CAR BOOKING SYSTEM

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CHAPTER 1

DATABASE DESIGN METHODOLOGY

1.1 CANDIDATE SYSTEM DESCRIPTION

Project that involves the interaction between the employee and customer with respect to renting a car. The system will allow the customer to rent a car.

So our entites include the Employee(acting as admin), Customer, Car, Booking, Payment.

Employee: The Employee entity represents individuals associated with the car Booking service. Each employee is uniquely identified by an employee ID (emp_id) and has a corresponding password (emp_password). Employees play a crucial role in managing various aspects of the car Booking system, such as managing bookings, and ensuring the overall efficiency of the service.

Customer: The Customer entity encapsulates information about individuals who utilize the car Booking service. Customers are identified by a unique customer ID (cust_id) and provide details such as their first name (fname), last name (lname), email address (email), username (username) for login, password (password), and address (address). This entity enables the system to maintain personalized customer profiles and manage their interactions with the car Booking service.

Booking: The Booking entity tracks the details of each car reservation made by customers. It includes a unique booking ID (book_id) and references to the rented car (car_id) and the customer making the booking (cust_id). Additional information comprises the booking date (book_date), pickup date (pickup_date), return date (return_date), and the location of the booking (book_place). This entity facilitates the efficient organization and tracking of reservations within the car Booking system.

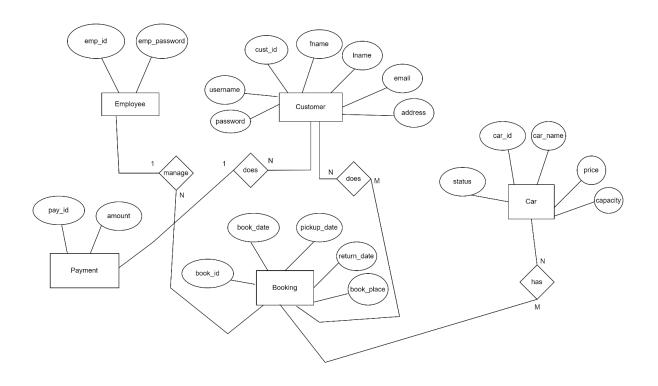
Car: The Car entity represents the fleet of vehicles available for Booking. Each car is uniquely identified by a car ID (car_id) and is associated with attributes such as the car's name or model (car_name), Booking price (price), maximum capacity (capacity), and availability status (status). This entity enables the system to manage and display information about the cars offered for rent, including their current availability.

Payment: The Payment entity records financial transactions associated with car bookings. It includes a unique payment ID (pay_id) and references the corresponding booking (book_id). The amount attribute signifies the payment made for the booking. This entity ensures accurate financial tracking, allowing the system to keep a record of payments and provide customers with transparent billing information.

1.2 ENTITY RELATIONSHIP DIAGRAM

An entity relationship diagram shows the connection between entity sets that are kept in the database. To put it another way, ER diagrams assist in describing the logical organisation of the database. Entities, attributes, and relationships are the three fundamental ideas that serve as the foundation of the ER diagram.

Rectangles are represented as entities in the ER diagram, ovals are used to indicate attributes and diamond shapes are used to represent relationships. An ER diagram and a flowchart initially have a similar appearance, designed to show how a system is divided into smaller portions and to highlight the flow of data between those parts. It is useful for analysing existing as well as proposed systems.



Constraints between entities Employee and Booking

Cardinality: There is a 1:N cardinality with respect to Employee and Booking entities as 1 employee will manage many(N) booking in the system provided by us.

Participation of the entities: The employee and booking entity has total participation in the ER diagram.

Constraints between entities Customer and Booking

Cardinality: There is a N:M cardinality with respect to Customer and Booking entities as N customer will book many(N) booking in the system provided by us.

Participation of the entities: The customer and booking entity has total participation in the ER diagram.

Constraints between entities Booking and Car

Cardinality: There is a N:M cardinality with respect to Booking and Car entities as N booking will have many(N) car in the system provided by us.

Participation of the entities: The booking and car entity has total participation in the ER diagram.

Constraints between entities Payment and Customer

Cardinality: There is a 1:N cardinality with respect to Customer and Payment entities as N customer will make 1 booking in the system provided by us.

Participation of the entities: The payment and customer entity has total participation in the ER diagram.

1.3 CONVERSION OF THE ER DIAGRAM TO RELATIONAL MAPPING VIA ALGORITHMS

Step 1: Mapping of Regular Entities

- For each regular (strong) entity type E in the ER schema, create a relation R that includes all the simple attributes of E.
- Choose one of the key attributes of E as the primary key for R.
- If the chosen key of E is composite, the set of simple attributes that form it will together form the primary key of R.

Step 2: Mapping of Weak Entity Types

- For each weak entity type W in the ER schema with owner entity type E, create a relation R & include all simple attributes (or simple components of composite attributes) of W as attributes of R.
- Also, include as foreign key attributes of R the primary key attribute(s) of the relation(s) that correspond to the owner entity type(s).
- The primary key of R is the combination of the primary key(s) of the owner(s) and the partial key of the weak entity type W,

Step 3: Mapping of Binary 1:1 Relation Types

- For each binary 1:1 relationship type R in the ER schema, identify the relations S and T that correspond to the entity types participating in R.
- There are three possible approaches:
- Foreign Key approach: Choose one of the relations-say S-and include a foreign key in S the primary key of T. It is better to choose an entity type with total participation in R in the role of S.
- Merged relation option: An alternate mapping of a 1:1 relationship type is possible by merging the two entity types and the relationship into a single relation. This may be appropriate when both participations are total.
- Cross-reference or relationship relation option: The third alternative is to set up a third relation R for the purpose of cross-referencing the primary keys of the two relations S and T representing the entity types.

Step 4: Mapping of Binary 1:N Relationship Types.

- For each regular binary 1:N relationship type R, identify the relation S that represents the participating entity type at the N-side of the relationship type.
- Include as a foreign key in S the primary key of the relation T that represents the other entity type participating in R.
- Include any simple attributes of the 1:N relation type as attributes of S.

Step 5: Mapping of Binary M:N Relationship Types.

- For each regular binary M:N relationship type R, create a new relation S to represent R.
- Include as foreign key attributes in S the primary keys of the relations that represent the participating entity types; their combination will form the primary key of S.
- Also include any simple attributes of the M:N relationship type (or simple components of composite attributes) as attributes of S.

Step 6: Mapping of Multivalued attributes.

- For each multivalued attribute A, create a new relation R.
- This relation R will include an attribute corresponding to A, plus the primary key attribute K-as a foreign key in R-of the relation that represents the entity type of relationship type that has A as an attribute.
- The primary key of R is the combination of A and K. If the multivalued attribute is composite, we include its simple components.

employee

| emp_id | emp_password |
|--------|--------------|
|--------|--------------|

customer

| <u>cust id</u> fname Iname email password username address |
|--|
|--|

car

| car_id car_name price capacity status |
|---------------------------------------|
|---------------------------------------|

booking

| | | | | | | | l |
|---------|---------------|----------------|-----------|-------------|-------------|------------|---|
| book_id | <u>car_id</u> | <u>cust_id</u> | book_date | pickup_date | return_date | book_place | l |
| | | | | | | | ı |

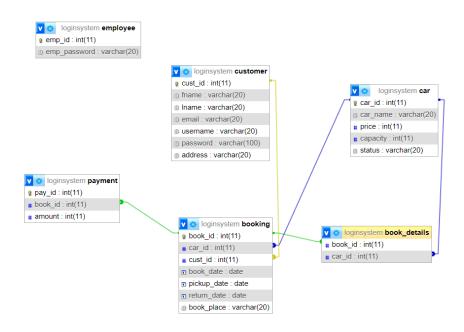
book_details

| book id | <u>car id</u> |
|---------|---------------|
| | |

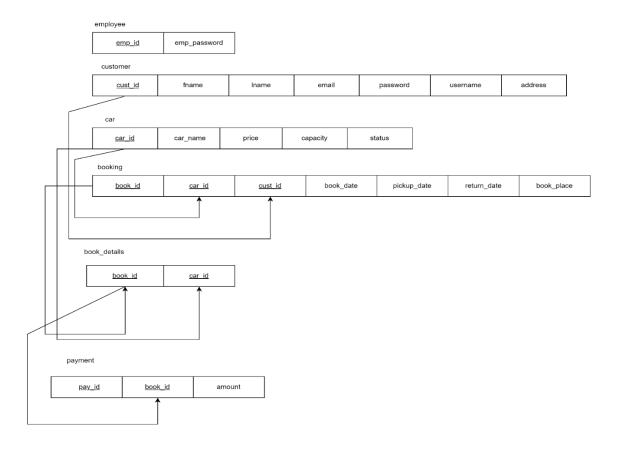
payment

| amount |
|--------|
| |

1.3 RELATIONAL SCHEMA FOR THE MANAGEMENT SYSTEM ALONG WITH KEY CONSTRAINTS



RESPECTIVE SCHEMA



1.3 NORMALISATION CHART OF THE DATABASE

1st Normal Form

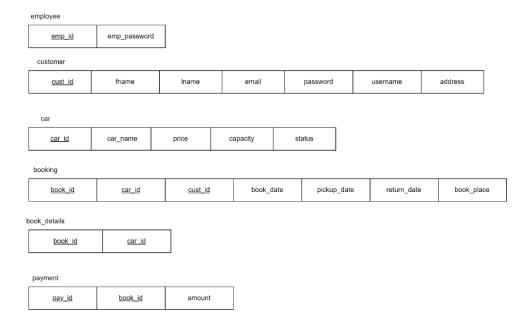
The employee table is in 1NF because it has no repeating groups and each column has a single value for each row. Customer, car, booking and payment is also in 1NF reason is same

| employee | | | | | | | |
|---------------|--------------|---------|----------|------|-------------|-------------|------------|
| emp_id | emp_password | | | | | | |
| customer | | | _ | | | | |
| cust id | fname | Iname | email | | password | username | address |
| | | | | | | | |
| car | | | | | | | |
| <u>car_id</u> | car_name | price | capacity | st | atus | | |
| booking | | | | | | | |
| book_id | car_id | cust_id | book_ | date | pickup_date | return_date | book_place |
| | | | | | | | |
| | | | | | | | |
| payment | | | | | | | |
| pay_id | book_id | amount | | | | | |

2nd Normal Form

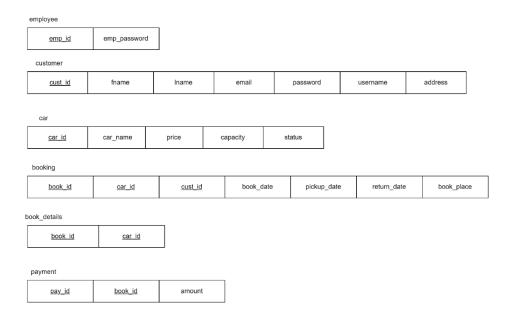
The Booking table is in 1NF because it has no repeating groups, but it is not in 2NF because the TotalAmount column depends on the CarlD and the ReturnDate columns, which are not part of the primary key. To make the Booking table in 2NF, we need to remove the TotalAmount column and create a new table called BookingDetail with the following columns:

BookingID (foreign key), CarlD (foreign key), ReturnDate, and TotalAmount. The BookingDetail table is in 2NF because every non-key column depends on the whole primary key, which is the combination of BookingID and CarlD. The Payment table is in 2NF because every non-key column depends on the primary key which is PaymentID



3rd Normal Form

The Car table is in 3NF because every non-key column depends only on the primary key, which is CarlD. The Customer table is also in 3NF for the same reason. The Booking table is in 3NF because every non-key column depends only on the primary key, which is BookinglD. The BookingDetail table is in 3NF because every non-key column depends only on the primary key, which is the combination of BookingID and CarlD. The Payment table is in 3NF because every non-key column depends only on the primary key, which is redundant or PaymentID. The car Booking system database model is in 3NF. This means that the database has no transitive dependencies, and it ensures data consistency and integrity.



1.5.1 DATABASE

```
CREATE TABLE 'available cars view' (
`car id` int(11)
,'car_name' varchar(20)
, price int(11)
, capacity int(11)
);
CREATE TABLE 'booking' (
 'book id' int(11) NOT NULL,
 'car_id' int(11) DEFAULT NULL,
 'cust id' int(11) DEFAULT NULL,
 'book_date' date DEFAULT NULL,
 'pickup_date' date DEFAULT NULL,
 'return date' date DEFAULT NULL,
 'book_place' varchar(20) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci;
INSERT INTO 'booking' ('book id', 'car id', 'cust id', 'book date', 'pickup date',
'return_date', 'book_place') VALUES
(23, 5, 9, '2023-11-22', '2023-11-23', '2023-11-30', 'Mapusa');
CREATE TABLE 'booking_details_view' (
'book id' int(11)
```

```
, 'book_date' date
, 'pickup_date' date
, 'return_date' date
,'book place' varchar(20)
,'car name' varchar(20)
, price int(11)
,'customer fname' varchar(20)
, 'customer_lname' varchar(20)
, 'customer_email' varchar(20)
);
CREATE TABLE 'book_details' (
 'book_id' int(11) DEFAULT NULL,
 'car_id' int(11) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci;
CREATE TABLE 'car' (
 'car id' int(11) NOT NULL,
 'car name' varchar(20) DEFAULT NULL,
 'price' int(11) DEFAULT NULL,
 'capacity' int(11) DEFAULT NULL,
 'status' varchar(20) NOT NULL DEFAULT 'Available'
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci;
```

```
INSERT INTO 'car' ('car id', 'car name', 'price', 'capacity', 'status') VALUES
(1, 'mahindra thar', 7000, 4, 'Available'),
(2, 'Tata Nexon', 6000, 4, 'Available'),
(3, 'Mahindra XUV700', 4000, 4, 'Available'),
(4, 'Mahindra Scorpio N', 7000, 4, 'Available'),
(5, 'Tata Harrier', 7000, 4, 'Not Available'),
(6, 'Skoda Kushaq', 7000, 4, 'Available');
CREATE TABLE 'customer' (
 'cust id' int(11) NOT NULL,
 'fname' varchar(20) DEFAULT NULL,
 'lname' varchar(20) DEFAULT NULL,
 'email' varchar(20) DEFAULT NULL,
 'username' varchar(20) DEFAULT NULL,
 'password' varchar(100) DEFAULT NULL,
 'address' varchar(20) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4 general ci;
INSERT INTO 'customer' ('cust id', 'fname', 'lname', 'email', 'username', 'password',
'address') VALUES
(9, 'Sagar', 'Lotlikar', 's@gmail.com', 'sagar', '202cb962ac59075b964b07152d234b70',
'Cuncolim');
CREATE TABLE 'customer return days view' (
```

```
'cust_id' int(11)
, 'fname' varchar(20)
,'lname' varchar(20)
, 'book_id' int(11)
, 'return_date' date
, 'days_until_return' int(7)
);
CREATE TABLE 'employee' (
 'emp id' int(11) NOT NULL,
 'emp password' varchar(20) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci;
INSERT INTO 'employee' ('emp_id', 'emp_password') VALUES
(1, '1');
CREATE TABLE 'payment' (
 'pay_id' int(11) NOT NULL,
 'book id' int(11) DEFAULT NULL,
 'amount' int(11) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4 general ci;
INSERT INTO 'payment' ('pay_id', 'book_id', 'amount') VALUES
(8, 23, 49000);
```

```
CREATE TABLE `payment_summary_view` (
    `pay_id` int(11)
    ,`book_id` int(11)
    ,`payment_amount` int(11)
    ,`customer_fname` varchar(20)
    ,`customer_lname` varchar(20)
    ,`customer_email` varchar(20)
);
```

VIEWS USED

CREATE ALGORITHM=UNDEFINED DEFINER='root'@'localhost' SQL SECURITY DEFINER VIEW 'available_cars_view' AS SELECT 'car'.'car_id' AS 'car_id', 'car'.'car_name' AS 'car_name', 'car'.'price' AS 'price', 'car'.'capacity' AS 'capacity' FROM 'car' WHERE 'car'.'status' = 'Available';

CREATE ALGORITHM=UNDEFINED DEFINER='root'@'localhost' SQL SECURITY
DEFINER VIEW 'booking_details_view' AS SELECT 'b'.'book_id' AS 'book_id',
'b'.'book_date' AS 'book_date', 'b'.'pickup_date' AS 'pickup_date', 'b'.'return_date' AS
'return_date', 'b'.'book_place' AS 'book_place', 'c'.'car_name' AS 'car_name', 'c'.'price'
AS 'price', 'cu'.'fname' AS 'customer_fname', 'cu'.'lname' AS 'customer_lname',
'cu'.'email' AS 'customer_email' FROM (('booking' 'b' join 'car' 'c' on('b'.'car_id' =
'c'.'car_id')) join 'customer' 'cu' on('b'.'cust_id' = 'cu'.'cust_id'));

CREATE ALGORITHM=UNDEFINED DEFINER='root'@'localhost' SQL SECURITY DEFINER VIEW 'customer_return_days_view' AS SELECT 'cu'.'cust_id' AS 'cust_id', 'cu'.'fname' AS 'fname', 'cu'.'lname' AS 'lname', 'b'.'book_id' AS 'book_id', 'b'.'return_date' AS 'return_date', to_days('b'.'return_date') - to_days(curdate()) AS

```
'days until return' FROM ('customer' 'cu' join 'booking' 'b' on('cu'.'cust id' =
'b'.'cust id')) WHERE 'b'.'return_date' >= curdate();
CREATE ALGORITHM=UNDEFINED DEFINER='root'@'localhost' SQL SECURITY
DEFINER VIEW 'payment summary view' AS SELECT 'p'.'pay id' AS 'pay id',
'p'.'book id' AS 'book id', 'p'.'amount' AS 'payment amount', 'cu'.'fname' AS
'customer fname', 'cu'. 'lname' AS 'customer lname', 'cu'. 'email' AS 'customer email'
FROM (('payment' 'p' join 'booking' 'b' on('p'.'book id' = 'b'.'book id')) join 'customer'
'cu' on('b'.'cust id' = 'cu'.'cust id'));
ALTER TABLE 'booking'
ADD PRIMARY KEY ('book id'),
ADD KEY 'car id' ('car id'),
ADD KEY 'cust id' ('cust id');
ALTER TABLE 'book details'
ADD KEY 'book id' ('book id'),
ADD KEY 'car id' ('car id');
ALTER TABLE 'car'
ADD PRIMARY KEY ('car id');
ALTER TABLE 'customer'
ADD PRIMARY KEY ('cust id');
ALTER TABLE 'employee'
```

ADD PRIMARY KEY ('emp id');

```
ALTER TABLE 'payment'
ADD PRIMARY KEY ('pay id'),
ADD KEY 'book id' ('book id');
ALTER TABLE 'booking'
MODIFY 'book id' int(11) NOT NULL AUTO INCREMENT, AUTO INCREMENT=24;
ALTER TABLE 'car'
MODIFY 'car_id' int(11) NOT NULL AUTO_INCREMENT, AUTO INCREMENT=7;
ALTER TABLE 'customer'
MODIFY 'cust id' int(11) NOT NULL AUTO INCREMENT, AUTO INCREMENT=10;
ALTER TABLE 'employee'
MODIFY 'emp id' int(11) NOT NULL AUTO INCREMENT, AUTO INCREMENT=2;
ALTER TABLE 'payment'
MODIFY 'pay id' int(11) NOT NULL AUTO INCREMENT, AUTO INCREMENT=9;
ALTER TABLE 'booking'
ADD CONSTRAINT 'booking_ibfk_1' FOREIGN KEY ('car_id') REFERENCES 'car'
('car id'),
ADD CONSTRAINT 'booking ibfk 2' FOREIGN KEY ('cust id') REFERENCES
```

'customer' ('cust id');

```
ALTER TABLE 'book_details'
ADD CONSTRAINT 'book details ibfk 1' FOREIGN KEY ('book id') REFERENCES
'booking' ('book_id'),
ADD CONSTRAINT 'book details ibfk 2' FOREIGN KEY ('car id') REFERENCES
`car` (`car_id`);
ALTER TABLE 'payment'
ADD CONSTRAINT 'payment ibfk 1' FOREIGN KEY ('book id') REFERENCES
'booking' ('book_id');
TRIGGERS USED
CREATE TABLE booking trigger (
  trigger id INT AUTO INCREMENT PRIMARY KEY,
  event type VARCHAR(10),
  book id INT,
  car_id INT,
  cust id INT,
  event timestamp TIMESTAMP
);
CREATE TABLE payment trigger (
  trigger_id INT AUTO_INCREMENT PRIMARY KEY,
  event_type VARCHAR(10),
  pay id INT,
  book id INT,
```

```
amount INT,
  event timestamp TIMESTAMP
);
DELIMITER //
CREATE TRIGGER after_booking_insert
AFTER INSERT ON booking FOR EACH ROW
BEGIN
  INSERT INTO booking_trigger (event_type, book_id, car_id, cust_id, event_timestamp)
  VALUES ('INSERT', NEW.book id, NEW.car id, NEW.cust id, NOW());
END;
//
DELIMITER;
DELIMITER //
CREATE TRIGGER after_payment_insert
AFTER INSERT ON payment FOR EACH ROW
BEGIN
  INSERT INTO payment trigger (event type, pay id, book id, amount, event timestamp)
  VALUES ('INSERT', NEW.pay id, NEW.book id, NEW.amount, NOW());
END;
//
DELIMITER;
```

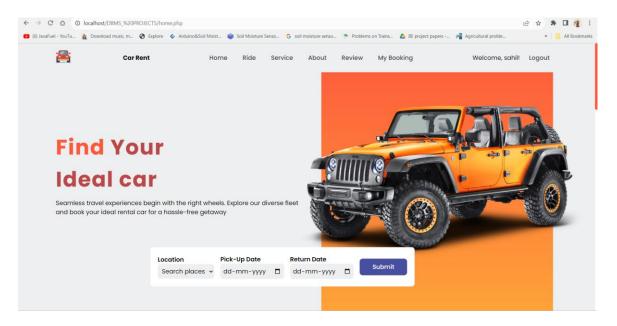
JOINS USED

```
$sqlCarEarnings = "SELECT
    car.car id,
    car.car_name,
    COUNT(booking.book_id) AS total_bookings,
    SUM(payment.amount) AS total_amount
  FROM
    car
  LEFT JOIN booking ON car.car_id = booking.car_id
  LEFT JOIN payment ON booking.book id = payment.book id
  GROUP BY
    car.car_id, car.car_name
  ORDER BY
    total amount desc;
";
$sql = "SELECT b.*, c.fname, c.Lname, p.amount
       FROM booking b
       JOIN customer c ON b.cust id = c.cust id
       LEFT JOIN payment p ON b.book_id = p.book_id";
```

CHAPTER 2

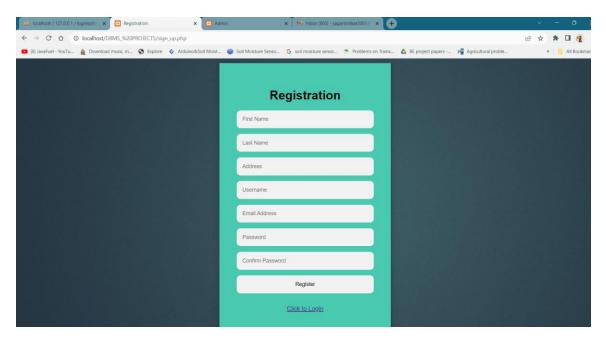
IMPLEMENTATION

5.1 HOME PAGE



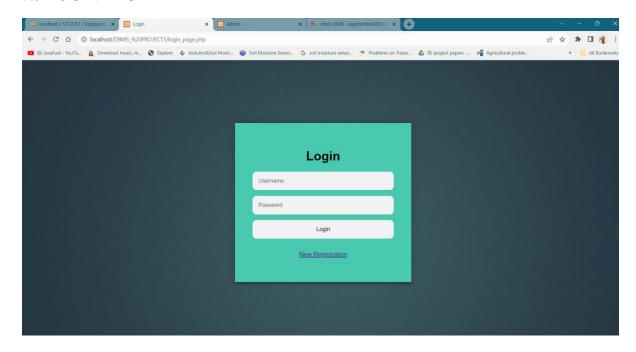
The home page of our project serves as the central hub for our car Booking management system, offering a user-friendly interface that caters to both customers and administrators. The design is clean and intuitive, ensuring a seamless user experience.

5.2 SIGN IN PAGE



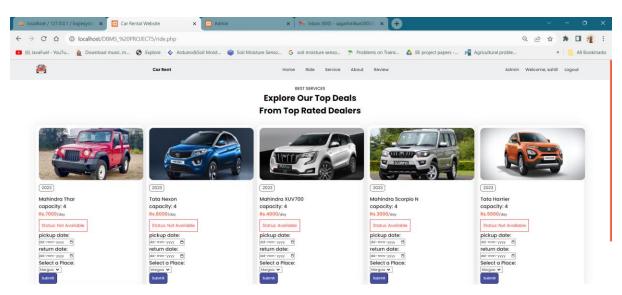
In the sign in page if you are new user you can register to login

5.3 LOGIN PAGE



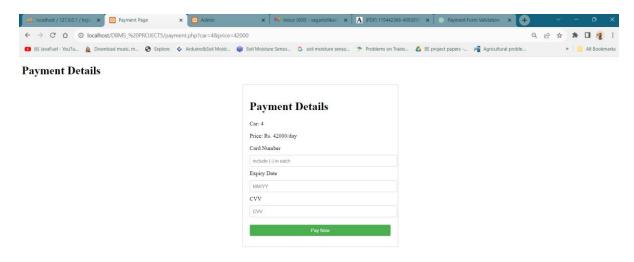
After registration you can login here or if you are an existing user

5.4 RIDE PAGE



Here the customers will be able to book the rented cars as per customers preferred date.

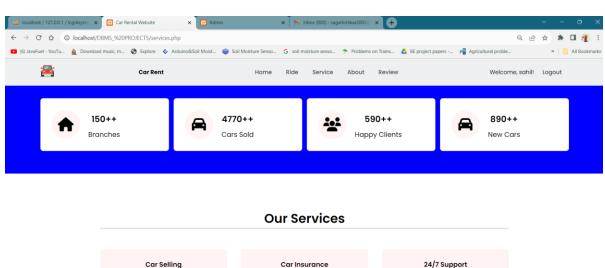
5.5 PAYMENT PAGE



After booking a car, customer will be proceeding to the payment page

5.6 SERVICE PAGE

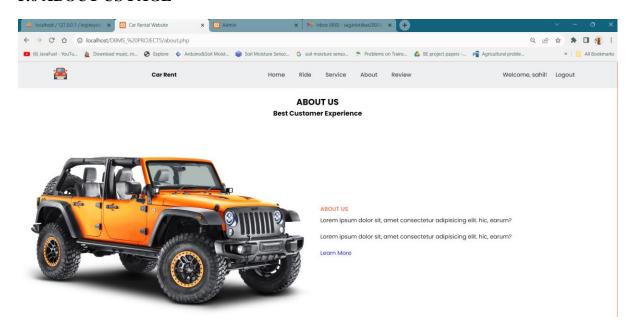
Lorem ipsum dolor sit, amet consectetur adipisicing elit. hic, earum?



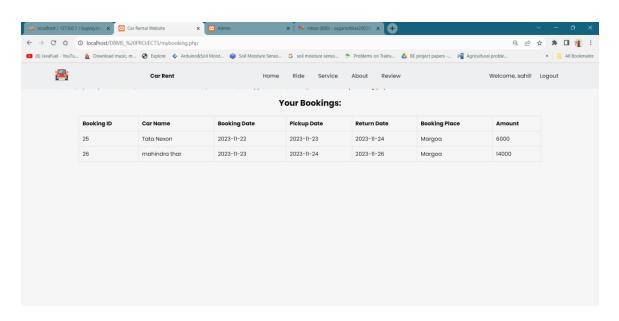
Lorem ipsum dolor sit, amet consectetur adipisicing elit. hic, earum?

Lorem ipsum dolor sit, amet consectetur adipisicing elit. hic, earum?

5.6 ABOUT US PAGE

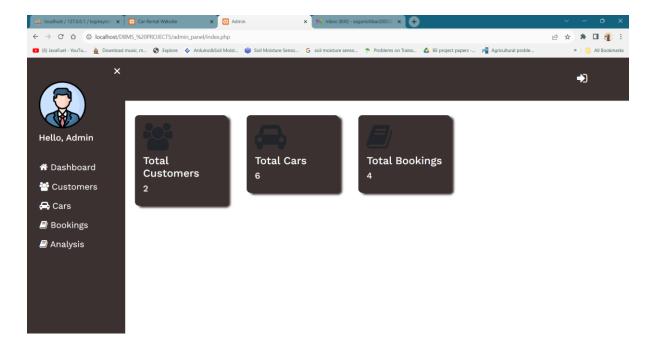


5.6 MY BOOKING

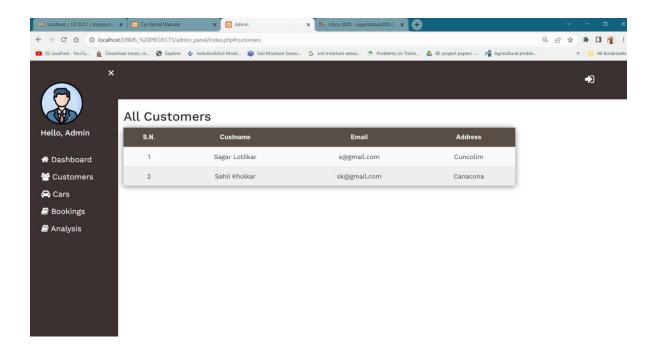


Here the customer will able to see all the bookings which he had made

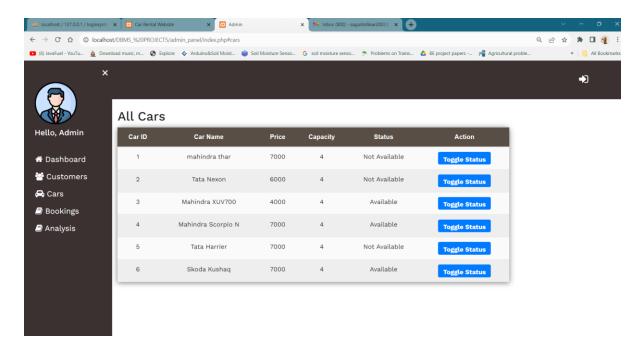
5.2 ADMIN'S PAGE



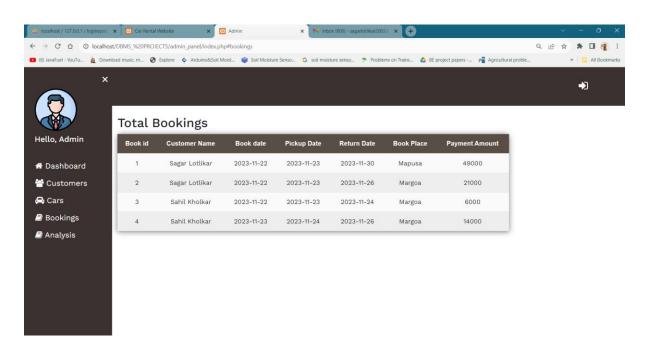
The home page of admin project serves as the all details of customers for our car Booking management system, offering a user-friendly interface that admin can handle all customers details The design is clean and intuitive, ensuring a seamless user experience.



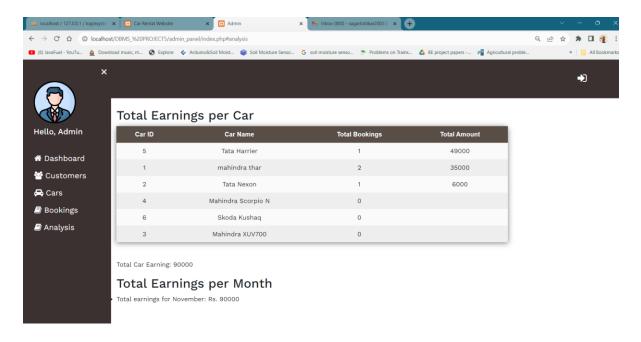
Here admin can view all the registered customers



Here the admin can make changes to status of the cars



Here the admin can view all customer booking details



Here admin can analyze which car was booked most of the times and the total amount also the profit per month