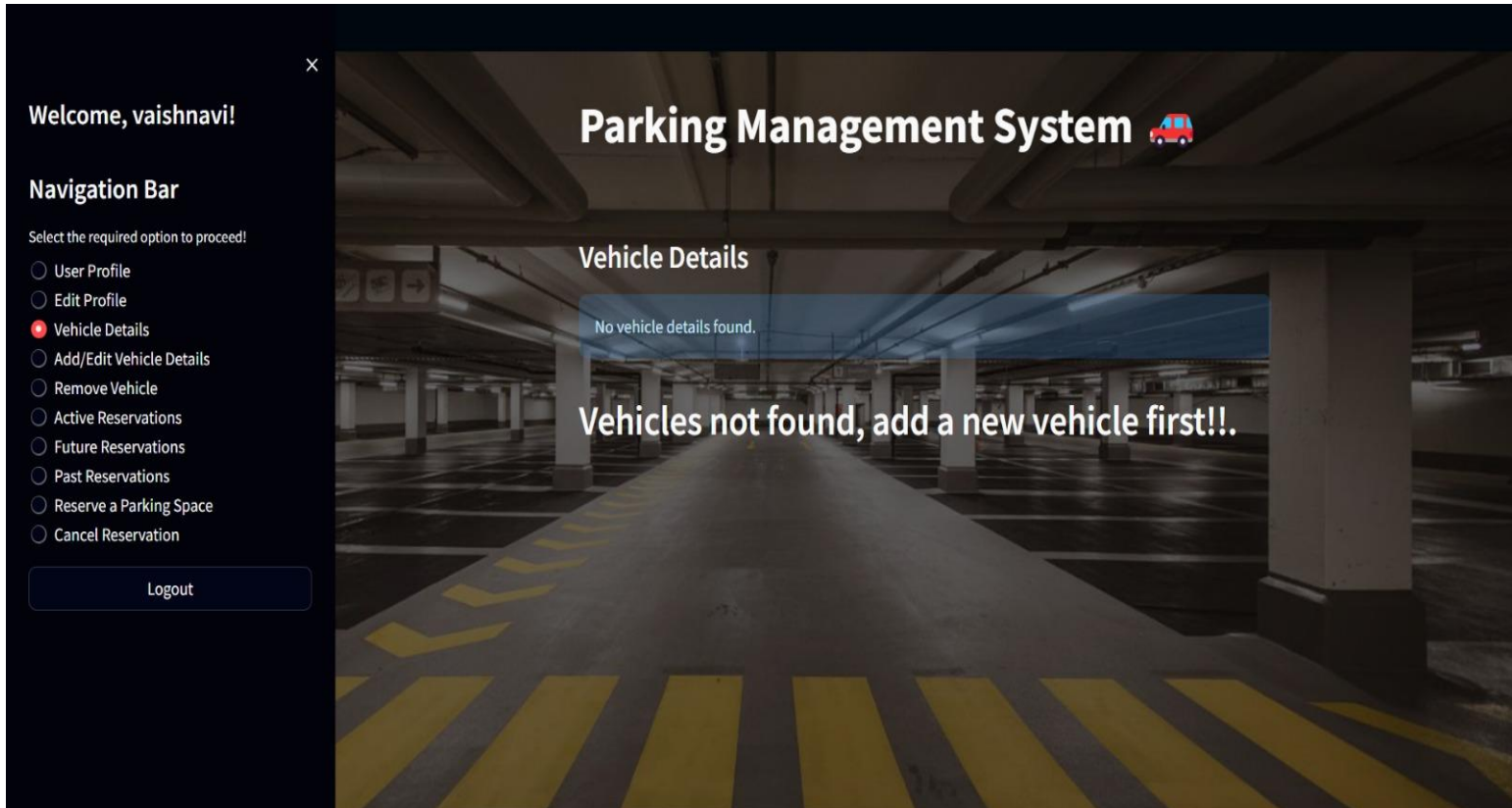
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👁

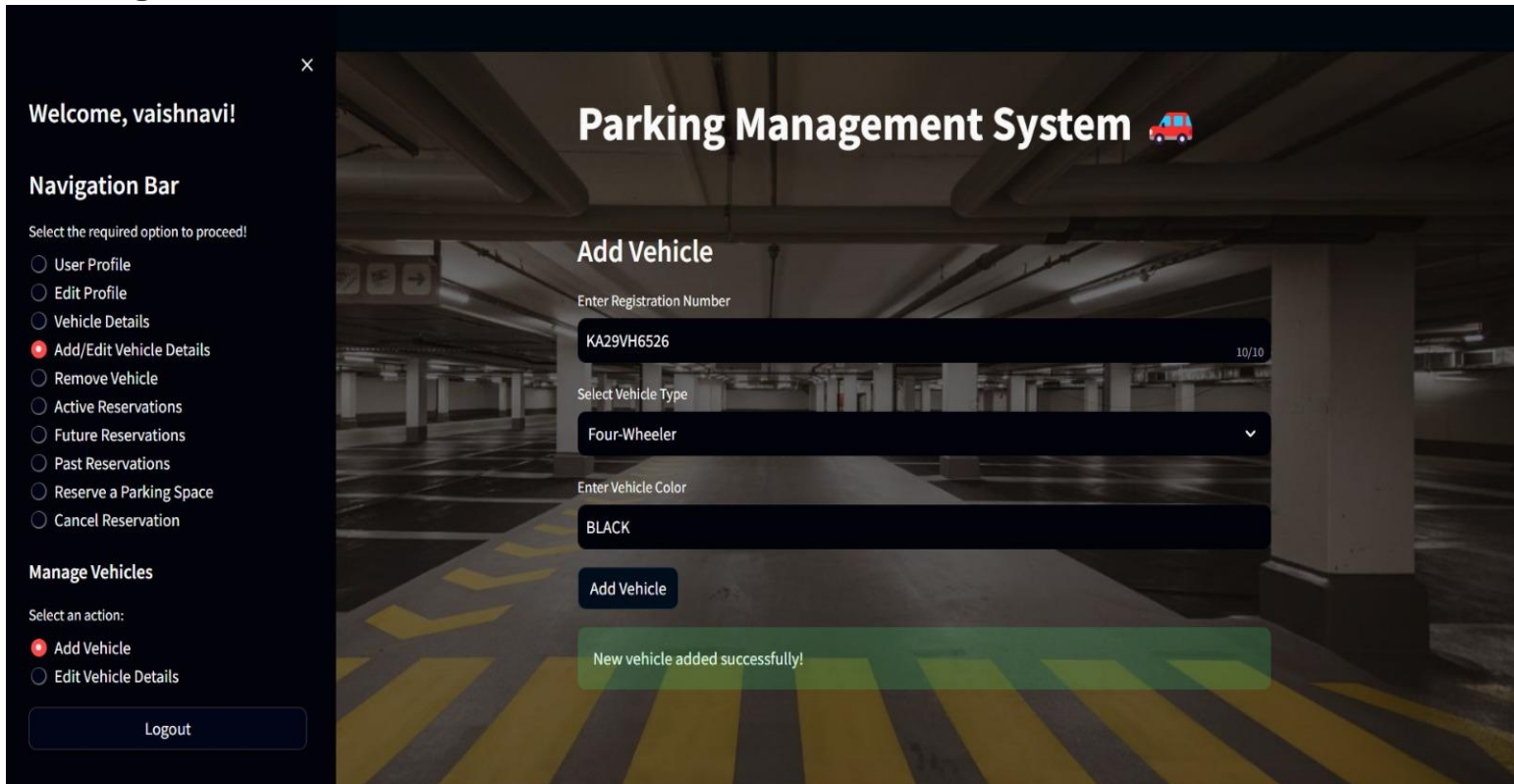
Submit

Profile updated successfully!, Go to the profile page to see the changes.

Vehicle Details:



Adding Vehicles:



Vehicle Details:

Welcome, vaishnavi!

Navigation Bar

Select the required option to proceed!

User Profile

Edit Profile

Vehicle Details

Add/Edit Vehicle Details

Remove Vehicle

Active Reservations

Future Reservations

Past Reservations

Reserve a Parking Space

Cancel Reservation

Logout

Parking Management System 🚗

Vehicle Details

	VehicleID	UserID	RegistrationNumber	VehicleType	Color
0	21	22	KA29VH6526	Four-Wheeler	BLACK

Edit Vehicle Details:

Welcome, vaishnavi!

Navigation Bar

Select the required option to proceed!

User Profile

Edit Profile

Vehicle Details

Add/Edit Vehicle Details

Remove Vehicle

Active Reservations

Future Reservations

Past Reservations

Reserve a Parking Space

Cancel Reservation

Manage Vehicles

Select an action:

Add Vehicle

Edit Vehicle Details

Logout

Parking Management System 🚗

Select a vehicle to edit:

23

Edit Registration Number

KA29VH652610/10

Edit Vehicle Type

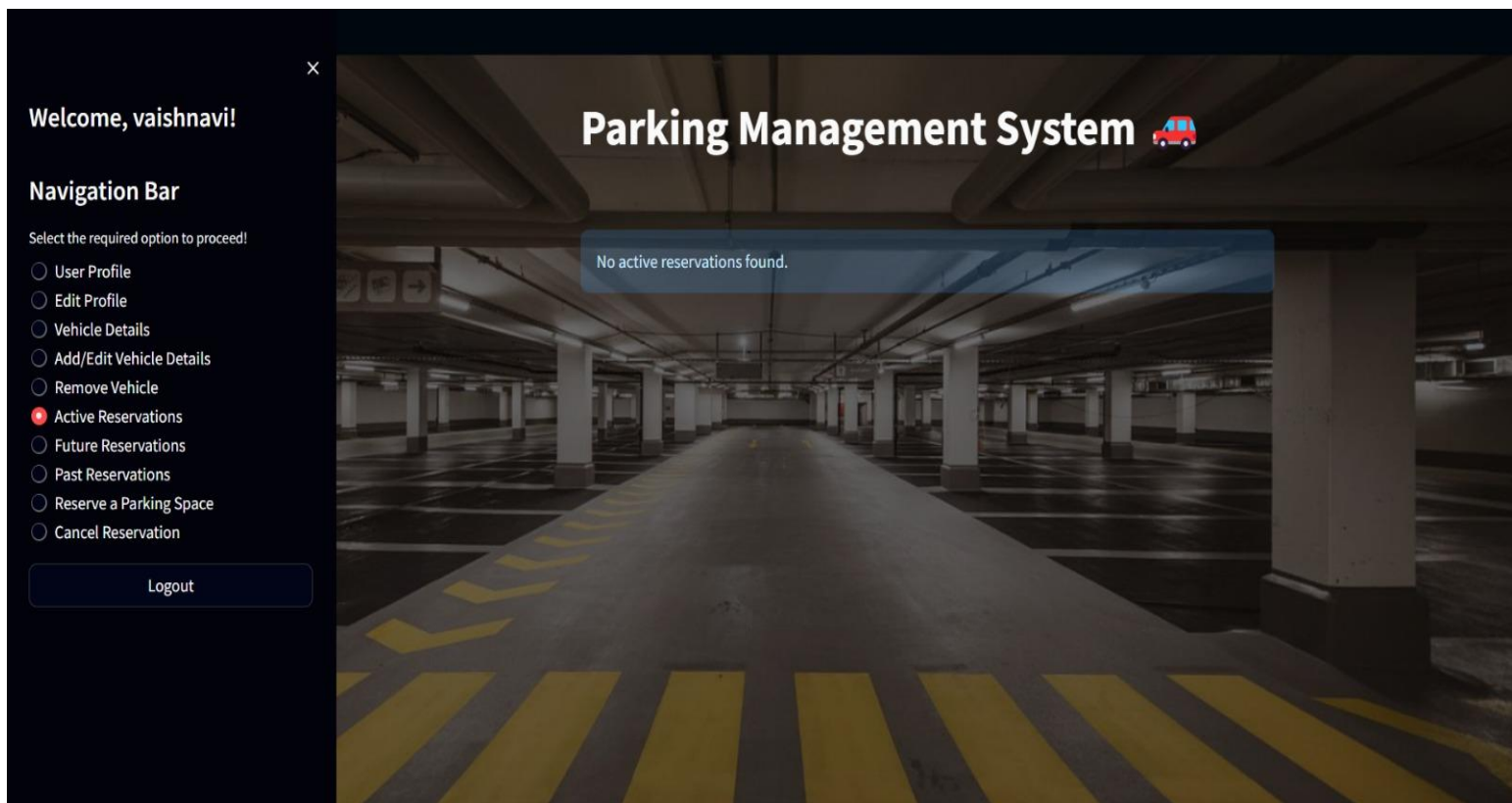
Four-Wheeler

Edit Vehicle Color

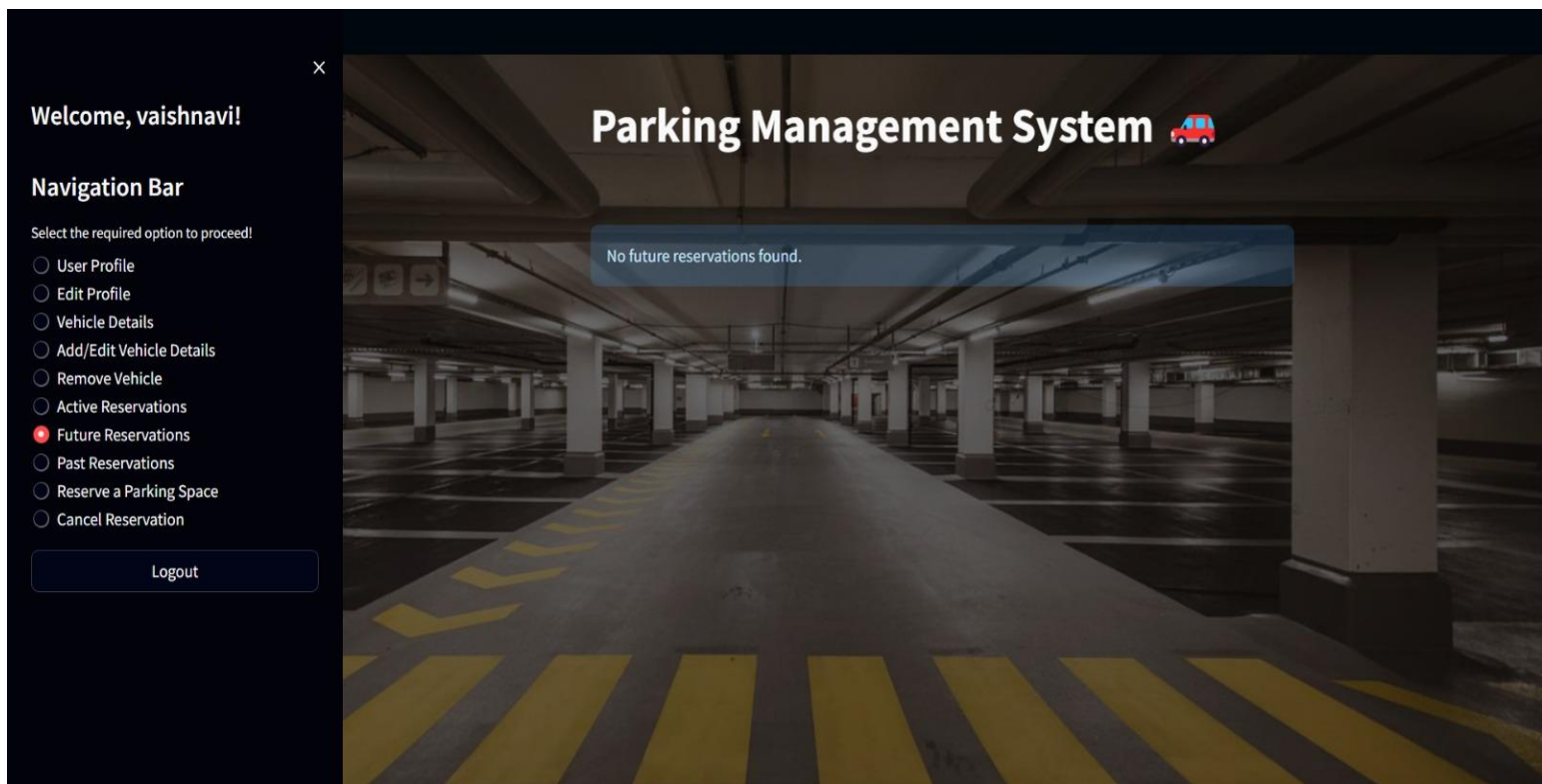
BLACK

Save Changes

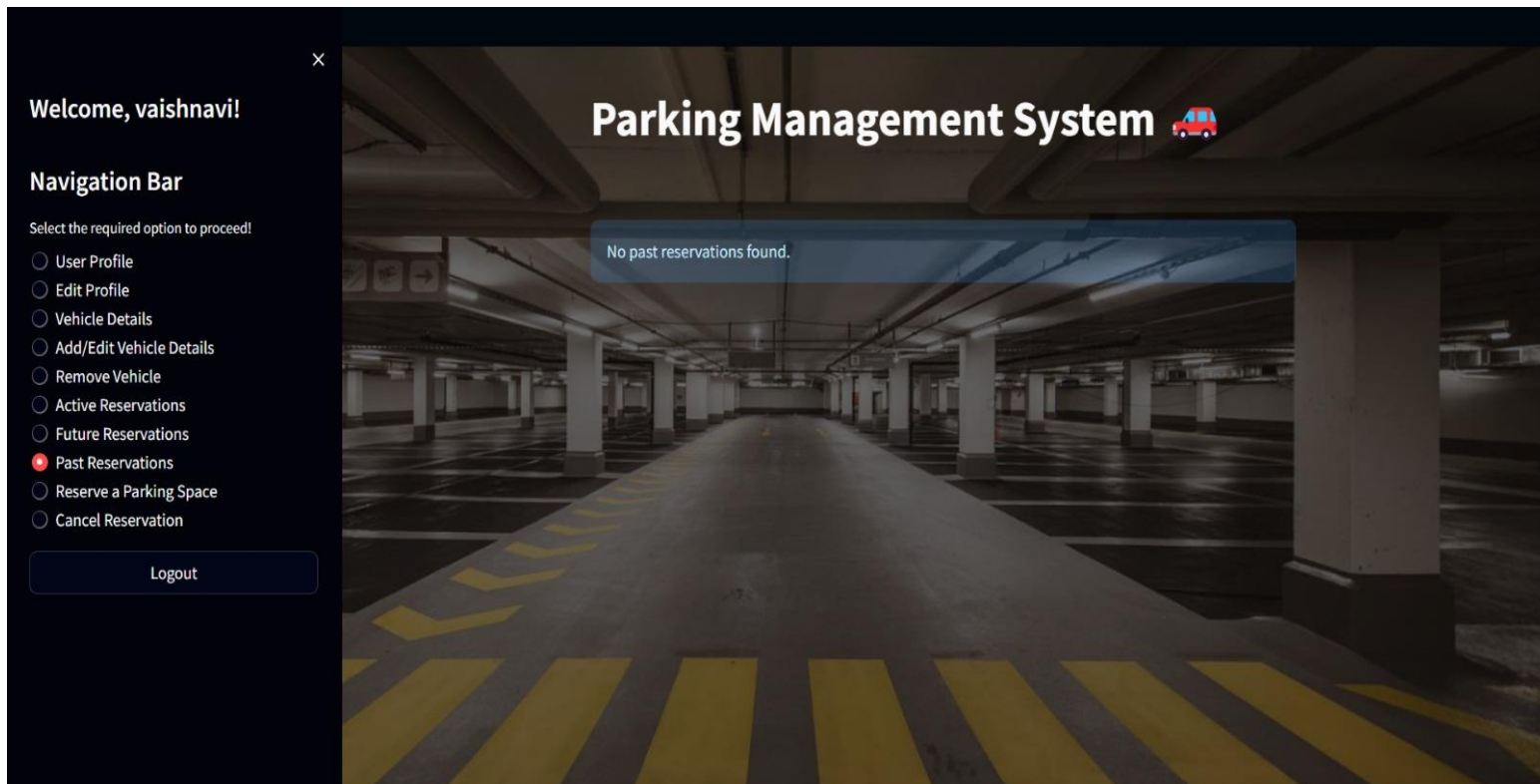
Active Reservations:



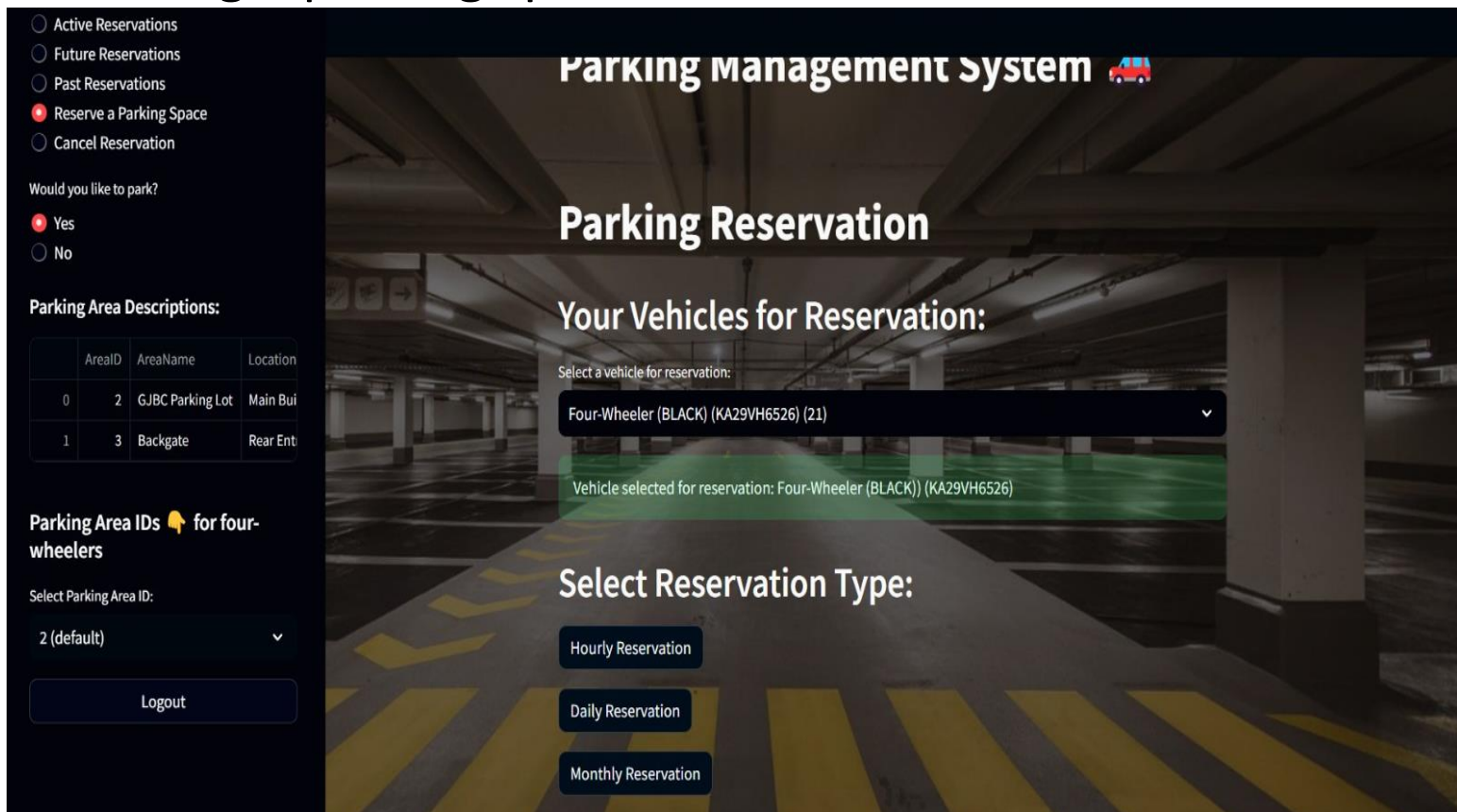
Future Reservations:



Past Reservations:



Reserving a parking space:



☐ Active Reservations
☐ Future Reservations
☐ Past Reservations
☒ Reserve a Parking Space
☐ Cancel Reservation

Would you like to park?
☒ Yes
☐ No

Parking Area Descriptions:

	ArealD	AreaName	Location
0	2	GJBC Parking Lot	Main Bui
1	3	Backgate	Rear Ent

Parking Area IDs 📍 for four-wheelers

Select Parking Area ID:
2 (default) ▼

Logout

Select Reservation Type:

Hourly Reservation
Daily Reservation
Monthly Reservation

Hourly reservation logic goes here!

Enter the number of hours for reservation:
1 - +

Select the date for reservation:
2023/12/01

Select the start time for reservation:
12:17 ▼

Space is available! You can proceed with the reservation.

☐ I want to proceed with the reservation

Continued...

☐ Active Reservations
☐ Future Reservations
☐ Past Reservations
☒ Reserve a Parking Space
☐ Cancel Reservation

Would you like to park?
☒ Yes
☐ No

Parking Area Descriptions:

	ArealD	AreaName	Location
0	2	GJBC Parking Lot	Main Bui
1	3	Backgate	Rear Ent

Parking Area IDs 📍 for four-wheelers

Select Parking Area ID:
2 (default) ▼

Logout

Enter the number of hours for reservation:
3 - +

Select the date for reservation:
2023/12/01

Select the start time for reservation:
12:17 ▼

Space is available! You can proceed with the reservation.

☒ I want to proceed with the reservation

Reservation successful! You can proceed with the payment.

Please pay now.

Enter your email:
[Input Field]

Continued...

Active Reservations

Future Reservations

Past Reservations

Reserve a Parking Space

Cancel Reservation

Would you like to park?

Yes

No

Parking Area Descriptions:

	AreaID	AreaName	Location
0	2	GJBC Parking Lot	Main Bui
1	3	Backgate	Rear Ent

Parking Area IDs 📌 for four-wheelers

Select Parking Area ID:

2 (default) ▾

Logout

Reservation successful! You can proceed with the payment.

Please pay now.

Enter your email:

harshithpallapothu9@gmail.com

Amount to pay: \$90.0

Pay Now

An OTP has been sent to your email!!.

Enter the OTP sent to your email:

0/6

Proceed!!!

Gmail OTP:

1-50 of 2,887 < >

Primary

Promotions 24 new
Chess.com, Tutorials Point, H...

Social 6 new
LinkedIn

parkingdbms

Your OTP for verification - Your OTP is: 535897

12:19 PM

Gmail

Search mail

1 of 2,887 < >

12:19 PM (1 minute ago) ☆ ↶ ⋮

Your OTP for verification

to

parkingdbms@gmail.com

Your OTP is: 535897

Reply

Forward

After successfully reservation:

Welcome, vaishnavi!

Navigation Bar

Select the required option to proceed!

User Profile

Edit Profile

Vehicle Details

Add/Edit Vehicle Details

Remove Vehicle

Active Reservations

Future Reservations

Past Reservations

Reserve a Parking Space

Cancel Reservation

Logout

Parking Management System

Active reservations found:

	ReservationID	SpaceType	ReservationDateTime	Duration	RegistrationNumber	VehicleType	Ar
0	104	Four-Wheeler	2023-12-01 12:24:00	1	KA29VH6526	Four-Wheeler	G

Reservation details: (Amount paid during parking)

	ReservationID	SpaceType	ReservationDateTime	Duration	RegistrationNumber	VehicleType	AreaName	Location	HourlyRate	DailyRate	MonthlyRate	AmountPaid	AmountToBePaid
0	104	Four-Wheeler	2023-12-01 12:24:00	1	KA29VH6526	Four-Wheeler	GJBC Parking Lot	Main Building	30	85	1,700	None	30

Canceling a reservation:

Welcome, vaishnavi!

Navigation Bar

Select the required option to proceed!

User Profile

Edit Profile

Vehicle Details

Add/Edit Vehicle Details

Remove Vehicle

Active Reservations

Future Reservations

Past Reservations

Reserve a Parking Space

Cancel Reservation

Logout

Parking Management System

Your Reservations:

Select a reservation to cancel:

Reservation ID: 104, Area: GJBC Parking Lot, Vehicle: Four-Wheeler, Reservation Date: 2023-12-0...

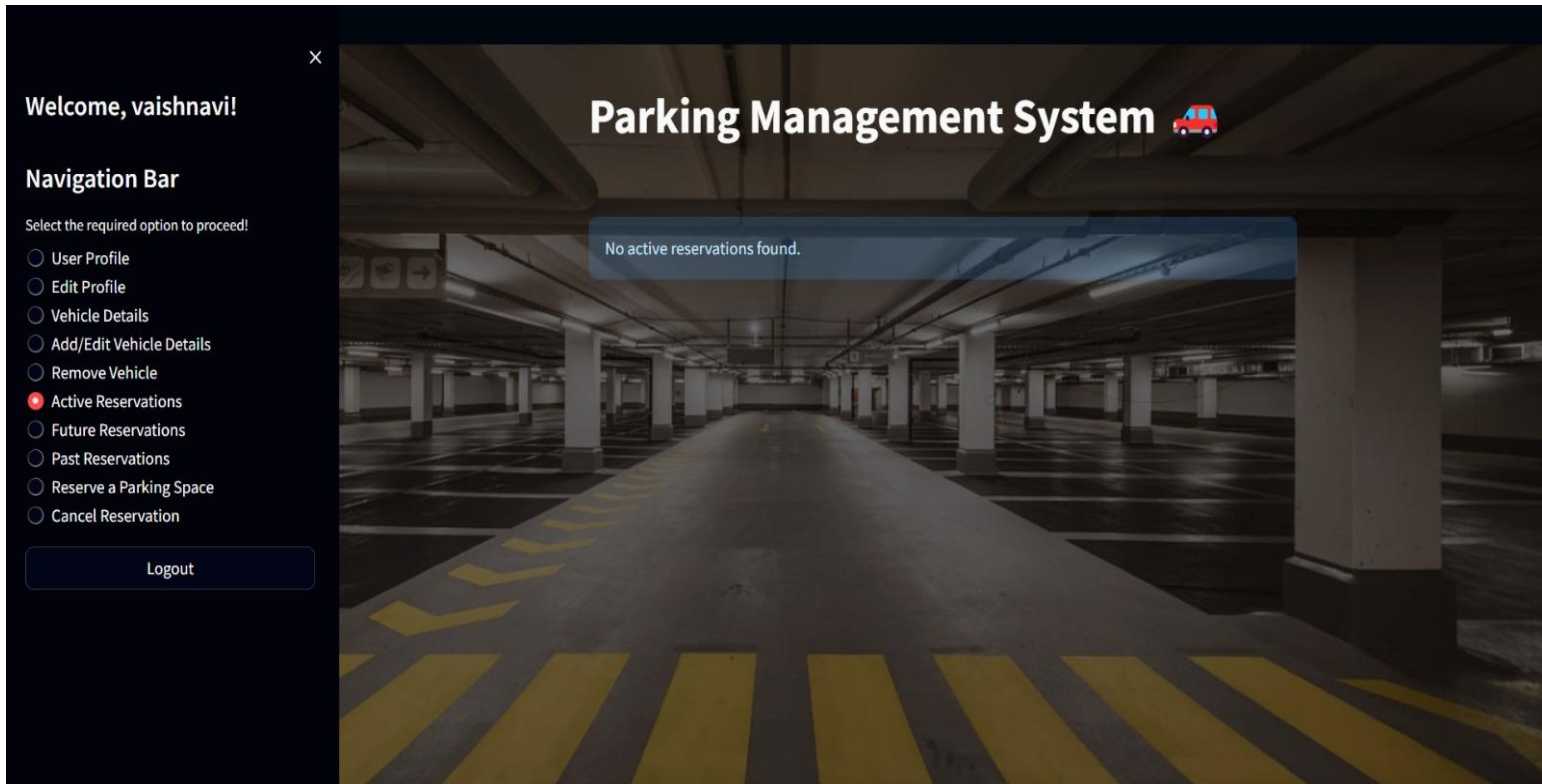
Selected Reservation String: Reservation ID: 104, Area: GJBC Parking Lot, Vehicle: Four-Wheeler, Reservation Date: 2023-12-01 12:24:00, Duration: 1 hours

Reservation selected for cancellation: Reservation ID: 104, Area: GJBC Parking Lot, Vehicle: Four-Wheeler, Reservation Date: 2023-12-01 12:24:00, Duration: 1 hours

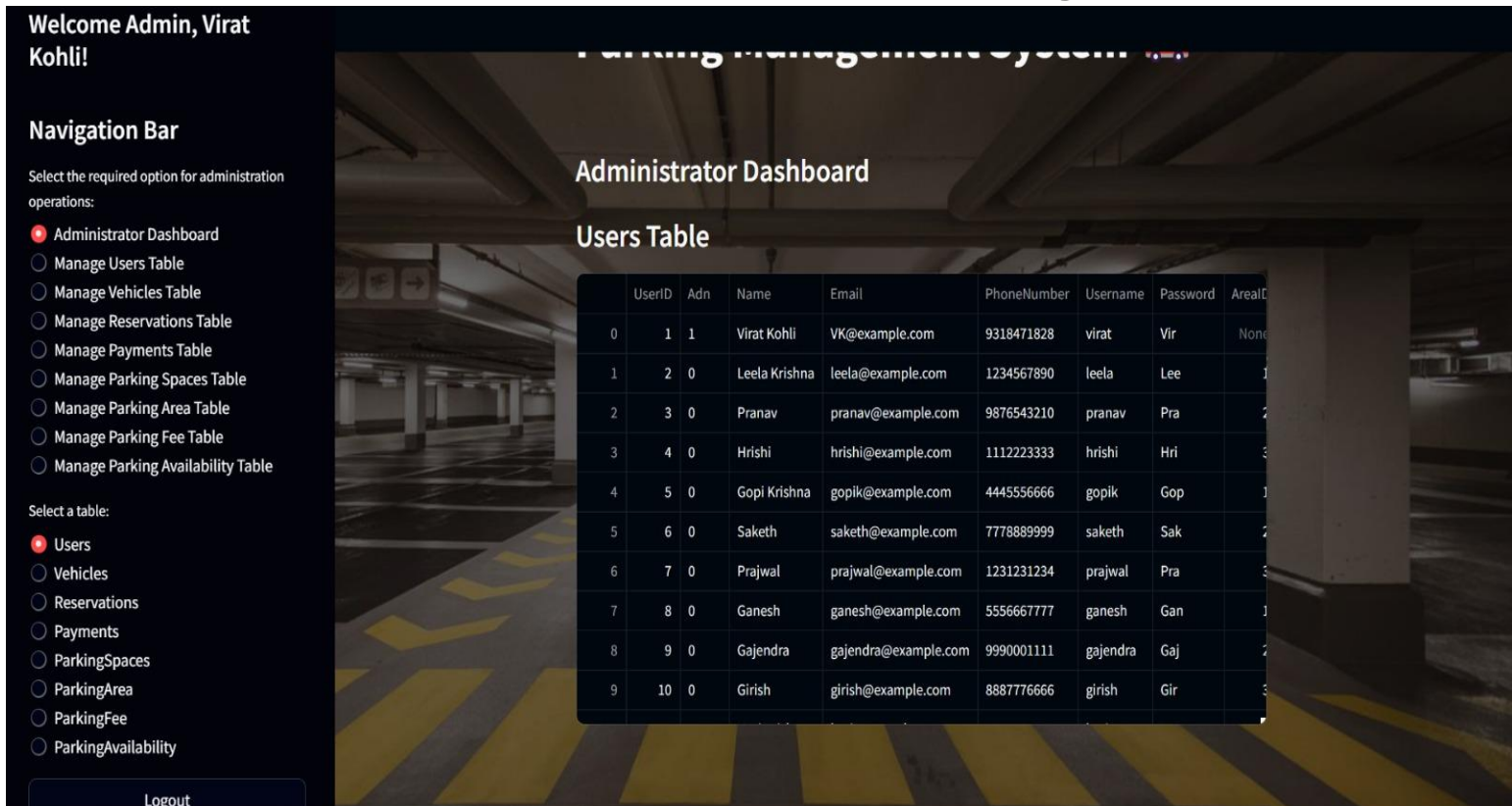
☒ I want to cancel this reservation

Reservation canceled successfully!

After deletion of reservation:



Administrator Window after successful sign in:



Adding a user as an administrator (can add an administrator also):

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

☐ Administrator Dashboard

☒ Manage Users Table

☐ Manage Vehicles Table

☐ Manage Reservations Table

☐ Manage Payments Table

☐ Manage Parking Spaces Table

☐ Manage Parking Area Table

☐ Manage Parking Fee Table

☐ Manage Parking Availability Table

Select an action:

☒ Add User

☐ Update User

☐ Delete User

Add User

Enter name

alen

☐ IS THE USER A ADMINISTRATOR?

Enter email

alen@gmail.com

Enter phone number

4563782987

Enter username

alen

Enter password

.....

Successful creation:

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

☐ Administrator Dashboard

☒ Manage Users Table

☐ Manage Vehicles Table

☐ Manage Reservations Table

☐ Manage Payments Table

☐ Manage Parking Spaces Table

☐ Manage Parking Area Table

☐ Manage Parking Fee Table

☐ Manage Parking Availability Table

Select an action:

☒ Add User

☐ Update User

☐ Delete User

0	1	Frontgate	Campus Entrance
1	2	GJBC Parking Lot	Main Building
2	3	Backgate	Rear Entrance

Select your Area ID

☐ 1

☒ 2

☐ 3

Add User

User added successfully!

Refresh

Edit user details:

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

☐ Administrator Dashboard

☒ Manage Users Table

☐ Manage Vehicles Table

☐ Manage Reservations Table

☐ Manage Payments Table

☐ Manage Parking Spaces Table

☐ Manage Parking Area Table

☐ Manage Parking Fee Table

☐ Manage Parking Availability Table

Select an action:

☐ Add User

☒ Update User

☐ Delete User

Logout

Edit User

Select a user to edit:

4

Update User Information:

☐ IS THIS USER AN ADMINISTRATOR?

Enter new name:

Hrishi

Enter new email:

hrishi@example.com

Enter new phone number:

4567890456

Enter new username:

hrishi2

Enter new password:

Hri

Successful updating:

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

☐ Administrator Dashboard

☒ Manage Users Table

☐ Manage Vehicles Table

☐ Manage Reservations Table

☐ Manage Payments Table

☐ Manage Parking Spaces Table

☐ Manage Parking Area Table

☐ Manage Parking Fee Table

☐ Manage Parking Availability Table

Select an action:

☐ Add User

☒ Update User

☐ Delete User

Logout

Parking Area Table

	AreaID	AreaName	Location
0	1	Frontgate	Campus Entrance
1	2	GJBC Parking Lot	Main Building
2	3	Backgate	Rear Entrance

Select your Area ID

☐ 1

☒ 2

☐ 3

Update User

User information updated successfully!

Refresh

Deletion of a user:

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

☐ Administrator Dashboard

☒ Manage Users Table

☐ Manage Vehicles Table

☐ Manage Reservations Table

☐ Manage Payments Table

☐ Manage Parking Spaces Table

☐ Manage Parking Area Table

☐ Manage Parking Fee Table

☐ Manage Parking Availability Table

Select an action:

☐ Add User

☐ Update User

☒ Delete User

Logout

Select a user to Delete:

23

User Details:

User ID: 23

Name: alen

Email: alen@gmail.com

Phone Number: 4563782987

Username: alen

Password: Alen1234567*

Area ID: 2

☒ I confirm that I want to delete this user.

Delete User

Window for all other tables:

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

☐ Administrator Dashboard

☐ Manage Users Table

☒ Manage Vehicles Table

☐ Manage Reservations Table

☐ Manage Payments Table

☐ Manage Parking Spaces Table

☐ Manage Parking Area Table

☐ Manage Parking Fee Table

☐ Manage Parking Availability Table

Select an action:

☒ Add Vehicle

☐ Update Vehicle

☐ Delete Vehicle

Logout

Vehicles Table

	VehicleID	UserID	RegistrationNumber	VehicleType	Color	Name
0	1	2	KA01AB1234	Two-Wheeler	Red	Leela Krishna
1	2	3	MH02CD5678	Four-Wheeler	Blue	Pranav
2	3	4	TS03EF9876	Four-Wheeler	Green	Hrishi
3	4	5	AP04GH5432	Two-Wheeler	Black	Gopi Krishna
4	5	6	KL05IJ6789	Four-Wheeler	Silver	Saketh
5	6	7	UP06KL4321	Two-Wheeler	White	Prajwal
6	7	8	TN07MN9876	Two-Wheeler	Yellow	Ganesh
7	8	9	HR08OP2345	Four-Wheeler	Red	Gajendra
8	9	10	DL09QR7654	Four-Wheeler	Blue	Girish
9	10	11	RJ10ST8765	Two-Wheeler	Green	Hari Krishna

Add Vehicle

Select user:

1

Edit Vehicle Type

Two-Wheeler

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

- ☐ Administrator Dashboard
- ☐ Manage Users Table
- ☐ Manage Vehicles Table
- ☒ Manage Reservations Table
- ☐ Manage Payments Table
- ☐ Manage Parking Spaces Table
- ☐ Manage Parking Area Table
- ☐ Manage Parking Fee Table
- ☐ Manage Parking Availability Table

Select an action:

- ☒ Add Reservation
- ☐ Update Reservation
- ☐ Delete Reservation

Logout

Reservations Table

	ReservationID	UserID	ArealID	SpaceID	VehicleID	ReservationDateTime	Duration	Name
0	3	4	3	36	3	2023-11-15 08:45:00	1	Hrishi
1	5	6	2	17	5	2023-11-17 13:15:00	4	Saketh
2	6	7	3	42	6	2023-11-18 17:30:00	3	Prajwal
3	7	8	1	3	7	2023-11-20 09:00:00	2	Ganesh
4	8	9	2	18	8	2023-11-22 12:45:00	1	Gajendra
5	9	10	3	37	9	2023-11-23 14:30:00	3	Girish
6	10	11	1	4	10	2023-11-25 15:30:00	2	Hari Krishna
7	11	12	2	19	11	2023-11-26 10:15:00	2	Amit Patel
8	12	13	3	38	12	2023-11-28 16:00:00	3	Neha Sharma
9	13	14	1	5	13	2023-11-30 09:45:00	1	Arun Kumar

Add Reservation

Select user:

1

Select parking area:

1

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

- ☐ Administrator Dashboard
- ☐ Manage Users Table
- ☐ Manage Vehicles Table
- ☐ Manage Reservations Table
- ☒ Manage Payments Table
- ☐ Manage Parking Spaces Table
- ☐ Manage Parking Area Table
- ☐ Manage Parking Fee Table
- ☐ Manage Parking Availability Table

Select an action:

- ☐ Add Payment
- ☒ Update Payment
- ☐ Delete Payment

Payments Table

	PaymentID	UserID	ReservationID	Amount	PaymentDateTime	Name	ReservationDateTime
0	3	4	3	30	2023-11-15 07:35:00	Hrishi	2023-11-15 08:45:00
1	5	6	5	120	2023-11-17 12:30:00	Saketh	2023-11-17 13:15:00
2	6	7	6	75	2023-11-18 15:15:00	Prajwal	2023-11-18 17:30:00
3	7	8	7	50	2023-11-20 08:00:00	Ganesh	2023-11-20 09:00:00
4	8	9	8	30	2023-11-22 12:00:00	Gajendra	2023-11-22 12:45:00
5	9	10	9	95	2023-11-22 12:30:00	Girish	2023-11-23 14:30:00
6	10	11	10	50	2023-11-24 16:00:00	Hari Krishna	2023-11-25 15:30:00
7	11	12	11	70	2023-11-10 10:30:00	Amit Patel	2023-11-26 10:15:00
8	12	13	12	100	2023-11-12 15:00:00	Neha Sharma	2023-11-28 16:00:00
9	13	14	13	35	2023-11-23 09:30:00	Arun Kumar	2023-11-30 09:45:00

Update Payment

Select a payment to edit:

2

×

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

☐ Administrator Dashboard

☐ Manage Users Table

☐ Manage Vehicles Table

☐ Manage Reservations Table

☐ Manage Payments Table

☒ Manage Parking Spaces Table

☐ Manage Parking Area Table

☐ Manage Parking Fee Table

☐ Manage Parking Availability Table

Select an action:

☐ Add Parking Space

☐ Update Parking Space

☒ Delete Parking Space

Logout

Parking Spaces Table

	SpaceID	SpaceType	AreaID	AreaName
0	36	Four-Wheeler	3	Backgate
1	37	Four-Wheeler	3	Backgate
2	38	Four-Wheeler	3	Backgate
3	39	Four-Wheeler	3	Backgate
4	40	Four-Wheeler	3	Backgate
5	41	Four-Wheeler	3	Backgate
6	42	Two-Wheeler	3	Backgate
7	43	Two-Wheeler	3	Backgate
8	44	Two-Wheeler	3	Backgate
9	45	Two-Wheeler	3	Backgate

Delete Parking Space

Select a parking space to delete:

36

▼

Parking Space Details:

×

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

☐ Administrator Dashboard

☐ Manage Users Table

☐ Manage Vehicles Table

☐ Manage Reservations Table

☐ Manage Payments Table

☐ Manage Parking Spaces Table

☒ Manage Parking Area Table

☐ Manage Parking Fee Table

☐ Manage Parking Availability Table

Select an action:

☐ Add Parking Area

☒ Update Parking Area

☐ Delete Parking Area

Logout

Parking Area Table

	AreaID	AreaName	Location	TotalSpaces
0	1	Frontgate	Campus Entrance	15
1	2	GJBC Parking Lot	Main Building	20
2	3	Backgate	Rear Entrance	15

Update Parking Area

Select a parking area to edit:

1

▼

Update Parking Area Information:

Enter new parking area name:

Frontgate

Enter new parking area location:

Campus Entrance

Enter new total parking spaces:

15

-

+

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

- ☐ Administrator Dashboard
- ☐ Manage Users Table
- ☐ Manage Vehicles Table
- ☐ Manage Reservations Table
- ☐ Manage Payments Table
- ☐ Manage Parking Spaces Table
- ☐ Manage Parking Area Table
- ☒ Manage Parking Fee Table
- ☐ Manage Parking Availability Table

Select an action:

- ☒ Add Parking Fee
- ☐ Update Parking Fee
- ☐ Delete Parking Fee

Logout

Parking Fee Table

	FeeID	SpaceType	HourlyRate	DailyRate	MonthlyRate
0	1	Two-Wheeler	25	75	1,500
1	2	Four-Wheeler	30	85	1,700
2	3	Large Vehicle	35	95	1,900

Add Parking Fee

Select space type:

Enter hourly rate:

0.00

- +

Enter daily rate:

0.00

- +

Enter monthly rate:

0.00

- +

Add Parking Fee

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

- ☐ Administrator Dashboard
- ☐ Manage Users Table
- ☐ Manage Vehicles Table
- ☐ Manage Reservations Table
- ☐ Manage Payments Table
- ☐ Manage Parking Spaces Table
- ☐ Manage Parking Area Table
- ☐ Manage Parking Fee Table
- ☒ Manage Parking Availability Table

Select an action:

- ☐ Add Parking Availability
- ☒ Update Parking Availability
- ☐ Delete Parking Availability

Logout

Update Parking Availability

Select a parking availability to edit:

2

▼

Update Parking Availability Information:

Select new space ID:

2

▼

Select new reservation ID:

16

▼

Enter new start time for non-availability (YYYY-MM-DD HH:MM:'SS'):

Enter new end time for non-availability (YYYY-MM-DD HH:MM:'SS'):

2023-11-12 14:30:00

Update Parking Availability

7) Triggers, Procedures/Functions, Nested Query, Join Aggregate Queries:

/*Trigger to update TotalSpaces in ParkingArea after Reservation Insert:*/

DELIMITER //

CREATE TRIGGER update_total_spaces AFTER INSERT ON Reservations

FOR EACH ROW

BEGIN

 DECLARE area_capacity INT;

 SELECT TotalSpaces INTO area_capacity FROM ParkingArea WHERE AreaID = NEW.AreaID;

 UPDATE ParkingArea SET TotalSpaces = area_capacity - 1 WHERE AreaID = NEW.AreaID;

END;

//

DELIMITER ;

/*Trigger to update TotalSpaces in ParkingArea after Reservation Delete:*/

DELIMITER //

CREATE TRIGGER update_total_spaces_after_delete AFTER DELETE ON

Reservations

FOR EACH ROW

BEGIN

 DECLARE area_capacity INT;

 SELECT TotalSpaces INTO area_capacity FROM ParkingArea WHERE AreaID = OLD.AreaID;

 UPDATE ParkingArea SET TotalSpaces = area_capacity + 1 WHERE AreaID = OLD.AreaID;

END;

//

DELIMITER ;

```
/*Trigger to update Availability after Reservation Insert:*/  
DELIMITER //  
CREATE TRIGGER update_availability_after_insert AFTER INSERT ON Reservations  
FOR EACH ROW  
BEGIN  
    INSERT INTO ParkingAvailability (AreaID, SpaceID, ReservationID,  
NoneAvailStart, NoneAvailEnd)  
    VALUES (NEW.AreaID, NEW.SpaceID, NEW.ReservationID,  
NEW.ReservationDateTime, DATE_ADD(NEW.ReservationDateTime, INTERVAL  
NEW.Duration HOUR));  
END;  
//  
DELIMITER ;
```

```
/*Trigger to update Availability after Reservation Delete:*/  
DELIMITER //  
CREATE TRIGGER update_availability_after_delete AFTER DELETE ON Reservations  
FOR EACH ROW  
BEGIN  
    DELETE FROM ParkingAvailability WHERE ReservationID = OLD.ReservationID;  
END;  
//  
DELIMITER ;
```

```
/*Trigger to update Payments after Reservation Insert:*/  
DELIMITER //  
CREATE TRIGGER update_payments_after_insert AFTER INSERT ON Reservations  
FOR EACH ROW  
BEGIN  
    INSERT INTO Payments (UserID, ReservationID, Amount, PaymentDateTime)  
    VALUES (NEW.UserID, NEW.ReservationID, calculate_amount_to_be_paid(25.0,  
75.0, 1500.0, NEW.Duration, NEW.ReservationDateTime, NOW()), NOW());  
END;  
//
```

DELIMITER ;

/*Trigger to update Payments after Reservation Delete:*/

DELIMITER //

CREATE TRIGGER update_payments_after_delete AFTER DELETE ON Reservations
FOR EACH ROW

BEGIN

DELETE FROM Payments WHERE ReservationID = OLD.ReservationID;

END;

//

DELIMITER ;

/*Trigger to prevent overlapping reservations:*/

DELIMITER //

CREATE TRIGGER prevent_overlapping_reservations BEFORE INSERT ON
Reservations

FOR EACH ROW

BEGIN

IF EXISTS (

SELECT 1 FROM Reservations

WHERE SpaceID = NEW.SpaceID

AND (

(NEW.ReservationDateTime BETWEEN ReservationDateTime AND
DATE_ADD(ReservationDateTime, INTERVAL Duration HOUR))

OR (DATE_ADD(NEW.ReservationDateTime, INTERVAL NEW.Duration
HOUR) BETWEEN ReservationDateTime AND DATE_ADD(ReservationDateTime,
INTERVAL Duration HOUR))

OR (NEW.ReservationDateTime < ReservationDateTime AND
DATE_ADD(NEW.ReservationDateTime, INTERVAL NEW.Duration HOUR) >
DATE_ADD(ReservationDateTime, INTERVAL Duration HOUR))

)

) THEN

SIGNAL SQLSTATE '45000'

SET MESSAGE_TEXT = 'Reservation overlaps with an existing reservation';

END IF;

```
END;  
//  
DELIMITER ;
```

```
/*Procedure to calculate the parking fee for a reservation:*/
```

```
DELIMITER //
```

```
CREATE PROCEDURE CalculateParkingFee(IN reservationID INT)
```

```
BEGIN
```

```
    DECLARE hourlyRate DECIMAL(10, 2);
```

```
    DECLARE dailyRate DECIMAL(10, 2);
```

```
    DECLARE monthlyRate DECIMAL(10, 2);
```

```
    DECLARE durationHours INT;
```

```
    SELECT HourlyRate, DailyRate, MonthlyRate INTO hourlyRate, dailyRate,  
monthlyRate
```

```
    FROM ParkingFee
```

```
    WHERE SpaceType = (
```

```
        SELECT SpaceType FROM Reservations WHERE ReservationID = reservationID  
    );
```

```
    SELECT Duration INTO durationHours
```

```
    FROM Reservations
```

```
    WHERE ReservationID = reservationID;
```

```
    IF durationHours < 24 THEN
```

```
        SELECT hourlyRate * durationHours AS Fee;
```

```
    ELSEIF durationHours < 720 THEN
```

```
        SELECT dailyRate * CEIL(durationHours / 24) AS Fee;
```

```
    ELSE
```

```
        SELECT monthlyRate * CEIL(durationHours / 720) AS Fee;
```

```
    END IF;
```

```
END;
```

```
//
```

DELIMITER ;

/*Function to get the total number of reservations for a user:*/

DELIMITER //

CREATE FUNCTION GetTotalReservationsForUser(userID INT) RETURNS INT
BEGIN

DECLARE totalReservations INT;
 SELECT COUNT(*) INTO totalReservations
 FROM Reservations
 WHERE UserID = userID;
 RETURN totalReservations;

END;

//

DELIMITER ;

/*Procedure to update user information:*/

DELIMITER //

CREATE PROCEDURE UpdateUser(
 IN userID INT,
 IN newName VARCHAR(255),
 IN newEmail VARCHAR(255),
 IN newPhoneNumber VARCHAR(20),
 IN newUsername VARCHAR(20),
 IN newPassword VARCHAR(255)
)

BEGIN

UPDATE Users
 SET Name = newName,
 Email = newEmail,
 PhoneNumber = newPhoneNumber,
 Username = newUsername,
 Password = newPassword
 WHERE UserID = userID;

```
END;  
//  
DELIMITER ;
```

```
/*Function to get available parking spaces in an area:*/  
DELIMITER //  
CREATE FUNCTION GetAvailableParkingSpaces(areaID INT) RETURNS INT  
BEGIN  
    DECLARE totalSpaces INT;  
    DECLARE reservedSpaces INT;  
  
    SELECT TotalSpaces INTO totalSpaces  
    FROM ParkingArea  
    WHERE AreaID = areaID;  
  
    SELECT COUNT(*) INTO reservedSpaces  
    FROM Reservations R  
    JOIN ParkingSpaces PS ON R.SpaceID = PS.SpaceID  
    WHERE R.AreaID = areaID;  
  
    RETURN totalSpaces - reservedSpaces;  
END;  
//  
DELIMITER ;
```

```
/*Procedure to delete a user and associated data:*/  
DELIMITER //  
CREATE PROCEDURE DeleteUserAndData(userID INT)  
BEGIN  
    DELETE FROM Users WHERE UserID = userID;  
    DELETE FROM Vehicles WHERE UserID = userID;  
    DELETE FROM Reservations WHERE UserID = userID;  
    DELETE FROM Payments WHERE UserID = userID;  
END;
```

//
DELIMITER ;

8) Code snippets from invoking Procedures/Functions/Trigger: 1st trigger action:

☐ Active Reservations

☐ Future Reservations

☐ Past Reservations

☒ Reserve a Parking Space

☐ Cancel Reservation

Would you like to park?

☒ Yes

☐ No

Parking Area Descriptions:

	ArealD	AreaName	Location
0	2	GJBC Parking Lot	Main Bui
1	3	Backgate	Rear Ent

Parking Area IDs 📌 for four-wheelers

Select Parking Area ID:

2 (default)

Logout

Select Reservation Type:

Hourly Reservation

Daily Reservation

Monthly Reservation

Hourly reservation logic goes here!

Enter the number of hours for reservation:

1

Select the date for reservation:

2023/12/01

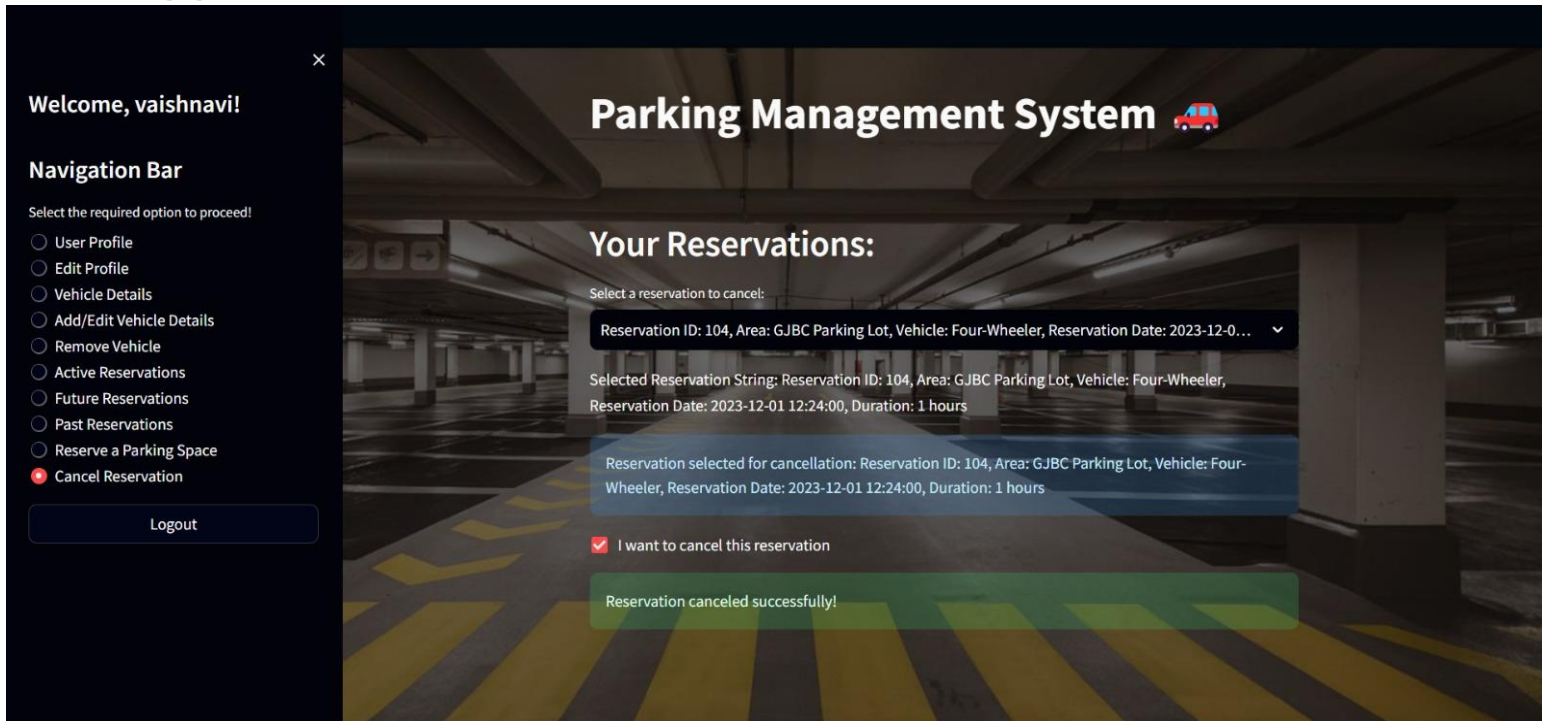
Select the start time for reservation:

12:17

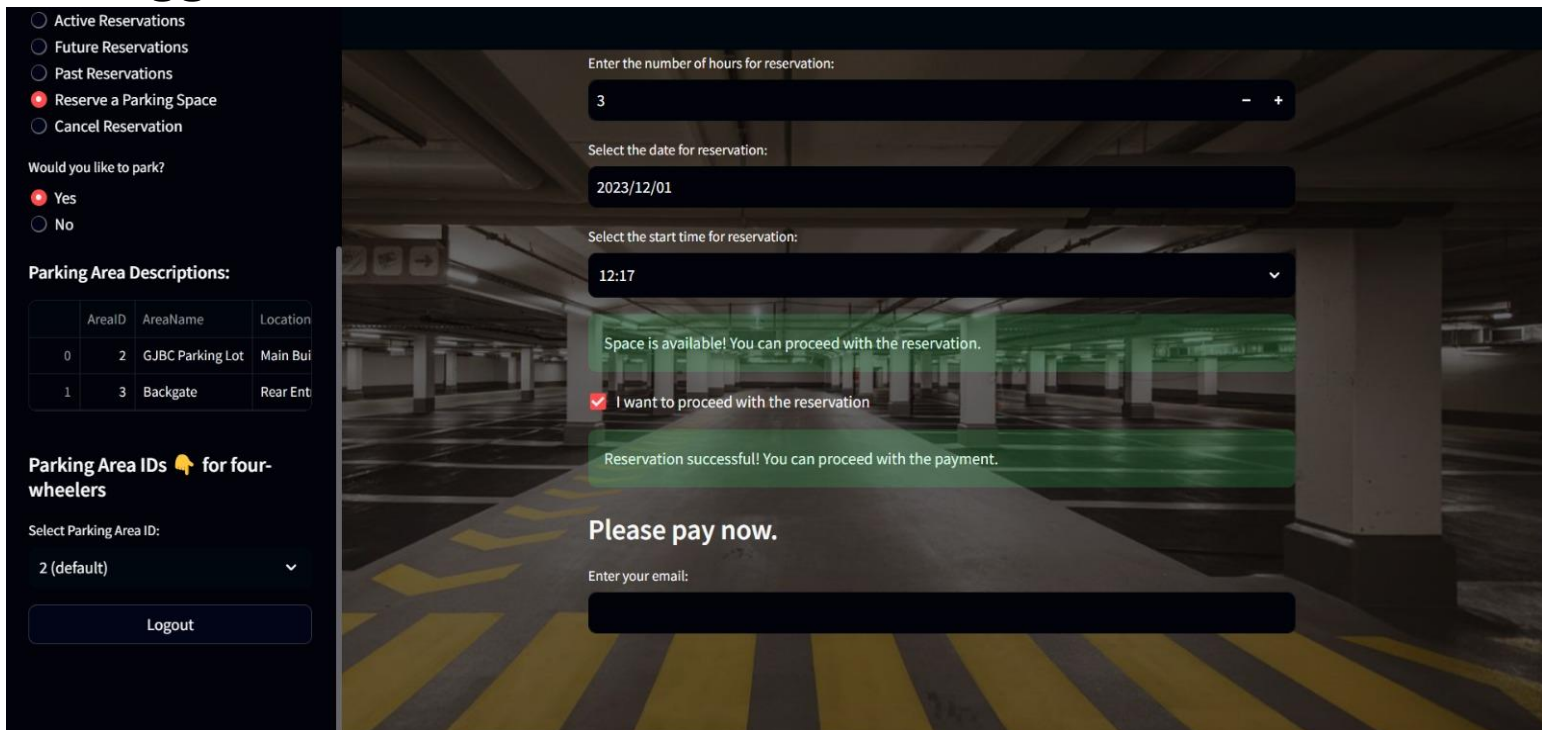
Space is available! You can proceed with the reservation.

☒ I want to proceed with the reservation

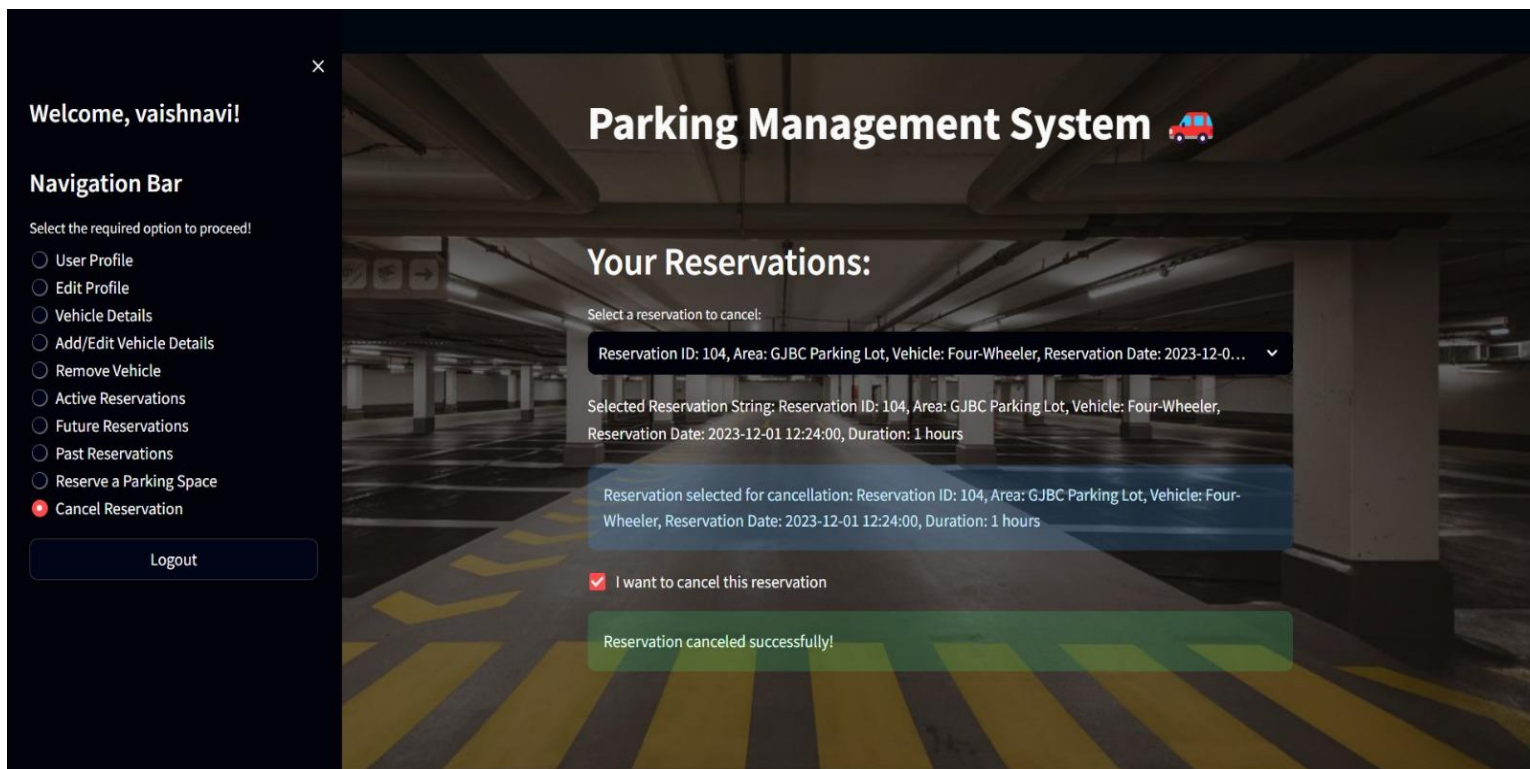
2nd trigger action:



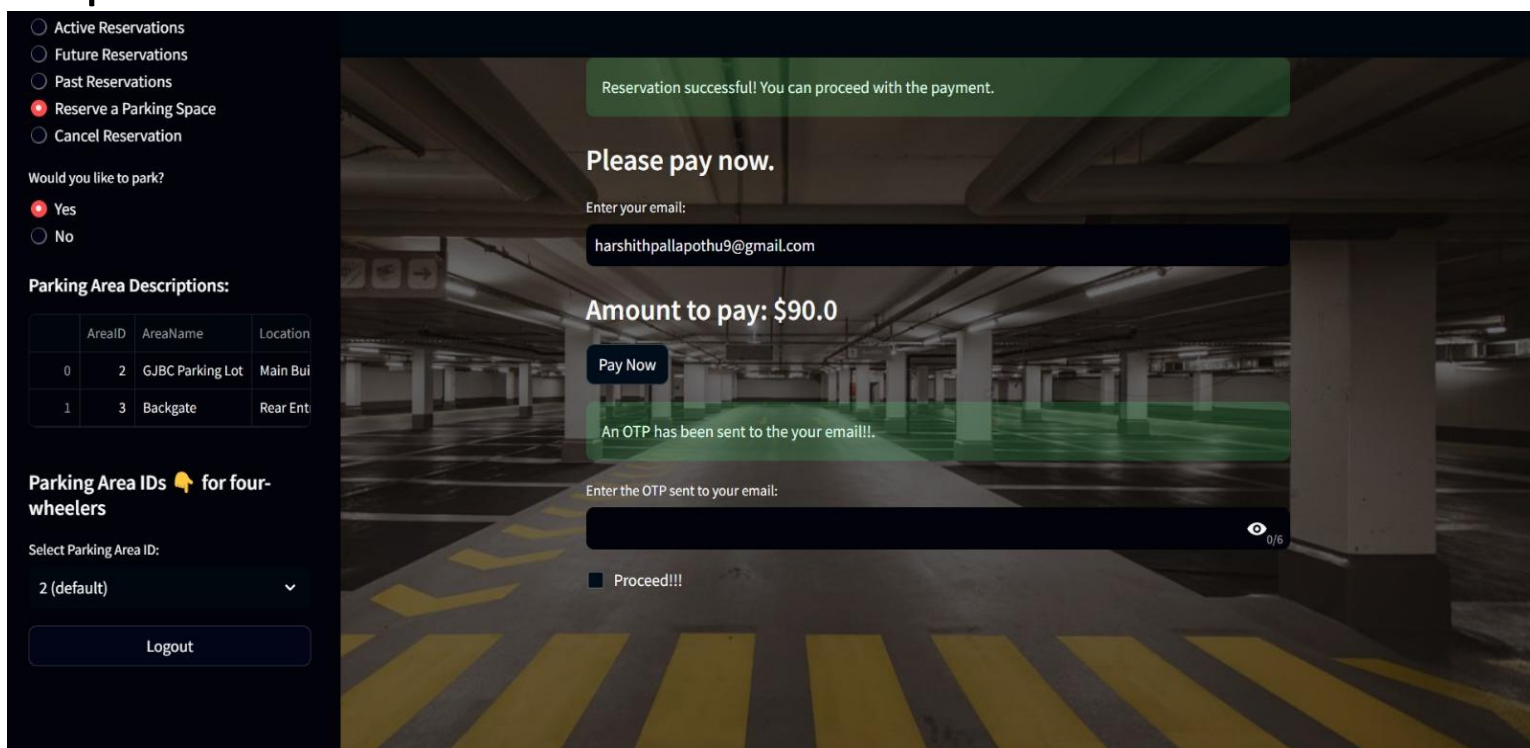
3rd trigger action:



4th trigger action:



1st procedure call:



2nd procedure call:

Welcome, vaishnavi!

Navigation Bar

Select the required option to proceed!

☐ User Profile

☒ Edit Profile

☐ Vehicle Details

☐ Add/Edit Vehicle Details

☐ Remove Vehicle

☐ Active Reservations

☐ Future Reservations

☐ Past Reservations

☐ Reserve a Parking Space

☐ Cancel Reservation

Logout

vaishnavi's Profile Editing Page

Edit Your Name

vaishnavi

Edit Your Email

vaishnavi@gmail.com

Edit Your Phone Number

9008067944

Edit Your Password

.....

Submit

Profile updated successfully!, Go to the profile page to see the changes.

3rd procedure call:

Welcome Admin, Virat Kohli!

Navigation Bar

Select the required option for administration operations:

☐ Administrator Dashboard

☒ Manage Users Table

☐ Manage Vehicles Table

☐ Manage Reservations Table

☐ Manage Payments Table

☐ Manage Parking Spaces Table

☐ Manage Parking Area Table

☐ Manage Parking Fee Table

☐ Manage Parking Availability Table

Select an action:

☐ Add User

☐ Update User

☒ Delete User

Logout

Select a user to Delete:

23

User Details:

User ID: 23

Name: alen

Email: alen@gmail.com

Phone Number: 4563782987

Username: alen

Password: Alen1234567*

Area ID: 2

☒ I confirm that I want to delete this user.

Delete User

Github Repo Link:

[Github link](#)