UNIVERSITY OF ASIA PACIFIC

Department of Computer Science and Engineering (CSE)

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Ticket Management System

Ticket Management System is a database-driven platform developed to streamline and modernize the process of booking, managing, and reselling tickets for various modes of transportation, including buses, trains, and planes. This system reduces manual intervention, minimizes ticketing errors, and improves user convenience by offering real-time access to ticket data and transaction histories. The Ticket Management System provides an intuitive interface for both customers and administrators, with clear roles and permissions to ensure smooth operation.

Each table in the system has been carefully designed to support fast, reliable access to critical information, such as ticket availability, purchase status, travel schedules, and user details. The database is structured in a way that enhances operational efficiency, supports resale functions, and maintains data consistency across the platform. The system is easy to navigate even for users who have limited technical skills. This management system supports:

- **Centralized Ticketing and User-Friendly Management:**
    1. Tables like Ticket, Bus, Train, and Plane allow users to book, view, and manage multiple types of transport from a single platform.
    2. The system interface is simple and intuitive, making it accessible even for users with limited technical skills.
- **Role-Based Access and Security:**
    1. The Admin and Customer tables define user roles, ensuring that only authorized users can perform specific actions like managing users or reselling tickets.
    2. Login credentials and foreign key-based control (Control table) provide structured user access and secure role-based interactions.
- **Enhanced Tracking and Resolution:**
    1. Every ticket and resale transaction are logged in the Ticket and Resell tables, ensuring full traceability of user activity.
    2. Admins can easily monitor and resolve disputes related to ticket ownership or payment using centralized ticket records.
- **Efficient Financial Handling:**
    1. The Resell table tracks resale prices, buyer and seller IDs, and ensures correct financial transfers between users.
    2. Pricing details in the Ticket table help customers understand travel costs clearly and reduce billing errors.
- **Challenges Faced During Development:**
    1. Implementing many-to-many relationships between Ticket and various transport modes (Bus, Train, Plane) required complex database design.
    2. Ensuring proper ticket ownership transfer and data integrity during resale was a difficult but crucial part of development.

- **Future Enhancements:**
    1. Add QR code-based digital tickets, mobile alerts for schedule changes, and contactless check-ins to improve user experience.
    2. Integrate digital wallets and user rating systems to increase trust, speed up transactions, and enhance overall system usability.

Having a Ticket Management System is essential to make travel easier, quicker, and more efficient for everyone. It removes the need for time-consuming booking procedures, paperwork, or dealing with unorganized schedules. Passengers can easily book, manage, or even resell their tickets, while admins can oversee transactions and transport services effectively.

Ultimately, it's about streamlining the process, minimizing confusion, and delivering a hassle-free experience so travelers can focus on their journey, and service providers can ensure smooth operations.

Tables and Entities:

To make this database system a success, we have used several tables to structure the system.

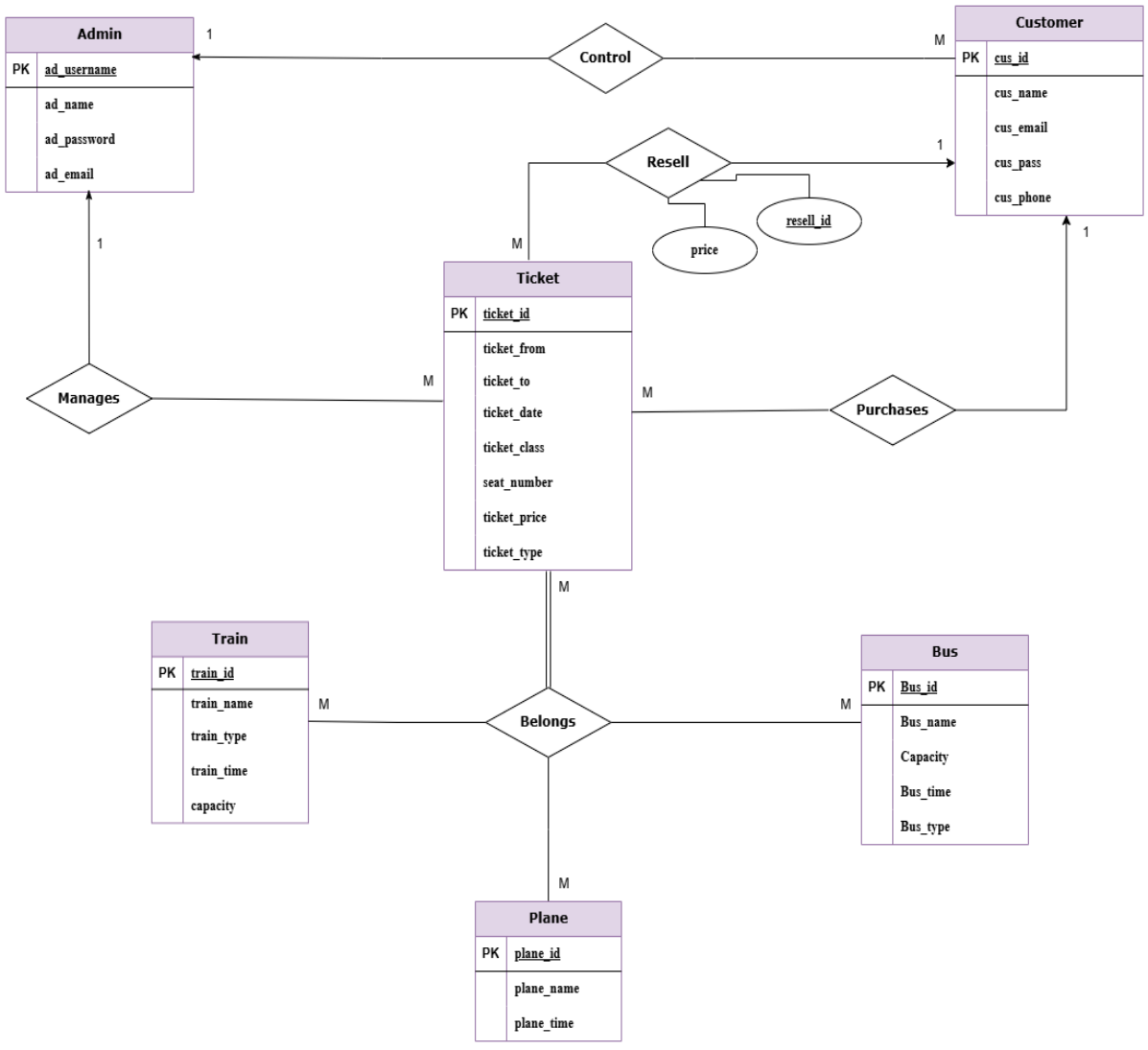
They are:

1. **Admin:**
    - **ad_username** (PK)
    - **ad_name, ad_password, ad_email**
    - **Primary Entity:** Represents the administrators of the system who are responsible for managing tickets and overseeing customer interactions. This table stores login credentials and essential contact details for access control.
2. **Customer:**
    - **cus_id** (PK)
    - **cus_name, cus_email, cus_pass, cus_phone**
    - **Primary Entity:** Represents individual users of the system who can book or resell tickets. It holds customer details such as name, email, phone number, and login information.
3. **Bus:**
    - **Bus_id** (PK)
    - **Bus_name, Capacity, Bus_time, Bus_type**
    - **Primary Entity:** Contains information about available buses in the system. It stores data such as the bus name, schedule, capacity, and type of service.

4. **Train:**
    - **train_id** (PK)
    - **train_name, train_type, train_time, capacity**
    - **Primary Entity:** Stores data related to train services offered in the system. Includes details like train type, timing, and seat capacity for bookings.
5. **Plane:**
    - **plane_id** (PK)
    - **plane_name, plane_time**
    - **Primary Entity:** Represents available plane services in the system. It includes flight names and scheduled times for travel.
6. **Ticket:**
    - **ticket_id** (PK)
    - **cus_id, ad_username, Bus_id, train_id, plane_id, ticket_from, ticket_to, ticket_date, ticket_class, seat_number, ticket_price, ticket_type**
    - **Foreign Keys:** cus_id references **Customer.cus_id**, ad_username references **Admin.ad_username,** Bus_id references **Bus.Bus_id**, train_id references **Train.train_id**, plane_id references **Plane.plane_id**
    - **Primary Entity:** Central table representing each travel ticket. Stores journey details, transport type, ticket class, seat info, pricing, and links to customer and admin for tracking and management.
7. **Control:**
    - **cus_id, ad_username**
    - **Foreign Keys:** cus_id references **Customer.cus_id**, ad_username references **Admin.ad_username**
    - **Relationship Table:** Establishes the connection between customers and their assigned admins. Implements a one-to-many relationship where each admin manages several customers.
8. **Reselling:**
    - **resell_id** (PK)
    - **buyer_cus_id, seller_cus_id, ticket_id, price**
    - **Foreign Keys:** buyer_cus_id references **Customer.cus_id**, seller_cus_id references **Customer.cus_id**, ticket_id references **Ticket.ticket_id**
    - **Primary Entity:** Records details of ticket resale transactions between customers. Stores buyer and seller information, ticket being resold, and updated pricing for transparency and ownership tracking.

ER Diagram:

This ER diagram visually represents the relationships between key entities such as Customers, Tickets, Trains, Buses, Planes, and Admins. It illustrates how customers purchase tickets for various modes of transportation, managed by admins, and how ticket reselling is controlled. The diagram ensures efficient management of ticket bookings, transportation schedules, and customer information by defining the data flow within the system. Entities like Customers and Trains are linked through Tickets, while Admins manage the overall system.



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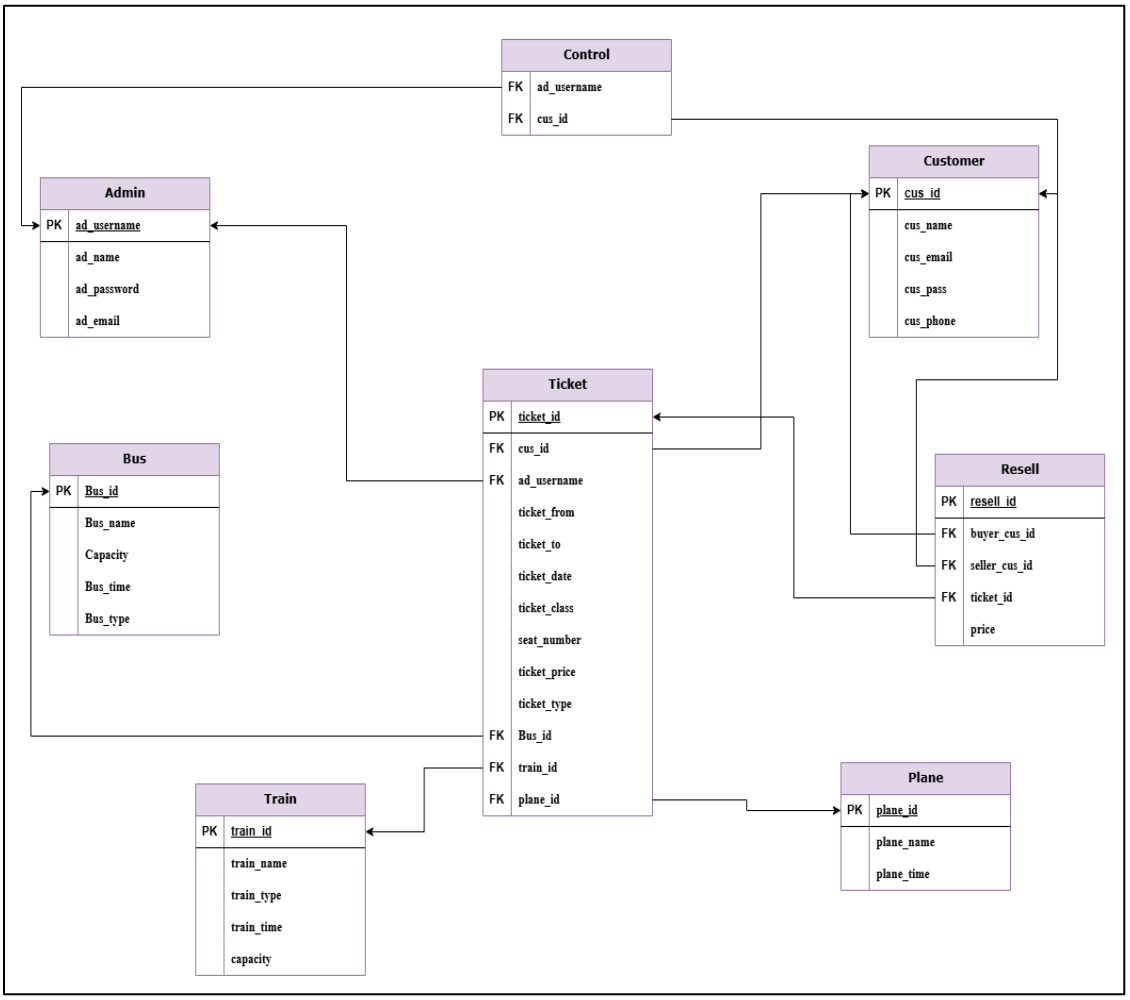
Schema Diagram:

This schema diagram provides a detailed structural view of the Ticket Management System's database. It defines the tables such as Customer, Admin, Ticket, Bus, Train, Plane, Resell, and Control and their key fields, primary keys, and foreign key relationships. The diagram shows how ticket information is connected to customers and various transportation modes, while also managing admin control and ticket reselling. By clearly outlining the organization of data and the links between tables, the schema diagram ensures efficient data storage, retrieval, and integrity within the system.



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Queries and Outputs:

Simple Queries:

1. Find all trains that are of AC type.

= SELECT * FROM Train WHERE train_type = 'AC';

Output:

train_id	train_name	train_type	train_time	capacity
101	Sundarban Express	AC	06:00 AM	500
103	Silk City Express	AC	08:30 AM	480
105	Tista Express	AC	10:00 AM	470
107	Parabat Express	AC	12:40 PM	490
109	Upakul Express	AC	03:10 PM	510
111	Jamuna Express	AC	05:45 PM	495

2. Count total number of tickets.

= SELECT COUNT(*) AS total_tickets FROM Ticket;

Output:

total_tickets
12

3. List the tickets sold by Admin 'fatema67'.

= SELECT * FROM Ticket WHERE ad_username = 'fatema67';

Output:

ticket_id	cus_id	ad_username	train_id	bus_id	plane_id	ticket_from	ticket_to	ticket_date	ticket_class	seat_number	ticket_price	ticket_type
101	1	fatema67	101	1	201	Dhaka	Chittagong	2025-05-01	Economy	E12	850.00	Train

4. List the ticket IDs and prices for tickets resold for more than 1000 BDT.

= SELECT ticket_id, price FROM Resell WHERE price > 1000;

Output:

ticket_id	price
105	2100.00
107	1850.00
109	1750.00

5. Find all the 'Non-AC' buses that have a capacity greater than 40.

= SELECT Bus_name, Capacity FROM Bus WHERE Bus_type = 'Non-AC' AND Capacity > 40;

Output:

Bus_name	Capacity
Utsab	45
Bandhan	50
Labbaik	56

Intermediate Queries:

6. **Show all the details of planes from the Plane table and sort them by the plane name in ascending order.**

= SELECT * FROM Plane order by plane_name asc;

Output:

plane_id	plane_name	plane_time
209	AeroLink	02:50 PM
205	Bangladesh Airlines Express	10:00 AM
210	BD Air Connect	04:00 PM
201	Biman Bangladesh Airlines	06:30 AM
212	CloudJet Airlines	06:45 PM
211	Eastern Air	05:20 PM
208	FlyFast	01:40 PM
206	Golden Wings	11:10 AM
203	Novoair	08:20 AM
204	Regent Airways	09:15 AM
207	Sky Air	12:30 PM
202	US-Bangla Airlines	07:45 AM

7. **Find the name of the bus with the highest capacity.**

= SELECT Bus_name FROM Bus WHERE Capacity = (SELECT MAX(Capacity) FROM Bus);

Output:

Bus_name
Labbaik

8. **Total number of tickets sold for each transport type.**

= SELECT ticket_type, COUNT(*) AS total FROM Ticket GROUP BY ticket_type;

Output:

ticket_type	total
Train	5
Bus	4
Air	3

9. Update plane time for plane_id 203.

= UPDATE Plane SET plane_time = '09:00 AM' WHERE plane_id = 203;

SELECT * FROM Plane;

Output:

plane_id	plane_name	plane_time
201	Biman Bangladesh Airlines	06:30 AM
202	US-Bangla Airlines	07:45 AM
203	Novoair	09:00 AM
204	Regent Airways	09:15 AM
205	Bangladesh Airlines Express	10:00 AM
206	Golden Wings	11:10 AM
207	Sky Air	12:30 PM
208	FlyFast	01:40 PM
209	AeroLink	02:50 PM
210	BD Air Connect	04:00 PM
211	Eastern Air	05:20 PM
212	CloudJet Airlines	06:45 PM

10. Add gender column to Customer table and show all data.

= ALTER TABLE Customer ADD gender VARCHAR(100);

SELECT * FROM Customer;

Output:

cus_id	cus_name	cus_email	cus_pass	cus_phone	gender
1	Rahul	rahul23@gmail.com	rahul123	01711000001	NULL
2	Sabina	sabina457@gmail.com	sabina321	01822000002	NULL
3	Muhit	muhit789@gmail.com	muhit456	01933000003	NULL
4	Sharmin	sharmin53@gmail.com	sharmin789	01644000004	NULL
5	Tanvir	tanvir2002@gmail.com	tanvir987	01555000005	NULL
6	Rafia	rafia456@gmail.com	rafia321	01366000006	NULL
7	Saiful	saiful123@gmail.com	saiful123	01477000007	NULL
8	Nusrat	nusrat990@gmail.com	nusrat456	01788000008	NULL
9	Adnan	adnan345@gmail.com	adnan789	01899000009	NULL
10	Sabrina	sabrina89@gmail.com	sabrina987	01900000010	NULL
11	Zubair	zubair63@gmail.com	zubair321	01611000011	NULL
12	Mim	mim29@gmail.com	mim123	01522000012	NULL

Hard Queries:

11. List all ticket details with customer names.

= SELECT Ticket.*, Customer.cus_nameFROM Ticket JOIN Customer ON Ticket.cus_id = Customer.cus_id;

Output:

ticket_id	cus_id	ad_username	train_id	bus_id	plane_id	ticket_from	ticket_to	ticket_date	ticket_class	seat_number	ticket_price	ticket_type	cus_name
101	1	fatema67	101	1	201	Dhaka	Chittagong	2025-05-01	Economy	E12	850.00	Train	Rahul
102	2	israt89	102	2	202	Dhaka	Sylhet	2025-05-02	Business	B4	1500.00	Bus	Sabina
103	3	tina567	103	3	203	Chittagong	Dhaka	2025-05-03	Economy	E15	900.00	Train	Muhit
104	4	mina34	104	4	204	Rajshahi	Dhaka	2025-05-04	Economy	E18	750.00	Bus	Sharmin
105	5	fatema53	105	5	205	Dhaka	Barisal	2025-05-05	Business	B2	2000.00	Air	Tanvir
106	6	karim45	106	6	206	Khulna	Dhaka	2025-05-06	Economy	E6	950.00	Train	Rafia
107	7	rahim23	107	7	207	Sylhet	Chittagong	2025-05-07	Business	B1	1800.00	Air	Saiful
108	8	sultana77	108	8	208	Dhaka	Cox's Bazar	2025-05-08	Economy	E10	1200.00	Bus	Nusrat
109	9	faria90	109	9	209	Chittagong	Khulna	2025-05-09	Business	B6	1700.00	Train	Adnan
110	10	nabila88	110	10	210	Dhaka	Jessore	2025-05-10	Economy	E9	800.00	Bus	Sabrina
111	11	hasan99	111	11	211	Barisal	Dhaka	2025-05-11	Economy	E13	850.00	Train	Zubair
112	12	sajjad60	112	12	212	Dhaka	Rangpur	2025-05-12	Business	B3	1600.00	Air	Mim

12. Show resold tickets with ticket type and buyer name.

= SELECT Resell.resell_id, Customer.cus_name, Ticket.ticket_type FROM Resell JOIN Customer ON Resell.buyer_cus_id = Customer.cus_id JOIN Ticket ON Resell.ticket_id = Ticket.ticket_id;

Output:

resell_id	cus_name	ticket_type
1	Sabina	Train
2	Sharmin	Train
3	Rafia	Air
4	Nusrat	Air
5	Sabrina	Train
6	Mim	Train

13. Find names of customers who bought plane tickets.

= SELECT c.cus_name FROM Customer cJOIN Ticket t ON c.cus_id = t.cus_id WHERE t.ticket_type = 'Air';

Output:

```
+----------+
| cus_name |
+----------+
| Tanvir   |
| Saiful   |
| Mim      |
+----------+
```

14. Get the average ticket price for each class (Economy/Business) and transportation type (Train/Bus/Air).

= SELECT ticket_class, ticket_type, AVG(ticket_price) AS avg_price FROM Ticket GROUP BY ticket_class, ticket_type;

Output:

```
+--------------+-------------+-------------+
| ticket_class | ticket_type | avg_price   |
+--------------+-------------+-------------+
| Economy      | Train       |  887.500000 |
| Business     | Bus         | 1500.000000 |
| Economy      | Bus         |  916.666667 |
| Business     | Air         | 1800.000000 |
| Business     | Train       | 1700.000000 |
+--------------+-------------+-------------+
```

15. Find the customer names and their phone numbers who have a ticket for the plane 'Biman Bangladesh Airlines'.

= SELECT Customer.cus_name, Customer.cus_phone FROM Customer JOIN Ticket ON Customer.cus_id = Ticket.cus_id JOIN Plane ON Ticket.plane_id = Plane.plane_id WHERE Plane.plane_name = 'Biman Bangladesh Airlines';

Output:

```
+----------+-------------+
| cus_name | cus_phone   |
+----------+-------------+
| Rahul    | 01711000001 |
+----------+-------------+
```

Conclusion:

In conclusion, the Ticket Management System combines modern database principles with practical features to create an efficient, scalable, and user-friendly platform. It reduces reliance on outdated booking systems and empowers users and administrators with real-time access and actionable insights, making the ticketing experience smoother, more reliable, and more flexible than ever before.

Drive Link:

https://drive.google.com/drive/folders/1JKQ39U3CcBKt_kSkE8cQs29ZYMDIpOLy?usp=drive_link