CAR-HAILING MANAGEMENT SYSTEM

By

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ADVANCE DATABASE

CMP7214

Domain

Apps that connect local drivers and riders using their own cars are known as car-hailing services. They are typically a convenient means of door-to-door transportation. In certain nations, car-hailing services are subject to the same regulations as traditional taxicabs. The car-hailing firms Uber, Bolt, and Lyft are a few examples.

Database Analysis

All the actions of the car-hailing service are managed by the car healing management system. Customers are required to enter their username and password to log in to the app. In this app, when a consumer requests a booking, a driver-owned car is assigned to the request. The distance between the pickup location and the destination determines the estimated price of a booking, and if a customer pays, the payment confirms the booking status, which validates the trip. Customers can make queries about a booking/trip, and a support staff member is accountable for answering them.

Business Rules

1. Staff can be a driver or support, but can't be both
2. Supervisors supervise staff
3. Each customer must have login.
4. Each customer can request one booking at a time
5. A car is assigned to a booking
6. A car belongs to a driver
7. Customer makes payment
8. Transaction validates a Trip
9. Booking initiate Transaction
10. A trip is initiated if the booking status is yes
11. A customer can send queries about a trip
12. A customer has an Account for payment purposes
13. Payment can be done by card or wallet.
14. The support team will handle queries
15. A support staff responds to many queries

Entity

1. Login(**SSN** , password,Time_in,Time_Out,Date)
2. Customer **(Cust_ID**, Email , First_name, Last_name, DOB, SSN_FK, Phone, Gender, Join date)
3. Staff (**Staff_ ID**, Email, First_name, Last_Name, Address, DOB, Phone_number, gender, join date,degree,age,role, Super_Id_FK)
4. Driver (**Staff_ID_FK** ,**Driver_Lnc**)
5. Support **(Staff_ID_FK** ,**Type)**
6. Car (**Car_ID**, Model, Year , Plate_Num, Brand, Color, Driver_ ID_FK)
7. Booking (**Book_ID**,Date, Esti_Bill, Destination, Pick_up,Status, Car_ID_FK, Cust_ID,Que_ID,Transaction)
8. Trip(**Trip_ID_FK**, Trip_start , Trip_end, Trip_Review)
9. Account (**Acct_ID** , card_ID, wallet_ID)
10. Card(Card_Typ,**Card_Num,**Card_Name**,**Bank)
11. Wallet(**Wallet_ID,**Balance)
12. Queries(**Que_ID**, Date , Descer, Que_ Type , Status, Support_ID_FK)

Relationships

[CUSTOMER] 1 <HAS> 1 [LOGIN]
[DRIVER] 1 <IS_A> 1 [STAFF]
[SUPPORT] 1 <IS_A> 1 [STAFF]
[SUPERVISOR STAFF] 1 <SUPERVISE> N [SUPERVISEE STAFF]
[CUSTOMER] M <REQUEST> N [BOOKING]
[CAR] 1 <ASSIGN> 1 [BOOKING]
[CAR] 1 <OWN_BY> 1 [DRIVER]
[CUSTOMER] 1 <HAS> 1 [ACCOUNT]
[BOOKING] 1 <INITIATE> 1 [TRANSACTION]
[TRANSACTION] 1 <VALIDATE> 1 [TRIP]
[CUSTOMER] M <MAKE> N [QUERIES]
[SUPPORT] M <RESPONDS> N [QUERIES]
[CARD] 1 <IS_A> 1 [ACCOUNT]
[WALLET] 1 <IS_A> 1 [ACCOUNT]

Connectivities, Cardinalities and Participation

A CUSTOMER has a minimum of __1__ LOGIN
A CUSTOMER has a maximum of __1__ LOGIN

Reverse:

A LOGIN belongs to a minimum of __1__ CUSTOMER
A LOGIN belongs to a maximum of __1__ CUSTOMER

A CUSTOMER can request a minimum of __1__ BOOKING
A CUSTOMER can request a maximum of __M__ BOOKING

Reverse:

BOOKING manages requests of a minimum of __1__ CUSTOMER
BOOKING manages requests of a maximum of __M__ CUSTOMER

A BOOKING is assigned to a minimum of __1__ CAR
A BOOKING is assigned to a maximum of __1__ CAR

Reverse:

A CAR is assigned to a minimum of __1__ BOOKING
A CAR is assigned to a minimum of __1__ BOOKING

A CAR is own by a minimum of __1__ DRIVER
A CAR is own by a minimum of __1__ DRIVER

Reverse:

A DRIVER owns a minimum of __1__ CAR
A DRIVER owns a maximum of __1__ CAR

A CUSTOMER has a minimum of __1__ ACCOUNT
A CUSTOMER has a maximum of __1__ ACCOUNT

Reverse:

AN ACCOUNT is owned by a minimum of __1__ CUSTOMER
AN ACCOUNT is owned by a maximum of __1__ CUSTOMER

A BOOKING initiates a minimum of __1__ TRANSACTION
A BOOKING initiates a maximum of __1__ TRANSACTION

Reverse:

A TRANSACTION confirms a minimum of __1__ BOOKING
A TRANSACTION confirms a maximum of __1__ BOOKING

A TRANSACTION initiates a minimum of __1__ TRIP
A TRANSACTION initiates a maximum of __1__ TRIP

Reverse:

A TRIP confirms a minimum of __1__ TRANSACTION
A TRIP confirms a maximum of __1__ TRANSACTION

A CUSTOMER makes a minimum of __1__ QUERY
A CUSTOMER makes a maximum of __M__ QUERY

Reverse:

QUERIES received from a minimum of __1__ CUSTOMER
QUERIES received from a maximum of __M__ CUSTOMER

A SUPPORT STAFF responds to a minimum of __1__ QUERY
A SUPPORT STAFF responds to a maximum of __M__ QUERY

Reverse:

QUERIES sent to a minimum of __1__ SUPPORT STAFF
QUERIES sent to a maximum of __M__ SUPPORT STAFF

A DRIVER is_a minimum of __1__ STAFF
A DRIVER is_a maximum of __1__ STAFF

Reverse:

STAFF are a minimum of __1__ DRIVER
STAFF are a maximum of __M__ DRIVER

A SUPPORT is_a minimum of __1__ STAFF
A SUPPORT is_a maximum of __1__ STAFF

Reverse:

STAFF are a minimum of __1__ SUPPORT
STAFF are a maximum of __M__ SUPPORT

A SUPERVISOR supervises a minimum of __1__ STAFF
A SUPERVISOR supervises a maximum of __M__ STAFF

Reverse:

STAFF is supervised by a minimum of __1__ SUPERVISOR
STAFF is supervised by a maximum of __1__ SUPERVISOR

AN ACCOUNT has a minimum of __1__ CARD
AN ACCOUNT has a maximum of __M__ CARD

Reverse:

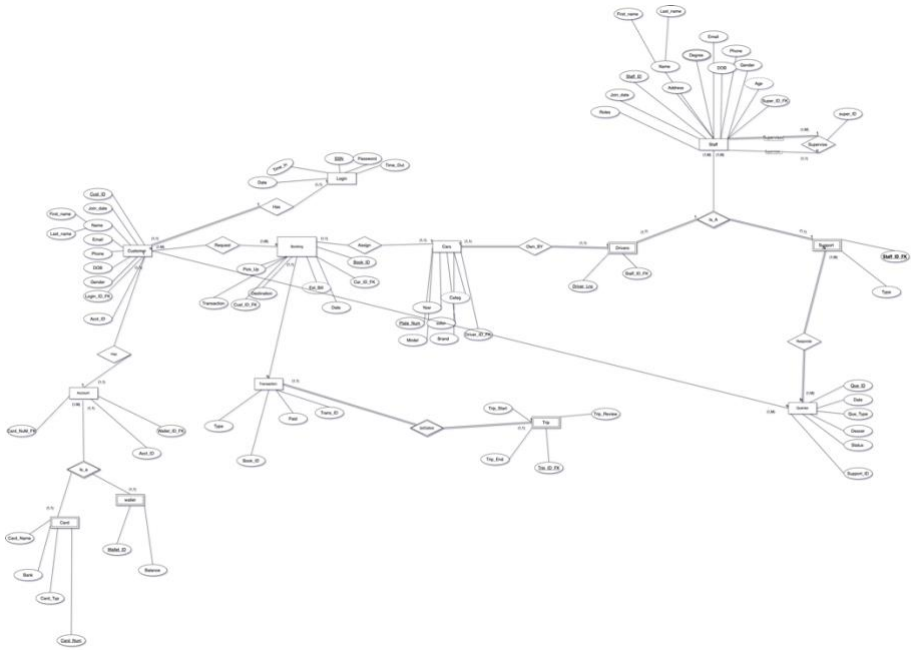
A CARD belongs to minimum of __1__ ACCOUNT
A CARD belongs to maximum of __1__ ACCOUNT

AN ACCOUNT has a minimum of __1__ WALLET
AN ACCOUNT has a maximum of __1__ WALLET

Reverse:

A WALLET belongs to minimum of __1__ ACCOUNT
A WALLET belongs to maximum of __1__ ACCOUNT

ERD



URL:
https://viewer.diagrams.net/?tags=%7B%7D&highlight=0000ff&edit=_blank&layers=1&nav=1&page-id=7yTAWuXxRzRLJP2mi0xD&title=Car%20Hailing%20Service%20#Uhttps%3A%2F%2Fdrive.google.com%2Fuc%3Fid%3D11lzZR0Pzj0e0Hm2PddPoH3rLDfpNMICQ%26export%3Ddownload

Normalization

To make sure that restrictions on database integrity effectively carry out their obligations, normalisation arranges the columns and tables of a database. It is a systematic method of breaking down tables to get rid of redundant data and undesired characteristics like Insertion, Update, and Deletion anomalies.

Customer Login Record

SSN	password	Login_date	Logout_date	Email	First_name	Last_Name	DOB	Phone	Gender	Join_date	Acct_ID
115	Below78	11/12/2021 16:30	11/12/2021 17:00	bello@gmail.com	Sule	Bello	11/12/1993	078965433	m	11/12/2021	1
117	Ali1993	11/12/2021 10:30	11/12/2021 11:00	Ali@gmail.com	Bose	Ali	01/8/1994	078654378	f	11/12/2021	2
117	Ali1993	11/12/2021 14:30	11/12/2021 15:30	Ali@gmail.com	Bose	Ali	01/8/1994	078654378	f	11/12/2021	3
115	Below78	13/12/2021 7:10	13/12/2021 8:00	bello@gmail.com	Sule	Bello	11/12/1993	078965433	m	11/12/2021	4
200	Shade11	14/12/2021 13:30	14/12/2021 14:00	Shae@yahoo.com	Kester	Shade	23/6/1991	078786288	f	14/12/2021	5

1st Normal Form

SSN	password	Login_date	Logout_date	Email	First_name	Last_Name	DOB	Phone	Gender	Join_date	Acct_ID

SSN	password	Login_Date	Login_Time	Logout_Time	Email	First_name	Last_Name	DOB	Phone	Gender	Join_date	Acct_ID
115	Below78	11/12/2021	16:30	17:00	bello@gmail.com	Sule	Bello	11/12/1993	078965433	m	11/12/2021	1
117	Ali1993	11/12/2021	10:30	11:00	Ali@gmail.com	Bose	Ali	01/8/1994	078654378	f	11/12/2021	2
117	Ali1993	11/12/2021	14:30	15:30	Ali@gmail.com	Bose	Ali	01/8/1994	078654378	f	11/12/2021	3
115	Below78	11/12/2021	7:10	8:00	bello@gmail.com	Sule	Bello	11/12/1993	078965433	m	11/12/2021	4
200	Shade11	11/12/2021	13:30	14:00	Shae@yahoo.com	Kester	Shade	23/6/1991	078786288	f	14/12/2021	5

- Data cells is atomic
- A unique identifier has been assigned (**SSN**).
- The table is in reduced form and no multivalued attribute

2nd Normal Form

Login

SSN	password	Date	Time_in	Time_out

Cust_ID	SSN	Email	First_name	Last_Name	DOB	Phone	Gender	Join_date	Acct_ID

- No partial dependency present

3rd Normal Form

Login Table

SSN	password	S_ID

Session Table

S_ID	Date	Time_in	Time_out

Customer Table

Cust_ID	SSN	Email	First_name	Last_Name	DOB	Phone	Gender	Join_date	Acct_ID

- There is no transitive dependencies so this table is in the 3NF

Staff Data

Staff_ID	First_name	Last_Name	DOB	Age	Phone	Gender	degree	Email	Role	Super_ID	Address	Join_date
001	Sule	Bello	11/12/1993	29	078965433	m	Bsc,Msc	bello@gmail.com	Super	Null	Shitta B75	11/12/2021
002	Seyi	Shila	01/8/1994	28	078654378	f	Bsc	Seyi@gmail.com	Support	005	Sea B75	11/12/2021
003	Bose	Ali	01/8/1994	28	078654378	f	Bsc	Ali@gmail.com	Support	005	Oak B76	11/12/2021
004	Bayo	Bodija	11/12/1993	29	078965433	m	Bsc,Msc	bayo@gmail.com	Driver	001	Shell H98	11/12/2021
005	Kester	Shade	23/6/1991	31	078786288	f	Ond, Ba, Mba	Shae@yahoo.com	Super	Null	Smooth C78	14/12/2021

1st Normal Form

Staff_ID	First_ name	Last_ Name	DOB	Age	Phone	Gender	de gr ee	Email	Role	Super_ID	Address	Join_dat e
001	Sule	Bello	11/12/1993	29	078965433	m	Bsc	bello@gmail.co m	Super	Null	Shitta B75	11/12/2021
001	Sule	Bello	11/12/1993	29	078965433	m	Msc	bello@gmail.co m	Super	Null	Shitta B75	11/12/2021
002	Seyi	Shila	01/8/1994	28	078654378	f	Bsc	Seyi@gmail.com	Support	005	Sea B75	11/12/2021
003	Bose	Ali	01/8/1994	28	078654378	f	Bsc	Ali@gmail.com	Support	005	Oak B76	11/12/2021
004	Bayo	Bodija	11/12/1993	29	078965433	m	Bsc	bayo@gmail.co m	Driver	001	Shell H98	11/12/2021
004	Bayo	Bodija	11/12/1993	29	078965433	m	Msc	bayo@gmail.co m	Driver	001	Shell H98	11/12/2021
005	Kester	Shade	23/6/1991	31	078786288	f	Ba	Shae@yahoo.co m	Super	Null	Smooth C78	14/12/2021
005	Kester	Shade	23/6/1991	31	078786288	f	Ond	Shae@yahoo.co m	Super	Null	Smooth C78	14/12/2021
005	Kester	Shade	23/6/1991	31	078786288	f	Mba	Shae@yahoo.co m	Super	Null	Smooth C78	14/12/2021

- Data cells is atomic
- A unique identifier has been assigned (**Staff_ID**).
- The table is in reduced form and no multivalued attribute

2nd Normal Form

Staff

Staff_ID	First_name	Last_Name	DOB	Age	Phone	Gender	degree	Email	Role ID	Super_ID	Address	Join_date
001	Sule	Bello	11/12/1993	29	078965433	m	Bsc	bello@gmail.com	3	Null	Shitta B75	11/12/2021
001	Sule	Bello	11/12/1993	29	078965433	m	Msc	bello@gmail.com	3	Null	Shitta B75	11/12/2021
002	Seyi	Shila	01/8/1994	28	078654378	f	Bsc	Seyi@gmail.com	2	005	Sea B75	11/12/2021
003	Bose	Ali	01/8/1994	28	078654378	f	Bsc	Ali@gmail.com	1	005	Oak B76	11/12/2021
004	Bayo	Bodija	11/12/1993	29	078965433	m	Bsc	bayo@gmail.com	2	001	Shell H98	11/12/2021
004	Bayo	Bodija	11/12/1993	29	078965433	m	Msc	bayo@gmail.com	2	001	Shell H98	11/12/2021
005	Kester	Shade	23/6/1991	31	078786288	f	Ba	Shae@yahoo.com	3	Null	Smooth C78	14/12/2021
005	Kester	Shade	23/6/1991	31	078786288	f	Ond	Shae@yahoo.com	3	Null	Smooth C78	14/12/2021
005	Kester	Shade	23/6/1991	31	078786288	f	Mba	Shae@yahoo.com	3	Null	Smooth C78	14/12/2021

Role

Role ID	Role

- No partial dependency present

3rd Normal Form

Staff Table

Staff_ID	First_name	Last_Name	DOB	Age	Phone	Gender	Email	Role_ID	Super_ID	Address	Join_date
001	Sule	Bello	11/12/1993	29	078965433	m	bello@gmail.com	3	Null	Shitta B75	11/12/2021
002	Seyi	Shila	01/8/1994	28	078654378	f	Seyi@gmail.com	2	005	Sea B75	11/12/2021
003	Bose	Ali	01/8/1994	28	078654378	f	Ali@gmail.com	1	005	Oak B76	11/12/2021
004	Bayo	Bodija	11/12/1993	29	078965433	m	bayo@gmail.com	2	001	Shell H98	11/12/2021
005	Kester	Shade	23/6/1991	31	078786288	f	Shae@yahoo.com	3	Null	Smooth C78	14/12/2021

Role

Role ID	Role

Degree Table

SN	Staff_ID	Degree_Type

- There is no transitive dependencies so this table is in the 3NF

Car

3rd Normal Form

Car_ID	Plate_Num	Model	Year	Brand	color	Driver_Lnc

- There is no transitive dependencies so this table is in the 3NF

Booking

3rd Normal Form

Book_ID	Date	Esti_Bill	Destination	Pick_up	Status	Car_ID	Cust_ID

- There is no transitive dependencies so this table is in the 3NF

Transaction

3rd Normal Form

Tran_ID	Book_ID	Type	Paid

- There is no transitive dependencies so this table is in the 3NF

Trip

3rd Normal Form

Trip_ID	Trans_ID	Trip_start	Trip_end	Trip_review

- There is no transitive dependencies so this table is in the 3NF

Queries

3rd Normal Form

Que_ID	Trip_ID	Date	Que_Type	Descer	Status	Support_ID

- There is no transitive dependencies so this table is in the 3NF

Account

3rd Normal Form

Acct_ID	Card_ID	Wallet_ID

- There is no transitive dependencies so this table is in the 3NF

Card

3rd Normal Form

Card_Num	Bank	Card_Name	Card_Typ

- There is no transitive dependencies so this table is in the 3NF

Wallet

3rd Normal Form

Wallet_ID	Balance

- There is no transitive dependencies so this table is in the 3NF

3rd Normal Form

Driver

Driver_Lnc	**Staff_ID**

- There is no transitive dependencies so this table is in the 3NF

3rd Normal Form

Support

Type	**Staff_ID**

- There is no transitive dependencies so this table is in the 3NF

Database Implementation

(Create tables, primary keys, foreign keys)

Customer

```
CREATE TABLE `Customer` (
  `Cust_ID` int NOT NULL AUTO_INCREMENT,
  `SSN` int NOT NULL,
  `Email` varchar(45) COLLATE utf8_bin NOT NULL,
  `First_name` varchar(45) COLLATE utf8_bin NOT NULL,
  `Last_name` varchar(45) COLLATE utf8_bin NOT NULL,
  `DOB` date DEFAULT NULL,
  `Phone` int NOT NULL,
  `Gender` char(2) COLLATE utf8_bin DEFAULT NULL,
  `Join_date` date NOT NULL,
  `Acct_ID` int NOT NULL,
  PRIMARY KEY (`Cust_ID`),
  KEY `SSN_idx` (`SSN`),
  KEY `Acct_ID_idx` (`Acct_ID`),
  CONSTRAINT `Acct_ID` FOREIGN KEY (`Acct_ID`) REFERENCES `Account` (`Acct_ID`),
  CONSTRAINT `SSN` FOREIGN KEY (`SSN`) REFERENCES `Login` (`SSN`)
)
```

Login

```
CREATE TABLE `Login` (
  `SSN` int NOT NULL,
  `Password` varchar(45) COLLATE utf8_bin NOT NULL,
  `S_ID` int NOT NULL,
  PRIMARY KEY (`SSN`),
  UNIQUE KEY `SSN_UNIQUE` (`SSN`),
  KEY `S_ID_idx` (`S_ID`),
  CONSTRAINT `S_ID` FOREIGN KEY (`S_ID`) REFERENCES `Session` (`S_ID`)
)
```

Session

```
CREATE TABLE `Session` (
  `S_ID` int NOT NULL AUTO_INCREMENT,
  `Date` date NOT NULL,
  `Time_in` time NOT NULL,
  `Time_out` time NOT NULL,
  PRIMARY KEY (`S_ID`)
)
```

Driver

```
REATE TABLE `Driver` (
  `Driver_LNC` int NOT NULL,
  `Staff_ID` int NOT NULL,
  PRIMARY KEY (`Driver_LNC`),
  KEY `Staff_ID_idx` (`Staff_ID`)
)
```

Support

```
CREATE TABLE `Support` (
  `Support_ID` int NOT NULL,
  `Type` char(5) COLLATE utf8_bin NOT NULL,
  PRIMARY KEY (`Support_ID`)
)
```

Staff

```
CREATE TABLE `Staff` (
  `Staff_ID` int NOT NULL AUTO_INCREMENT,
  `First_name` char(25) COLLATE utf8_bin NOT NULL,
  `Last_name` char(25) COLLATE utf8_bin NOT NULL,
  `DOB` date NOT NULL,
  `Age` int NOT NULL,
  `Phone` int NOT NULL,
  `Gender` char(1) COLLATE utf8_bin NOT NULL,
  `Email` varchar(45) COLLATE utf8_bin NOT NULL,
  `Super_ID` int DEFAULT NULL,
  `Address` varchar(200) COLLATE utf8_bin NOT NULL,
  `Join_date` date NOT NULL,
  PRIMARY KEY (`Staff_ID`),
  KEY `Super_ID_idx` (`Super_ID`),
  CONSTRAINT `Super_ID` FOREIGN KEY (`Super_ID`) REFERENCES `Staff` (`Staff_ID`)
)
```

Booking

```
CREATE TABLE `Booking` (
  `Book_ID` int NOT NULL AUTO_INCREMENT,
  `Date` date NOT NULL,
  `Est_bill` int NOT NULL,
  `Destination` varchar(200) COLLATE utf8_bin NOT NULL,
  `Pick_up` varchar(200) COLLATE utf8_bin NOT NULL,
  `Status` char(4) COLLATE utf8_bin NOT NULL,
  `Car_ID` int NOT NULL,
  `Cust_ID` int NOT NULL,
  PRIMARY KEY (`Book_ID`),
  KEY `Cust_ID_idx` (`Cust_ID`),
  KEY `Car_ID_idx` (`Car_ID`),
  CONSTRAINT `Car_ID` FOREIGN KEY (`Car_ID`) REFERENCES `Car` (`Car_ID`),
  CONSTRAINT `Cust_ID` FOREIGN KEY (`Cust_ID`) REFERENCES `Customer` (`Cust_ID`) ON UPDATE
CASCADE,
)
```

Trip

```
CREATE TABLE `Trip` (
  `Trip_ID_FK` int NOT NULL,
   `Trans_ID` int NOT NULL,
  `Trip_start` time NOT NULL,
  `Trip_end` time NOT NULL,
  `Trip_review` int DEFAULT NULL,
  PRIMARY KEY (`Trip_ID_FK`),
  CONSTRAINT `Trans_ID` FOREIGN KEY (`Trans_ID`) REFERENCES `Transaction` (`Trans_ID`)
)
```

Role

```
CREATE TABLE `Role` (
  `Role_ID` int NOT NULL AUTO_INCREMENT,
  `Role_Type` varchar(45) COLLATE utf8_bin NOT NULL,
  PRIMARY KEY (`Role_ID`)
)
```

Queries

```
CREATE TABLE `Queries` (
  `Que_ID` int NOT NULL,
  `Trip_ID` int NOT NULL,
  `Que_type` varchar(5) COLLATE utf8_bin NOT NULL,
  `Descer` varchar(45) COLLATE utf8_bin NOT NULL,
  `Status` varchar(5) COLLATE utf8_bin NOT NULL,
  `Support_ID` int NOT NULL,
  PRIMARY KEY (`Que_ID`),
  KEY `Support_ID_idx` (`Support_ID`),
  KEY `Que_ID_idx` (`Que_ID`),
  CONSTRAINT `Support_ID` FOREIGN KEY (`Support_ID`) REFERENCES `Support` (`Support_ID`
CONSTRAINT `Que_ID` FOREIGN KEY (`Que_ID `) REFERENCES `Queries` (`Que_ID `)
)
```

Account

```
CREATE TABLE `Account` (
  `Acct_ID` int NOT NULL,
  `Card_ID` int NOT NULL,
  `Wallet_ID` int NOT NULL,
  PRIMARY KEY (`Acct_ID`),
  KEY `Card_ID_idx` (`Card_ID`),
  KEY `Wallet_ID_idx` (`Wallet_ID`),
  CONSTRAINT `Card_ID` FOREIGN KEY (`Card_ID`) REFERENCES `Card` (`Card_Num`),
  CONSTRAINT `Wallet_ID` FOREIGN KEY (`Wallet_ID`) REFERENCES `Wallet` (`Wallet_ID`)
)
```

Wallet

```
CREATE TABLE `Wallet` (
  `Wallet_ID` int NOT NULL AUTO_INCREMENT,
  `Balance` int NOT NULL,
  PRIMARY KEY (`Wallet_ID`)
)
```

Card

```
CREATE TABLE `Card` (
  `Card_Num` int NOT NULL,
  `Bank` char(25) COLLATE utf8_bin NOT NULL,
  `Card_name` char(25) COLLATE utf8_bin NOT NULL,
  `Card_type` char(10) COLLATE utf8_bin NOT NULL,
  PRIMARY KEY (`Card_Num`)
)
```

Degree

```
CREATE TABLE `Degree` (
  `SN` int NOT NULL AUTO_INCREMENT,
  `Staff_ID` int NOT NULL,
  `Degree` varchar(10) COLLATE utf8_bin NOT NULL,
  PRIMARY KEY (`SN`),
  KEY `Staff_ID_idx` (`Staff_ID`),
  CONSTRAINT `Staff_ID` FOREIGN KEY (`Staff_ID`) REFERENCES `Staff` (`Staff_ID`)
)
```

Car

```
CREATE TABLE `Car` (
  `Car_ID` int NOT NULL AUTO_INCREMENT,
  `Plate_num` varchar(11) COLLATE utf8_bin NOT NULL,
  `Model` varchar(10) COLLATE utf8_bin NOT NULL,
  `Brand` varchar(15) COLLATE utf8_bin NOT NULL,
  `Color` varchar(10) COLLATE utf8_bin NOT NULL,
  `Year` year NOT NULL,
  `Driver` int NOT NULL,
  PRIMARY KEY (`Car_ID`),
  UNIQUE KEY `Plate_num_UNIQUE` (`Plate_num`),
  KEY `Driver_ID_idx` (`Driver`),
  CONSTRAINT `Driver_Lnc` FOREIGN KEY (`Driver`) REFERENCES `Driver` (`Driver_LNC`)
)
```

Transaction

```
CREATE TABLE `Transaction` (
  `Tran_ID` int NOT NULL AUTO_INCREMENT,
  `Book_ID` int DEFAULT NULL,
  `Type` varchar(10) COLLATE utf8_bin DEFAULT NULL,
  `Paid` char(4) COLLATE utf8_bin DEFAULT NULL,
  PRIMARY KEY (`Tran_ID`),
  KEY `Book_ID_idx` (`Book_ID`),
  CONSTRAINT `Book_ID` FOREIGN KEY (`Book_ID`) REFERENCES `Booking` (`Book_ID`)
)
```

Database Implementation

(Insert)

Wallet

```
INSERT INTO `Car Hailing Managment System`.`Wallet` (`Balance`) VALUES ('300');
INSERT INTO `Car Hailing Managment System`.`Wallet` (`Balance`) VALUES ('400');
INSERT INTO `Car Hailing Managment System`.`Wallet` (`Balance`) VALUES ('1000');
INSERT INTO `Car Hailing Managment System`.`Wallet` (`Balance`) VALUES ('3000');
INSERT INTO `Car Hailing Managment System`.`Wallet` (`Balance`) VALUES ('2000');
INSERT INTO `Car Hailing Managment System`.`Wallet` (`Balance`) VALUES ('200');
```

Trip

```
INSERT INTO `Car Hailing Managment System`.`Trip` (`Trip_ID_FK`,`Trans_ID`, `Trip_start`, `Trip_end`, `Trip_review`)
VALUES ('78', '1',  '20:00:00', '21:00:00');

INSERT INTO `Car Hailing Managment System`.`Trip` (`Trip_ID_FK`, `Trans_ID`, `Trip_start`, `Trip_end`) VALUES
('89', '2',  '11:00:00', '11:30:00', '4');

INSERT INTO `Car Hailing Managment System`.`Trip` (`Trip_ID_FK`, `Trans_ID`, `Trip_start`, `Trip_end`,
`Trip_review`) VALUES ('90', '3',  '20:00:00', '21:00:00', '3');

INSERT INTO `Car Hailing Managment System`.`Trip` (`Trip_ID_FK`, `Trans_ID`, `Trip_start`, `Trip_end`,
`Trip_review`) VALUES ('91', '4',  '20:00:00', '21:00:00', '2');

INSERT INTO `Car Hailing Managment System`.`Trip` (`Trip_ID_FK`, `Trans_ID`, `Trip_start`, `Trip_end`,
`Trip_review`) VALUES ('92', '5',  '20:00:00', '21:00:00');
```

INSERT INTO `Car Hailing Managment System`.`Trip` (`Trip_ID_FK`, `Trans_ID`, `Trip_start`, `Trip_end`, `Trip_review`) VALUES ('93', '6', '20:00:00', '21:00:00', '5');

Support

INSERT INTO `Car Hailing Managment System`.`Support` (`Support_ID`, `Type`) VALUES ('101', 'chat');
INSERT INTO `Car Hailing Managment System`.`Support` (`Support_ID`, `Type`) VALUES ('102', 'call');

Session

INSERT INTO `Car Hailing Managment System`.`Session` (`Date`, `Time_in`) VALUES ('2018-03-04', '04:50:00');

INSERT INTO `Car Hailing Managment System`.`Session` (`Date`, `Time_in`) VALUES ('2018-03-04', '04:50:00');

INSERT INTO `Car Hailing Managment System`.`Session` (`Date`, `Time_in`) VALUES ('2018-03-04', '04:50:00');

INSERT INTO `Car Hailing Managment System`.`Session` (`Date`, `Time_in`) VALUES ('2018-03-04', '04:50:00');

INSERT INTO `Car Hailing Managment System`.`Session` (`Date`, `Time_in`) VALUES ('2018-03-04', '04:50:00');

Queries

INSERT INTO `Car Hailing Managment System`.`Queries` (`Que_ID`, `Que_type`, `Descer`, `Status`,`Support_ID`) VALUES ('201', 'chat', 'Overcharge', 'Done', '101');

INSERT INTO `Car Hailing Managment System`.`Queries` (`Que_ID`, `Que_type`, `Descer`, `Status`,`Support_ID`) VALUES ('202', 'call', 'Overcharge', '102');

Login

INSERT INTO `Car Hailing Managment System`.`Login` (`SSN`, `Password`, `S_ID`) VALUES ('2221', ' werty554', '1');

INSERT INTO `Car Hailing Managment System`.`Login` (`SSN`, `Password`, `S_ID`) VALUES ('2222', ' 55555hbjh', '2');

INSERT INTO `Car Hailing Managment System`.`Login` (`SSN`, `Password`, `S_ID`) VALUES ('2223', hugsgu55', '3');

INSERT INTO `Car Hailing Managment System`.`Login` (`SSN`, `Password`, `S_ID`) VALUES ('2223', ' uhss78', '4');

INSERT INTO `Car Hailing Managment System`.`Login` (`SSN`, `Password`, `S_ID`) VALUES ('2223', ' shvhs98', '5');

Driver

INSERT INTO `Car Hailing Managment System`.`Driver` (`Driver_LNC`, `Staff_ID`) VALUES ('6739021', '1');

INSERT INTO `Car Hailing Managment System`.`Driver` (`Driver_LNC`, `Staff_ID`) VALUES ('6739022', '2');

INSERT INTO `Car Hailing Managment System`.`Driver` (`Driver_LNC`, `Staff_ID`) VALUES ('6739024', '3');

INSERT INTO `Car Hailing Managment System`.`Driver` (`Driver_LNC`, `Staff_ID`) VALUES ('6739025', '4');

INSERT INTO `Car Hailing Managment System`.`Driver` (`Driver_LNC`, `Staff_ID`) VALUES ('6739025', '5');

INSERT INTO `Car Hailing Managment System`.`Driver` (`Driver_LNC`, `Staff_ID`) VALUES ('6739026', '6');

Degree

INSERT INTO `Car Hailing Managment System`.`Degree` (`Staff_ID`, `Degree`) VALUES ('1', 'Msc');

INSERT INTO `Car Hailing Managment System`.`Degree` (`Staff_ID`, `Degree`) VALUES ('1', 'Bsc');

INSERT INTO `Car Hailing Managment System`.`Degree` (`Staff_ID`, `Degree`) VALUES ('2', 'Msc');

INSERT INTO `Car Hailing Managment System`.`Degree` (`Staff_ID`, `Degree`) VALUES ('2', 'Bsc');

Card

INSERT INTO `Car Hailing Managment System`.`Card` (`Card_Num`, `Bank`, `Card_name`, `Card_type`) VALUES (' 2345001', 'Zenith', ' Bello Sule ', 'Visa ');

INSERT INTO `Car Hailing Managment System`.`Card` (`Card_Num`, `Bank`, `Card_name`, `Card_type`) VALUES (' 2345002', 'Uba', ' Edes Joy ', 'Visa ');

INSERT INTO `Car Hailing Managment System`.`Card` (`Card_Num`, `Bank`, `Card_name`, `Card_type`) VALUES (' 2345003', 'Zenith', ' Yhit Bode ', 'Visa ');

INSERT INTO `Car Hailing Managment System`.`Card` (`Card_Num`, `Bank`, `Card_name`, `Card_type`) VALUES ('4567001', 'Uba', ' Titi Shade ', 'Master ');

INSERT INTO `Car Hailing Managment System`.`Card` (`Card_Num`, `Bank`, `Card_name`, `Card_type`) VALUES ('4567002', 'Uba', ' Ugo Kalu ', 'Master ');

Account

INSERT INTO `Car Hailing Managment System`.`Account` (`Acct_ID`, `Card_ID`, `Wallet_ID`) VALUES ('1', '2345001', '1');

INSERT INTO `Car Hailing Managment System`.`Account` (`Acct_ID`, `Card_ID`, `Wallet_ID`) VALUES ('2', '2345002', '2');

INSERT INTO `Car Hailing Managment System`.`Account` (`Acct_ID`, `Card_ID`, `Wallet_ID`) VALUES ('3', '2345003', '3');

INSERT INTO `Car Hailing Managment System`.`Account` (`Acct_ID`, `Card_ID`, `Wallet_ID`) VALUES ('4', '4567001', '4');

INSERT INTO `Car Hailing Managment System`.`Account` (`Acct_ID`, `Card_ID`, `Wallet_ID`) VALUES ('5', '4567002', '5');

Car

INSERT INTO `Car Hailing Managment System`.`Car` (`Plate_num`, `Model`, `Brand`, `Color`, `Year`, `Driver`) VALUES (' KJDDFOIS', ' XXE ', 'Toyota', 'Black', 2016, ' 6739021');

INSERT INTO `Car Hailing Managment System`.`Car` (`Plate_num`, `Model`, `Brand`, `Color`, `Year`, `Driver`) VALUES ('ISIS ', ' XXE ', 'Posh', 'Black', 2020, '6739022');

INSERT INTO `Car Hailing Managment System`.`Car` (`Plate_num`, `Model`, `Brand`, `Color`, `Year`, `Driver`) VALUES ('HSHSS', ' XXE ', 'Bens', 'Black', 2022, '6739023');

INSERT INTO `Car Hailing Managment System`.`Car` (`Plate_num`, `Model`, `Brand`, `Color`, `Year`, `Driver`) VALUES ('HSHSHS ', ' XXE ', 'Hunda', 'White', 2012, '6739024');

INSERT INTO `Car Hailing Managment System`.`Car` (`Plate_num`, `Model`, `Brand`, `Color`, `Year`, `Driver`) VALUES ('SSSKS', ' XXE ', 'Jeep', 'Black', 2016, ' 6739025');

INSERT INTO `Car Hailing Managment System`.`Car` (`Plate_num`, `Model`, `Brand`, `Color`, `Year`, `Driver`) VALUES (' IPAIAAP', 'XXE', 'Royce', 'Blue', 2018, ' 6739026');

Booking

INSERT INTO `Car Hailing Managment System`.`Booking` (`Date`, `Est_bill`, `Destination`, `Pick_up`, `Status`, `Car_ID`, `Cust_ID`) VALUES ('2022-06-12', '700', 'B99 999', 'B11 890', 'Yes', '5', '62');

INSERT INTO `Car Hailing Managment System`.`Booking` (`Date`, `Est_bill`, `Destination`, `Pick_up`, `Status`, `Car_ID`, `Cust_ID`) VALUES ('2022-06-12', '700', 'B99 999', 'B11 890', 'Yes', '5', '61');

INSERT INTO `Car Hailing Managment System`.`Booking` (`Date`, `Est_bill`, `Destination`, `Pick_up`, `Status`, `Car_ID`, `Cust_ID`) VALUES ('2022-06-12', '700', 'B99 999', 'B11 890', 'Yes', '5', '63');

INSERT INTO `Car Hailing Managment System`.`Booking` (`Date`, `Est_bill`, `Destination`, `Pick_up`, `Status`, `Car_ID`, `Cust_ID`) VALUES ('2022-06-12', '700', 'B99 999', 'B11 890', 'Yes', '5', '64');

INSERT INTO `Car Hailing Managment System`.`Booking` (`Date`, `Est_bill`, `Destination`, `Pick_up`, `Status`, `Car_ID`, `Cust_ID`) VALUES ('2022-06-12', '700', 'B99 999', 'B11 890', 'Yes', '5', '65');

INSERT INTO `Car Hailing Managment System`.`Booking` (`Date`, `Est_bill`, `Destination`, `Pick_up`, `Status`, `Car_ID`, `Cust_ID`) VALUES ('2022-06-13', '700', 'B99 999', 'B11 890', 'Yes', '5', '61');

Customer

INSERT INTO `Car Hailing Managment System`.`Customer` (`SSN`, `Email`, `First_name`, `Last_name`, `DOB`, `Phone`, `Gender`, `Join_date`, `Acct_ID`) VALUES ('2221', ' Bello@gmail.com', 'Bello', 'Sule, '2002-05-11', '892346701', 'm', '2022-07-13', '1');

INSERT INTO `Car Hailing Managment System`.`Customer` (`SSN`, `Email`, `First_name`, `Last_name`, `DOB`, `Phone`, `Gender`, `Join_date`, `Acct_ID`) VALUES ('2222', ' joy.edes@gmail.com', 'Edes', 'Joy', '2002-05-11', '892346702', 'f', '2022-07-13', '2');

INSERT INTO `Car Hailing Managment System`.`Customer` (`SSN`, `Email`, `First_name`, `Last_name`, `DOB`, `Phone`, `Gender`, `Join_date`, `Acct_ID`) VALUES ('2223', ' Bode@yahoo.com', 'Yhit', 'Bode', '2002-05-11', '892346703', 'f', '2022-07-13', '3');

INSERT INTO `Car Hailing Managment System`.`Customer` (`SSN`, `Email`, `First_name`, `Last_name`, `DOB`, `Phone`, `Gender`, `Join_date`, `Acct_ID`) VALUES ('2224', ' Shade.T@gmail.com', 'Titi', 'Shade', '2002-05-11', '892346704', 'f', '2022-07-13', '4');

INSERT INTO `Car Hailing Managment System`.`Customer` (`SSN`, `Email`, `First_name`, `Last_name`, `DOB`, `Phone`, `Gender`, `Join_date`, `Acct_ID`) VALUES ('2225', ' Kalu@hot.com', 'Ugo', 'Kalu', '2002-05-11', '892346705', 'f', '2022-07-13', '5');

Role

INSERT INTO `Car Hailing Managment System`.`Role` (`Role_Type`) VALUES ('Support');
INSERT INTO `Car Hailing Managment System`.`Role` (`Role_Type`) VALUES ('Driver');
INSERT INTO `Car Hailing Managment System`.`Role` (`Role_Type`) VALUES ('Hr');
INSERT INTO `Car Hailing Managment System`.`Role` (`Role_Type`) VALUES ('Admin');
INSERT INTO `Car Hailing Managment System`.`Role` (`Role_Type`) VALUES ('Super');

Transaction

INSERT INTO `Car Hailing Managment System`.`Transaction` (`Book_ID`, `Type`, `Paid`) VALUES ('78', 'card', 'yes');

INSERT INTO `Car Hailing Managment System`.`Transaction` (`Book_ID`, `Type`, `Paid`) VALUES ('89', 'wallet', 'yes');

INSERT INTO `Car Hailing Managment System`.`Transaction` (`Book_ID`, `Type`, `Paid`) VALUES ('90', 'card', 'yes');

INSERT INTO `Car Hailing Managment System`.`Transaction` (`Book_ID`, `Type`, `Paid`) VALUES ('91', 'card', 'yes');

INSERT INTO `Car Hailing Managment System`.`Transaction` (`Book_ID`, `Type`, `Paid`) VALUES ('92', 'wallet', 'yes');

INSERT INTO `Car Hailing Managment System`.`Transaction` (`Book_ID`, `Type`, `Paid`) VALUES ('93', 'card', 'yes');

Staff

INSERT INTO `Car Hailing Managment System`.`Staff` (`First_name`, `Last_name`, `DOB`, `Age`, `Phone`, `Gender`, `Email`, `Super_ID`, `Address`, `Join_date`, `Role_ID`) VALUES ('John', 'Ship', '1993-06-06', '29', '67376371', 'M', 'ship@gmail.com', '3', 'B67 429', '2022-01-12', '2');

INSERT INTO `Car Hailing Managment System`.`Staff` (`First_name`, `Last_name`, `DOB`, `Age`, `Phone`, `Gender`, `Email`, `Super_ID`, `Address`, `Join_date`, `Role_ID`) VALUES ('Sharon', 'Sky', '1993-06-06', '29', '67376372', 'F', 'sky@hot.com', '3', 'T67 429', '2022-01-12', '1');

INSERT INTO `Car Hailing Managment System`.`Staff` (`First_name`, `Last_name`, `DOB`, `Age`, `Phone`, `Gender`, `Email`, `Super_ID`, `Address`, `Join_date`, `Role_ID`) VALUES ('Moon', 'Sea', '1993-06-06', '29', '67376373', 'M', 'Moon.sea@Yahoo.com', '8', 'C56 429', '2022-01-12', '5');

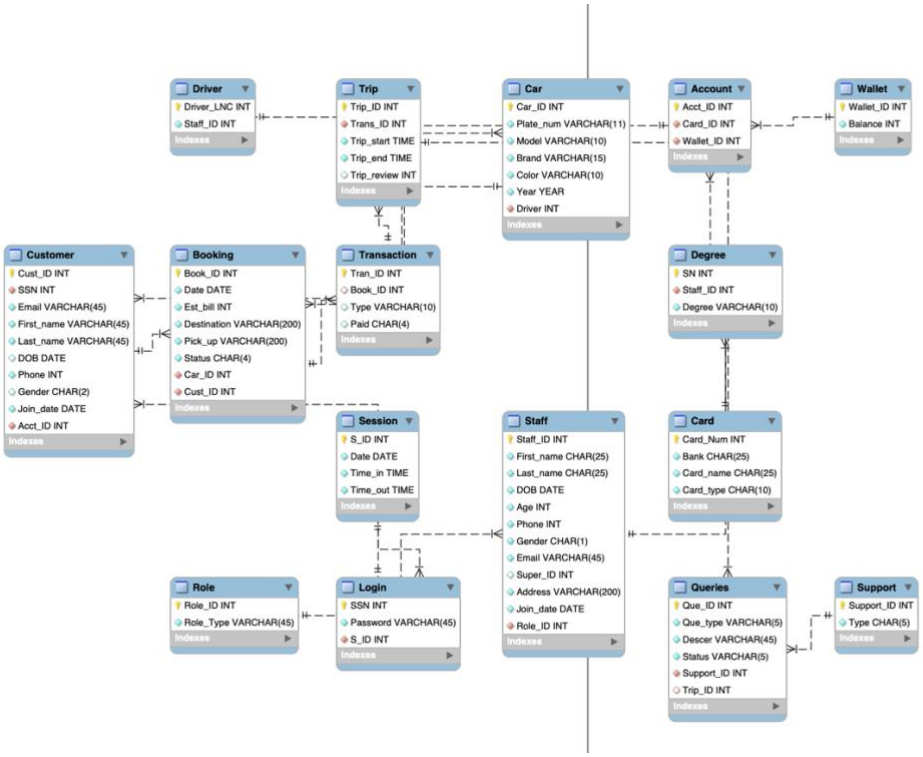
INSERT INTO `Car Hailing Managment System`.`Staff` (`First_name`, `Last_name`, `DOB`, `Age`, `Phone`, `Gender`, `Email`, `Super_ID`, `Address`, `Join_date`, `Role_ID`) VALUES ('Stone', 'Cold', '1991-06-06', '31', '67376374', 'F', 'stone@gmail.com', '3', 'B10 429', '2022-01-12', '1');

INSERT INTO `Car Hailing Managment System`.`Staff` (`First_name`, `Last_name`, `DOB`, `Age`, `Phone`, `Gender`, `Email`, `Super_ID`, `Address`, `Join_date`, `Role_ID`) VALUES ('Star', 'Guss', '1991-06-06', '31', '67376375', 'M', 'guss@gmail.com', '3', 'L19 429', '2022-01-12', '1');

INSERT INTO `Car Hailing Managment System`.`Staff` (`First_name`, `Last_name`, `DOB`, `Age`, `Phone`, `Gender`, `Email`, `Super_ID`, `Address`, `Join_date`, `Role_ID`) VALUES ('Akin', 'Anu', '1991-06-06', '31', '67376376', 'F', 'Akin@yahoo.com', '3', 'B10 444', '2022-01-12', '2');

INSERT INTO `Car Hailing Managment System`.`Staff` (`First_name`, `Last_name`, `DOB`, `Age`, `Phone`, `Gender`, `Email`, `Super_ID`, `Address`, `Join_date`, `Role_ID`) VALUES ('John', 'Ship', '1990-06-06', '32', '67376377', 'F', 'Bill@hotmail.com', '8', 'C56 429', '2022-01-12', '2');

Schema



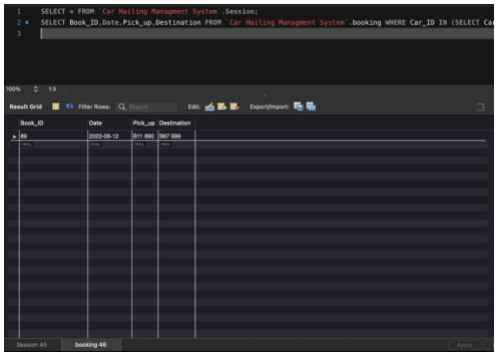
SQL Queries

By Onyinyechukwu Ani 20156554

1. The team wants to know the Bookings assigned to Driver with Driver's License 6739021

Solution:

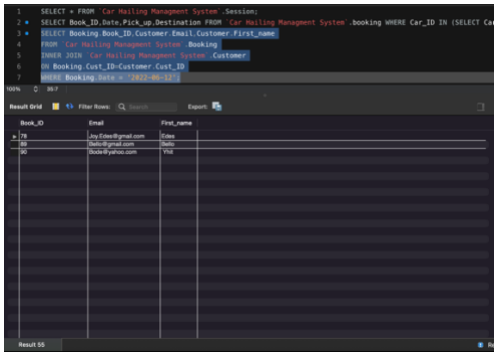
```
SELECT Book_ID,Pick_up,Destination,Date
FROM `Car Hailing Managment System`.booking
WHERE Car_ID
IN
(SELECT Car_ID
FROM `Car Hailing Managment System`.Car
WHERE Driver
IN
(SELECT Driver_LNC
FROM `Car Hailing Managment System`.Driver
WHERE Driver_LNC = "6739021"
));
```



2. The marketing team wants the email of customers who booked a ride on 12/06/2022 so they can send a marketing email

Solution:

```
SELECT Booking.Book_ID,Customer.Email,Customer.First_name
FROM `Car Hailing Managment System`.Booking
INNER JOIN `Car Hailing Managment System`.Customer
ON Booking.Cust_ID=Customer.Cust_ID
WHERE Booking.Date = '2022-06-12';
```



3. The marketing team also wants the email of customers who booked a ride on 12/06/2022 – 13/06/2022 and arranged in Ascending order

Solution:

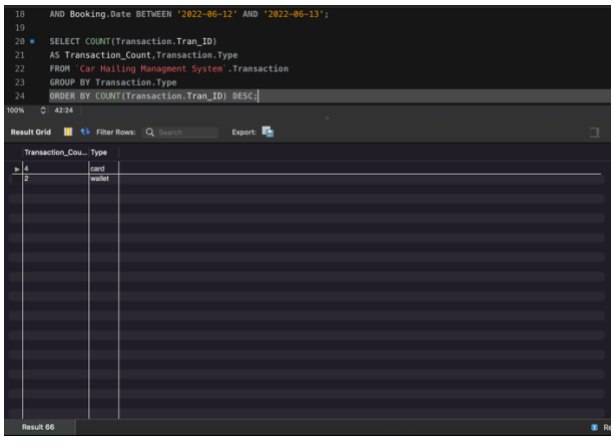
```
SELECT Booking.Book_ID,Customer.Email,Booking.Date,Customer.First_name
FROM `Car Hailing Managment System`.Booking
INNER JOIN `Car Hailing Managment System`.Customer
ON Booking.Cust_ID=Customer.Cust_ID
AND Booking.Date BETWEEN '2022-06-12' AND '2022-06-13'
ORDER BY Booking.Date ASC;
```

4. The Company wants to reward customers who pay with wallet payment

Solution:

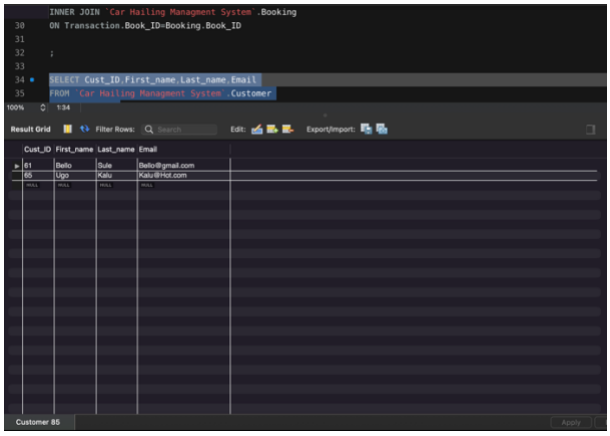
- Displays the number of transaction per Payment Type

```
SELECT COUNT(Transaction.Tran_ID)
AS Transaction_Count,Transaction.Type
FROM `Car Hailing Managment System`.Transaction
GROUP BY Transaction.Type
ORDER BY COUNT(Transaction.Tran_ID) DESC;
```



- Displays the customer information who use wallet payment option

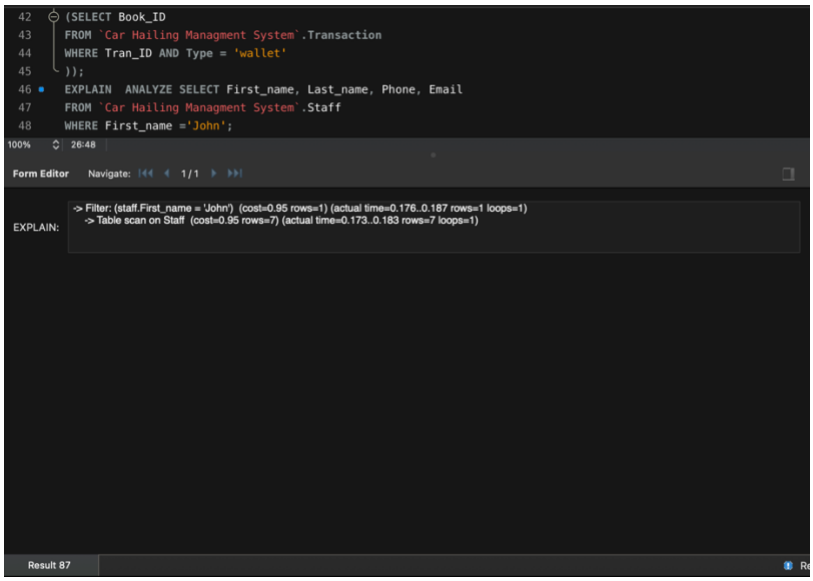
```
SELECT Cust_ID,First_name,Last_name,Email
FROM `Car Hailing Managment System`.Customer
WHERE Cust_ID
IN
(SELECT Cust_ID
FROM `Car Hailing Managment System`.Booking
WHERE Book_ID
IN
(SELECT Book_ID
FROM `Car Hailing Managment System`.Transaction
WHERE Tran_ID AND Type = 'wallet'
));
```



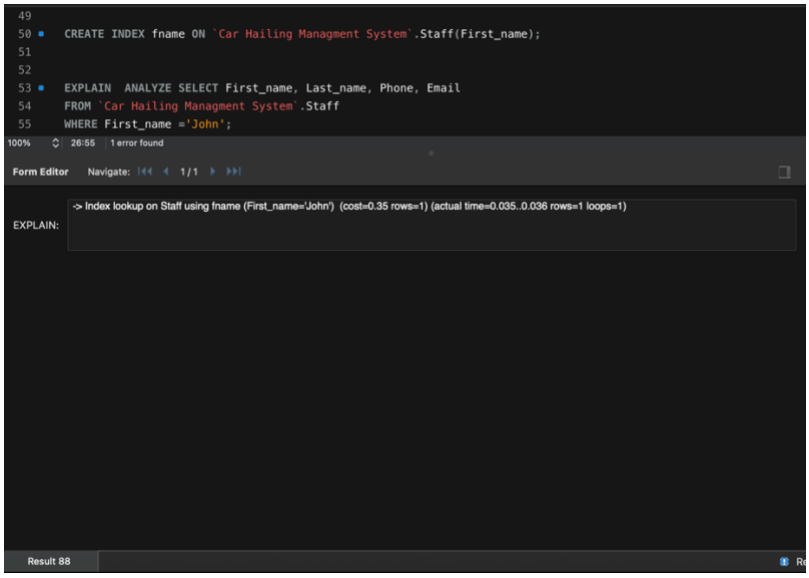
5. Optimization

Creating index on firstname* on Staff_table

```
EXPLAIN  ANALYZE SELECT First_name, Last_name, Phone, Email
FROM `Car Hailing Managment System`.Staff
WHERE First_name ='John';
```



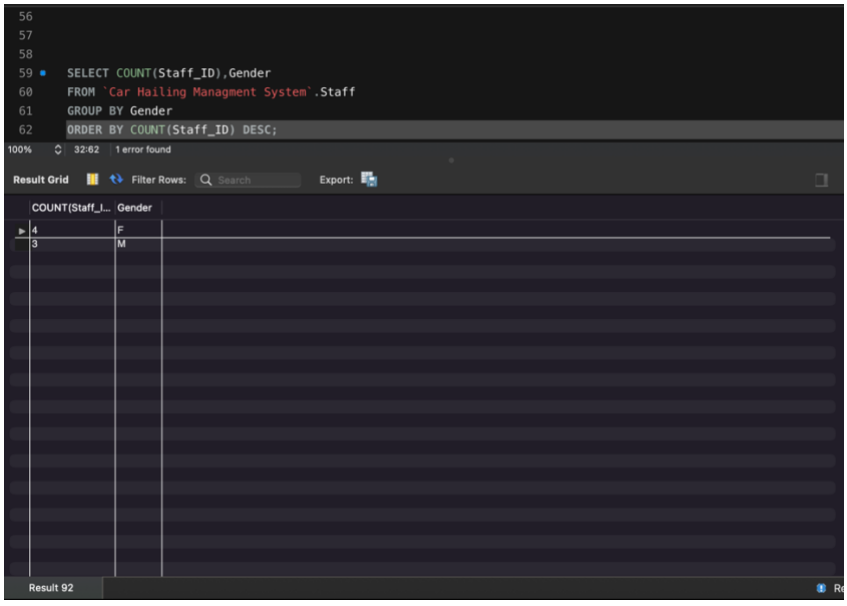
CREATE INDEX fname ON `Car Hailing Managment System`.Staff(First_name);



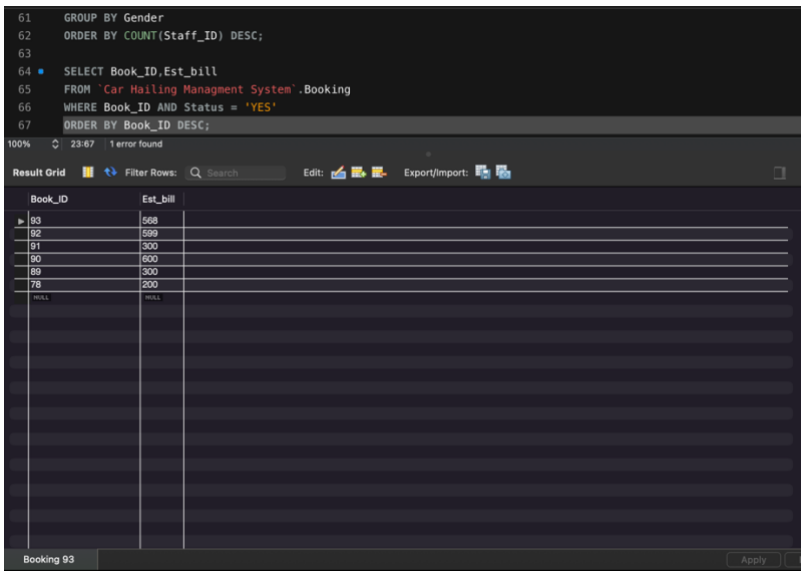
After optimization by building an index, costs dropped from 0.95 to 0.35 and execution times from 0.176 to 0.036.

By Khizer Shoukat 22110875

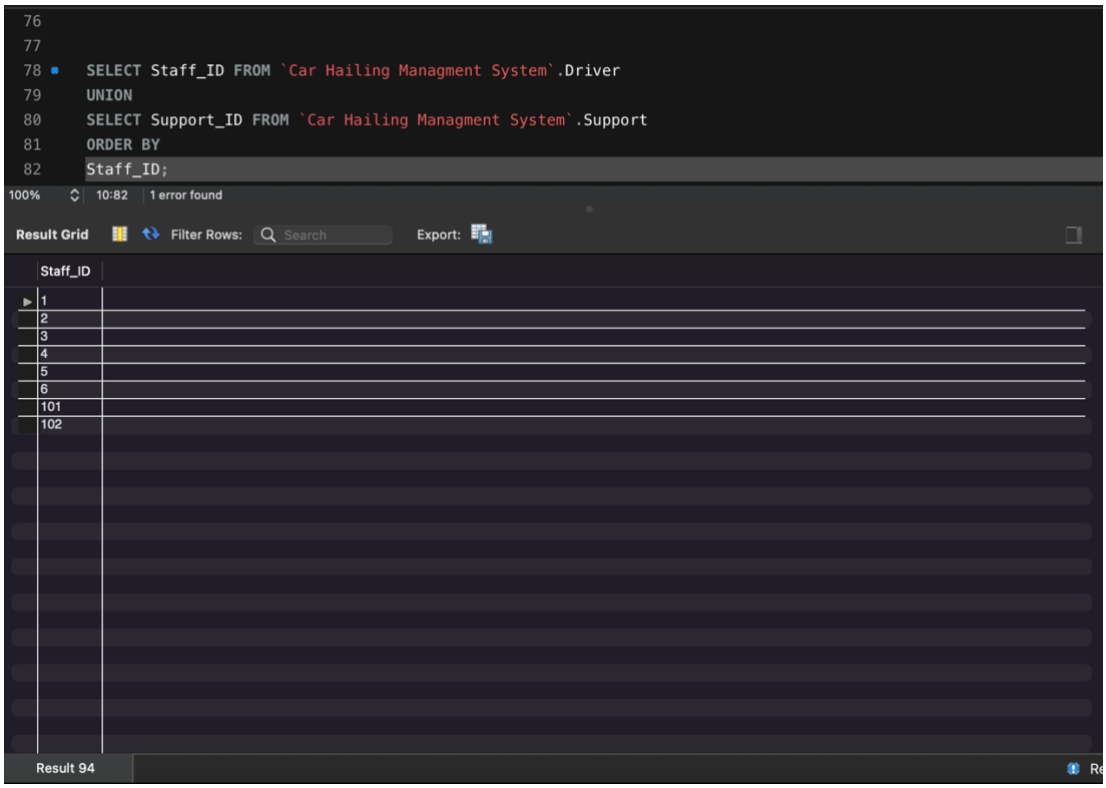
SELECT COUNT(Staff_ID),Gender
FROM `Car Hailing Managment System`.Staff
GROUP BY Gender
ORDER BY COUNT(Staff_ID) DESC;



```
SELECT Book_ID,Est_bill
FROM `Car Hailing Managment System`.Booking
WHERE Book_ID AND Status = 'YES'
ORDER BY Book_ID DESC;
```




```
SELECT Staff_ID FROM `Car Hailing Managment System`.Driver
UNION
SELECT Support_ID FROM `Car Hailing Managment System`.Support
ORDER BY
Staff_ID;
```



Conclusion

This database was made specifically for the car-hailing service to manage customer information and keep track of activity. Sixteen tables were made to store pertinent data, retrieve data, and implement optimization to cut costs and run time.

Reference:

(Point, n.d.)

(apexSQL, 2018)