SVKM'S NMIMS Deemed to be UNIVERSITY | HYDERABAD

School of Technology Management and Engineering

A Project Report On

Abhibus Travel Database Management System

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Submitted To

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Abhi bus Travel Database Management System

Contents

Problem Statement:

Developing a comprehensive database solution for a bus transportation company to manage various aspects of their operations. The system facilitate users in searching for available buses, booking seats, making payments, and providing feedback on their travel experiences. Administrators should have the capability to efficiently manage buses, routes, bookings, payments, user feedback, and other relevant entities. The goal is to create a robust and scalable database system that optimizes the management of bus operations while providing a seamless experience for both users and administrators.

Abstract:

This project aims to design and implement a database system for a bus transportation company to streamline their operations and enhance customer satisfaction. The database will include tables for managing users, buses, routes, bookings, payments, feedback, promotions, maintenance, and administrative activities. Users will be able to search for available buses, book seats, make payments, and provide feedback on their travel experiences. Administrators will have access to tools for managing buses, routes, bookings, payments, and analyzing feedback data to improve services. The database system will provide a centralized platform to efficiently manage all aspects of the bus transportation company, leading to improved operational efficiency and customer service.

Entity Sets:

User: Represents users of the system who can book bus tickets.

Bus: Represents different buses available for booking.

Route: Represents the various routes between departure and arrival locations.

Booking: Represents bookings made by users for bus journeys.

Seat: Represents individual seats on buses.

Feedback: Represents feedback provided by users after their journey.

Admin: Represents administrators who manage the system.

Payment: Represents payments made for bus bookings.

Promotion: Represents promotional offers for users.

BusSchedule: Represents schedules for buses on specific routes.

Driver: Represents drivers assigned to buses.

BusMaintenance: Represents maintenance records of buses.

AdminActivity: Represents activities performed by administrators.

Relationship Sets:

User-Booking: Represents the relationship between users and their bookings.

Bus-Booking: Represents the relationship between buses and bookings.

Route-Booking: Represents the relationship between routes and bookings.

Seat-Booking: Represents the relationship between seats and bookings.

Feedback-User: Represents the relationship between feedback and users.

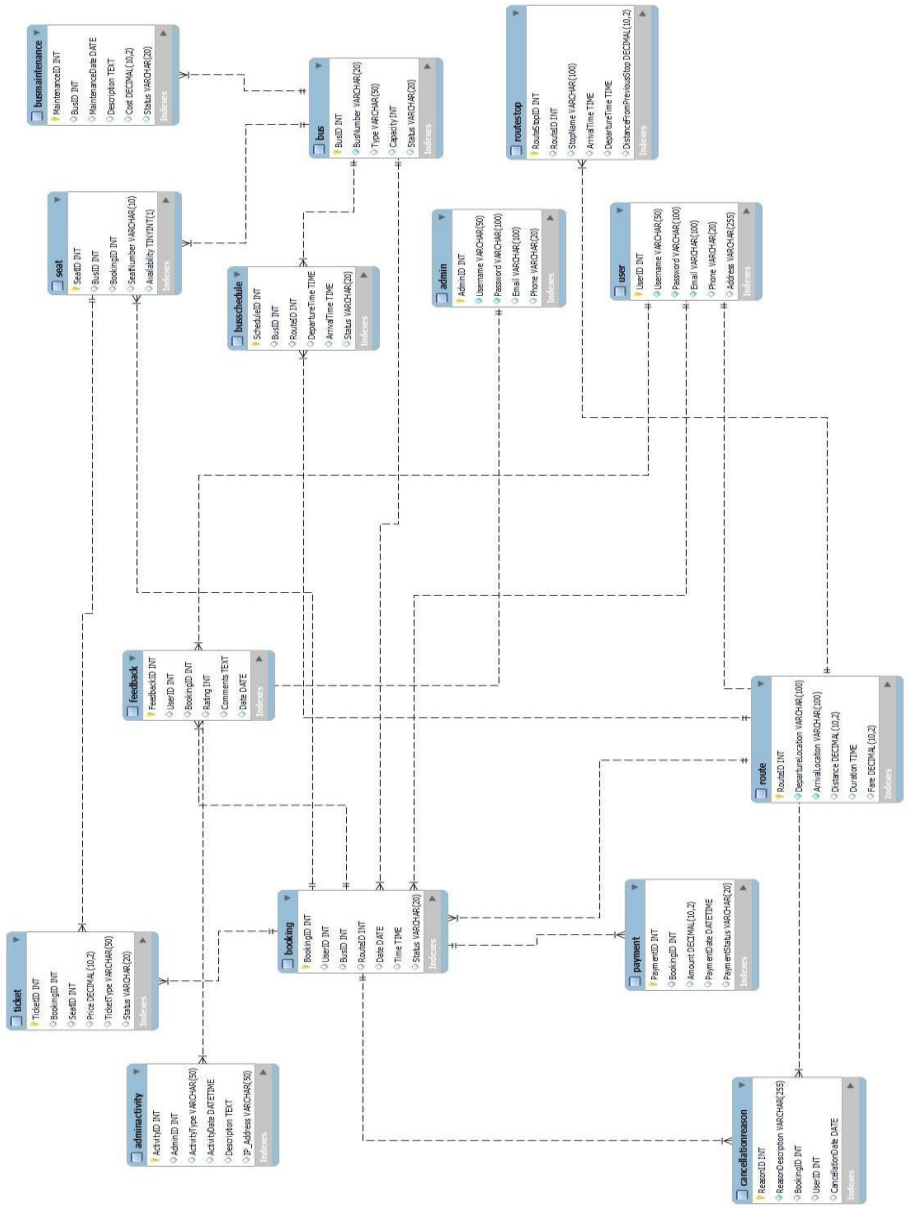
Feedback-Booking: Represents the relationship between feedback and bookings.

Admin-AdminActivity: Represents the relationship between administrators and their activities.

Booking-Payment: Represents the relationship between bookings and payments.

Bus-BusMaintenance: Represents the relationship between buses and maintenance records.

Entity Relationshiop Diagram



Creating database and Tables

```
CREATE DATABASE abhi_bus;
USE abhi_bus;

-- User Table
CREATE TABLE User (
    UserID INT AUTO_INCREMENT PRIMARY KEY,
    Username VARCHAR(50) NOT NULL,
    Password VARCHAR(100) NOT NULL,
    Email VARCHAR(100) NOT NULL,
    Phone VARCHAR(20),
    Address VARCHAR(255)
);

-- Bus Table
CREATE TABLE Bus (
    BusID INT AUTO_INCREMENT PRIMARY KEY,
    BusNumber VARCHAR(20) NOT NULL,
    Type VARCHAR(50),
    Capacity INT,
    Status VARCHAR(20)
);

-- Route Table
CREATE TABLE Route (
    RouteID INT AUTO_INCREMENT PRIMARY KEY,
    DepartureLocation VARCHAR(100) NOT NULL,
```

```
    ArrivalLocation VARCHAR(100) NOT NULL,
    Distance DECIMAL(10,2),
    Duration TIME,
    Fare DECIMAL(10,2)
);

-- Booking Table
CREATE TABLE Booking (
    BookingID INT AUTO_INCREMENT PRIMARY KEY,
    UserID INT,
    BusID INT,
    RouteID INT,
    Date DATE,
    Time TIME,
    Status VARCHAR(20),
    FOREIGN KEY (UserID) REFERENCES User(UserID),
    FOREIGN KEY (BusID) REFERENCES Bus(BusID),
    FOREIGN KEY (RouteID) REFERENCES Route(RouteID)
);

-- Seat Table
CREATE TABLE Seat (
    SeatID INT AUTO_INCREMENT PRIMARY KEY,
    BusID INT,
    BookingID INT,
    SeatNumber VARCHAR(10),
    Availability BOOLEAN,
    FOREIGN KEY (BusID) REFERENCES Bus(BusID),
    FOREIGN KEY (BookingID) REFERENCES Booking(BookingID)
```

```
)
-- Feedback Table
CREATE TABLE Feedback (
    FeedbackID INT AUTO_INCREMENT PRIMARY KEY,
    UserID INT,
    BookingID INT,
    Rating INT,
    Comments TEXT,
    Date DATE,
    FOREIGN KEY (UserID) REFERENCES User(UserID),
    FOREIGN KEY (BookingID) REFERENCES Booking(BookingID)
);

-- Admin Table
CREATE TABLE Admin (
    AdminID INT AUTO_INCREMENT PRIMARY KEY,
    Username VARCHAR(50) NOT NULL,
    Password VARCHAR(100) NOT NULL,
    Email VARCHAR(100),
    Phone VARCHAR(20)
);

-- Payment Table
CREATE TABLE Payment (
    PaymentID INT AUTO_INCREMENT PRIMARY KEY,
    BookingID INT,
    Amount DECIMAL(10,2),
    PaymentDate DATETIME,
    PaymentStatus VARCHAR(20),
```

```
    FOREIGN KEY (BookingID) REFERENCES Booking(BookingID) );
-- BusSchedule Table
CREATE TABLE BusSchedule (
    ScheduleID INT AUTO_INCREMENT PRIMARY KEY,
    BusID INT,
    RouteID INT,
    DepartureTime TIME,
    ArrivalTime TIME,
    Status VARCHAR(20),
    FOREIGN KEY (BusID) REFERENCES Bus(BusID),
    FOREIGN KEY (RouteID) REFERENCES Route(RouteID)
);

-- Promotion Table
CREATE TABLE Promotion (
    PromotionID INT AUTO_INCREMENT PRIMARY KEY,
    PromoCode VARCHAR(20) UNIQUE,
    DiscountPercentage DECIMAL(5,2),
    ExpiryDate DATE,
    Status VARCHAR(20)
);

-- Ticket Table
CREATE TABLE Ticket (
    TicketID INT AUTO_INCREMENT PRIMARY KEY,
    BookingID INT,
    SeatID INT,
    Price DECIMAL(10,2),
    TicketType VARCHAR(50),
```

```
    Status VARCHAR(20),
    FOREIGN KEY (BookingID) REFERENCES Booking(BookingID),
    FOREIGN KEY (SeatID) REFERENCES Seat(SeatID)
);

-- RouteStop Table
CREATE TABLE RouteStop (
    RouteStopID INT AUTO_INCREMENT PRIMARY KEY,
    RouteID INT,
    StopName VARCHAR(100),
    ArrivalTime TIME,
    DepartureTime TIME,
    DistanceFromPreviousStop DECIMAL(10,2),
    FOREIGN KEY (RouteID) REFERENCES Route(RouteID)
);

-- Driver Table
CREATE TABLE Driver (
    DriverID INT AUTO_INCREMENT PRIMARY KEY,
    FullName VARCHAR(100) NOT NULL,
    LicenseNumber VARCHAR(50) UNIQUE,
    ContactNumber VARCHAR(20),
    Email VARCHAR(100),
    Address VARCHAR(255)
);


-- BusMaintenance Table
CREATE TABLE BusMaintenance (
```

```
    MaintenanceID INT AUTO_INCREMENT PRIMARY KEY,
    BusID INT,
    MaintenanceDate DATE,
    Description TEXT,
    Cost DECIMAL(10,2),
    Status VARCHAR(20),
    FOREIGN KEY (BusID) REFERENCES Bus(BusID)
);

-- AdminActivity Table
CREATE TABLE AdminActivity (
    ActivityID INT AUTO_INCREMENT PRIMARY KEY,
    AdminID INT,
    ActivityType VARCHAR(50),
    ActivityDate DATETIME,
    Description TEXT,
    IP_Address VARCHAR(50),
    FOREIGN KEY (AdminID) REFERENCES Admin(AdminID)
);

-- CancellationReason Table
CREATE TABLE CancellationReason (
    ReasonID INT AUTO_INCREMENT PRIMARY KEY,
    ReasonDescription VARCHAR(255) NOT NULL,
    BookingID INT,
    UserID INT,
    CancellationDate DATE,
    FOREIGN KEY (BookingID) REFERENCES Booking(BookingID),
    FOREIGN KEY (UserID) REFERENCES User(UserID)
```

);

Tables

SELECT * FROM User;

UserID	Username	Password	Email	Phone	Address
1	Arjun	password123	arjun@example.com	1234567890	12A, MG Road, Bangalore
2	Shivani	securepass	shivani@example.com	0987654321	45, Beach Road, Chennai
3	Siddharth	siddharthpass	siddharth@example.com	5551234567	78, Kochi Street, Kochi
4	Ananya	ananyapass	ananya@example.com	9876543210	23, Temple Road, Thanjavur
5	Niharika	niharikapass	niharika@example.com	1239876543	56, Tea Estate Road, Ooty
6	Vijay	vijaypass	vijay@example.com	7778889999	89, Marina Beach Road, Puducherry
7	Sneha	snehapass	sneha@example.com	1112223333	34, Hill View Apartments, Coimbatore

SELECT * FROM Bus;

BusID	BusNumber	Type	Capacity	Status
1	BUS001	AC	50	Active
2	BUS002	Non-AC	40	Active
3	BUS003	Sleeper	30	Inactive
4	BUS004	AC	45	Active
5	BUS005	Non-AC	35	Active
6	BUS006	Sleeper	25	Inactive
7	BUS007	AC	50	Active

SELECT * FROM Route;

RouteID	DepartureLocation	ArrivalLocation	Distance	Duration	Fare
1	Bangalore	Chennai	300.50	06:30:00	30.00
2	Chennai	Kochi	250.20	05:00:00	25.00
3	Bangalore	Kochi	500.00	09:00:00	40.00
4	Thanjavur	Ooty	350.00	07:30:00	35.00
5	Ooty	Puducherry	280.50	05:45:00	30.00
6	Thanjavur	Puducherry	600.00	11:30:00	50.00
7	Coimbatore	Kochi	150.00	03:00:00	20.00

SELECT * FROM Booking;

BookingID	UserID	BusID	RouteID	Date	Time	Status
1	1	1	1	2024-04-10	08:00:00	Confirmed
2	2	2	2	2024-04-12	09:00:00	Pending
3	3	3	3	2024-04-15	10:00:00	Cancelled
4	4	4	4	2024-04-18	11:00:00	Confirmed
5	5	5	5	2024-04-20	12:00:00	Confirmed
6	6	6	6	2024-04-22	13:00:00	Pending
7	7	7	7	2024-04-25	14:00:00	Confirmed

SELECT * FROM Seat;

SeatID	BusID	BookingID	SeatNumber	Availability
1	1	1	A1	0
2	1	1	A2	1
3	2	2	B1	1
4	2	2	B2	0
5	3	3	C1	1
6	3	3	C2	1
7	4	4	D1	0

SELECT * FROM Feedback;

FeedbackID	UserID	BookingID	Rating	Comments	Date
1	1	1	4	Good service	2024-04-11
2	2	2	3	Average experience	2024-04-13
3	3	3	2	Bad experience	2024-04-16
4	4	4	5	Excellent service	2024-04-19
5	5	5	4	Comfortable journey	2024-04-21
6	6	6	2	Poor service	2024-04-23
7	7	7	3	Average journey	2024-04-26

SELECT * FROM Admin;

AdminID	Username	Password	Email	Phone
1	admin1	adminpass	admin1@example.com	9876543210
2	admin2	adminpass	admin2@example.com	9876543211
3	admin3	adminpass	admin3@example.com	9876543212
4	admin4	adminpass	admin4@example.com	9876543213
5	admin5	adminpass	admin5@example.com	9876543214
NULL	NULL	NULL	NULL	NULL

SELECT * FROM Payment;

PaymentID	BookingID	Amount	PaymentDate	PaymentStatus
1	1	25.00	2024-04-10 10:30:00	Paid
2	2	20.00	2024-04-12 11:45:00	Paid
3	3	30.00	2024-04-15 09:20:00	Pending
4	4	35.00	2024-04-18 12:00:00	Paid
5	5	30.00	2024-04-20 13:15:00	Pending
6	6	40.00	2024-04-22 14:30:00	Paid
7	7	15.00	2024-04-25 15:45:00	Paid

SELECT * FROM BusSchedule;

ScheduleID	BusID	RouteID	DepartureTime	ArrivalTime	Status
1	1	1	08:00:00	14:30:00	Active
2	2	2	09:00:00	14:00:00	Active
3	3	3	10:00:00	19:00:00	Inactive
4	4	4	11:00:00	16:30:00	Active
5	5	5	12:00:00	17:45:00	Active
6	6	6	13:00:00	21:00:00	Inactive
7	7	7	14:00:00	16:30:00	Active

SELECT * FROM Promotion;

PromotionID	PromoCode	DiscountPercentage	ExpiryDate	Status
1	PROMO001	10.00	2024-05-01	Active
2	PROMO002	15.00	2024-06-01	Active
3	PROMO003	20.00	2024-07-01	Inactive
4	PROMO004	25.00	2024-08-01	Active
5	PROMO005	30.00	2024-09-01	Active
NULL	NULL	NULL	NULL	NULL

SELECT * FROM Ticket;

TicketID	BookingID	SeatID	Price	TicketType	Status
1	1	1	25.00	Regular	Confirmed
2	2	2	20.00	Regular	Confirmed
3	3	3	30.00	Regular	Pending
4	4	4	35.00	Regular	Confirmed
5	5	5	30.00	Regular	Pending
6	6	6	40.00	Regular	Confirmed
7	7	7	15.00	Regular	Confirmed

SELECT * FROM RouteStop;

RouteStopID	RouteID	StopName	ArrivalTime	DepartureTime	DistanceFrom
1	1	Stop A	09:30:00	09:45:00	50.00
2	1	Stop B	10:30:00	10:45:00	100.00
3	2	Stop C	11:30:00	11:45:00	75.00
4	2	Stop D	12:30:00	12:45:00	120.00
5	3	Stop E	13:30:00	13:45:00	90.00
6	3	Stop F	14:30:00	14:45:00	150.00
7	4	Stop G	15:30:00	15:45:00	110.00

SELECT * FROM Driver;

DriverID	FullName	LicenseNumber	ContactNumber	Email	Address
1	Ramesh	DL123456	9876543210	ramesh@example.com	22, MGR Nagar, Chennai
2	Suresh	DL654321	9876543211	suresh@example.com	33, MG Road, Bangalore
3	Ganesh	DL789012	9876543212	ganesh@example.com	44, Beach Road, Puducherry
4	Mahesh	DL210987	9876543213	mahesh@example.com	55, Cochin Street, Kochi
5	Vignesh	DL345678	9876543214	vignesh@example.com	66, Marina Beach Road, Thanjavur
NULL	NULL	NULL	NULL	NULL	NULL

SELECT * FROM BusMaintenance;

MaintenanceID	BusID	MaintenanceDate	Description	Cost	Status
1	1	2024-04-10	Routine checkup	100.00	Completed
2	2	2024-04-12	AC repair	150.00	Completed
3	3	2024-04-15	Engine overhaul	300.00	Pending
4	4	2024-04-18	Oil change	80.00	Completed
5	5	2024-04-20	Brake pad replacement	200.00	Pending
6	6	2024-04-22	Suspension repair	250.00	Completed
7	7	2024-04-25	Battery replacement	120.00	Completed

SELECT * FROM AdminActivity;

ActivityID	AdminID	ActivityType	ActivityDate	Description	IP_Address
1	1	Login	2024-04-10 08:00:00	Admin logged in	192.168.1.100
2	2	Logout	2024-04-12 10:00:00	Admin logged out	192.168.1.101
3	3	Login	2024-04-15 12:00:00	Admin logged in	192.168.1.102
4	4	Logout	2024-04-18 14:00:00	Admin logged out	192.168.1.103
5	5	Login	2024-04-20 16:00:00	Admin logged in	192.168.1.104
6	1	Logout	2024-04-22 18:00:00	Admin logged out	192.168.1.105
7	2	Login	2024-04-25 20:00:00	Admin logged in	192.168.1.106
NULL	NULL	NULL	NULL	NULL	NULL

Performing Queries Simple

queries :

1. **Retrieve all active buses**
2. **Find all routes with a fare less than $25**
3. **Get all bookings with the status "Pending"**
4. **Retrieve all feedback with ratings greater than or equal to 4**
5. **Find all promotions that are currently active SELECT * FROM Bus**

WHERE Status = 'Active';

BusID	BusNumber	Type	Capacity	Status
1	BUS001	AC	50	Active
2	BUS002	Non-AC	40	Active
4	BUS004	AC	45	Active
5	BUS005	Non-AC	35	Active
7	BUS007	AC	50	Active

SELECT * FROM Route WHERE Fare < 25.00;

RouteID	DepartureLocation	ArrivalLocation	Distance	Duration	Fare
7	Coimbatore	Kochi	150.00	03:00:00	20.00
NULL	NULL	NULL	NULL	NULL	NULL

SELECT * FROM Booking WHERE Status = 'Pending';

BookingID	UserID	BusID	RouteID	Date	Time	Status
2	2	2	2	2024-04-12	09:00:00	Pending
6	6	6	6	2024-04-22	13:00:00	Pending
NULL	NULL	NULL	NULL	NULL	NULL	NULL

SELECT * FROM Feedback WHERE Rating >= 4;

FeedbackID	UserID	BookingID	Rating	Comments	Date
1	1	1	4	Good service	2024-04-11
4	4	4	5	Excellent service	2024-04-19
5	5	5	4	Comfortable journey	2024-04-21
NULL	NULL	NULL	NULL	NULL	NULL

SELECT * FROM Promotion WHERE Status = 'Active';

PromotionID	PromoCode	DiscountPercentage	ExpiryDate	Status
1	PROMO001	10.00	2024-05-01	Active
2	PROMO002	15.00	2024-06-01	Active
4	PROMO004	25.00	2024-08-01	Active
5	PROMO005	30.00	2024-09-01	Active
NULL	NULL	NULL	NULL	NULL

Aggregate Queries :

Aggregate Function (COUNT), String Function (UPPER), and Aliasing:

SELECT UPPER(Status) AS UppercaseStatus, COUNT(*) AS StatusCount

FROM Booking

GROUP BY UppercaseStatus;

	UppercaseStatus	StatusCount
▶	CONFIRMED	4
	PENDING	2
	CANCELLED	1

Aggregate Function (SUM), Mathematical Function (ABS), and Conditional Filtering:

SELECT SUM(ABS(Amount)) AS TotalAmountPaid

FROM Payment

WHERE PaymentStatus = 'Paid';

	TotalAmountPaid
▶	135.00

Aggregate Function (AVG), Date Function (YEAR), and Grouping:

SELECT YEAR(Booking.Date) AS Year, AVG(Ticket.Price) AS AveragePrice

FROM Ticket

JOIN Booking ON Ticket.BookingID = Booking.BookingID

GROUP BY Year;

	Year	AveragePrice
▶	2024	27.857143

Aggregate Function (MAX), String Function (CONCAT), and Subquery:

SELECT UserID, CONCAT(Username, ' - ', Email) AS UserDetails

FROM User

WHERE UserID = (SELECT UserID FROM Feedback WHERE Rating = (SELECT MAX(Rating) FROM Feedback));

	UserID	UserDetails
▶	4	Ananya - ananya@example.com

Aggregate Function (MIN), Numeric Function (POWER), and Join :

SELECT MIN(Cost) AS MinCost, Power(MIN(Cost), 2) AS MinCostSquared

FROM BusMaintenance

JOIN Bus ON BusMaintenance.BusID = Bus.BusID

WHERE Bus.Type = 'AC';

	MinCost	MinCostSquared
▶	80.00	6400

Joins Queries :

SELECT Booking.BookingID, Booking.Date, User.Username, User.Email

FROM Booking

INNER JOIN User ON Booking.UserID = User.UserID;

BookingID	Date	Username	Email
1	2024-04-10	Arjun	arjun@example.com
2	2024-04-12	Shivani	shivani@example.com
3	2024-04-15	Siddharth	siddharth@example.com
4	2024-04-18	Ananya	ananya@example.com
5	2024-04-20	Niharika	niharika@example.com
6	2024-04-22	Vijay	vijay@example.com
7	2024-04-25	Sneha	sneha@example.com

SELECT Bus.BusID, Bus.BusNumber, BusMaintenance.Description, BusMaintenance.Cost

FROM Bus

LEFT JOIN BusMaintenance ON Bus.BusID = BusMaintenance.BusID;

BusID	BusNumber	Description	Cost
1	BUS001	Routine checkup	100.00
2	BUS002	AC repair	150.00
3	BUS003	Engine overhaul	300.00
4	BUS004	Oil change	80.00
5	BUS005	Brake pad replacement	200.00
6	BUS006	Suspension repair	250.00
7	BUS007	Battery replacement	120.00

```
SELECT Feedback.FeedbackID, User.Username, Feedback.Rating,
Feedback.Comments

FROM Feedback

RIGHT JOIN User ON Feedback.UserID = User.UserID;
```

FeedbackID	Username	Rating	Comments
1	Arjun	4	Good service
2	Shivani	3	Average experience
3	Siddharth	2	Bad experience
4	Ananya	5	Excellent service
5	Niharika	4	Comfortable journey
6	Vijay	2	Poor service
7	Sneha	3	Average journey

```
SELECT User.Username, Bus.BusNumber

FROM User

CROSS JOIN Bus;
```

Username	BusNumber
Sneha	BUS001
Vijay	BUS001
Niharika	BUS001
Ananya	BUS001
Siddharth	BUS001
Shivani	BUS001
Arjun	BUS001
Sneha	BUS002
Vijay	BUS002
Niharika	BUS002
Ananya	BUS002
Siddharth	BUS002
Shivani	BUS002
Arjun	BUS002
Sneha	BUS003
Vijay	BUS003
Niharika	BUS003

Subqueries :

Correlated Subquery with Aggregation:

Username	TotalBookings	AverageTicketPrice
Arjun	1	25.000000
Shivani	1	20.000000
Siddharth	1	30.000000
Ananya	1	35.000000
Niharika	1	30.000000
Vijay	1	40.000000
Sneha	1	15.000000

Subquery with Multiple Conditions:

Username
Arjun
Ananya
Niharika
Sneha

Subquery with Aggregation and JOIN:

Username	TotalBookings	AvgRating
Arjun	1	4.0000
Shivani	1	3.0000
Siddharth	1	2.0000
Ananya	1	5.0000
Niharika	1	4.0000
Vijay	1	2.0000
Sneha	1	3.0000

Subquery with EXISTS and NOT EXISTS:

Username
Arjun
Ananya
Niharika
Sneha

Conclusion:

In conclusion, the database system facilitates efficient management of bus transportation operations. It organizes data pertaining to users, buses, routes, bookings, payments, and feedback, ensuring integrity and reliability. Through SQL queries, including joins and subqueries, it enables analysis and decision-making. Overall, the system enhances service quality, operational efficiency, and customer satisfaction in the bus transportation industry.