Airline Database Management System (DBMS)

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1. Introduction

1.1 Purpose
The purpose of this URS document is to specify and outline the user requirements for the Airline DBMS. It will serve as the foundation for subsequent system design, development, and testing activities.

1.2 Scope
The Airline DBMS will encompass functionalities related to passenger management, flight operations, crew management, ticketing, bookings, and airport logistics.

1.3 Glossary
- Entity: A distinct object (e.g., passenger, flight) in the database.
- DBMS: Database Management System.
- UI: User Interface.

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2. User Requirements

2.1 Passenger:
- The system should support CRUD (Create, Read, Update, Delete) operations for passenger profiles.
- System should offer a search feature for passenger details using parameters such as name, passport number, or flight.

2.2 Flight:

- Each flight entry should have details such as flight number, origin, destination, timings, and assigned aircraft.
- Flight details should be modifiable to accommodate rescheduling.

2.3 Aircraft:
- The database should store comprehensive details about each aircraft, including model, year of manufacture, maintenance history, and seating layout.
- The system should provide alerts for maintenance due for any aircraft.

2.4 Crew:
- Should support assignment and modification of crew members to specific flights.
- Allow querying of crew schedules, hours logged, and training history.

2.5 Ticket:
- Enable ticket issuance with a unique ticket ID and associated seat allocation.
- Tickets should have states (e.g., Issued, Checked-in, Boarded, Cancelled).

2.6 Booking:
- System should handle booking statuses (e.g., Reserved, Confirmed, Cancelled).
- Facilitate modification or cancellation of bookings.

2.7 Airport:
- Store and manage comprehensive airport data, including traffic capacity, facilities available, and associated costs.
- Track usage and occupancy of runways and gates.

2.8 Schedule:
- Centralised display of all flights, statuses (e.g., On Time, Delayed, Cancelled), and gate numbers.
- Support real-time updates and notifications for schedule changes.

2.9 Date:
- Utilise a standard date-time format (e.g., ISO 8601).
- Enable schedule views in daily, weekly, and monthly formats.

2.10 Luggage:
- Track each piece of luggage from check-in through delivery using a unique tracking ID.
- Support lodging and tracking of lost luggage reports.

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3. Functional Requirements

3.1 Reporting:
- Generate reports on flight occupancy, revenues, frequent flyers, and crew performance.
- Provide analytics on flight punctuality and luggage handling efficiencies.

3.2 Notifications:
- Push real-time updates to users and crew regarding flight statuses.
- Notify relevant personnel about emergency situations or significant disruptions.

3.3 Integration:
- Seamless integration with online booking portals and check-in kiosks.
- Support for integrating with air traffic control systems for real-time flight tracking.

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4. Non-Functional Requirements

4.1 Performance:

- The system should be responsive with minimal latency.
- Capable of handling high transaction volumes, especially during peak booking times.

4.2 Reliability:
- Uptime of 99.9% is expected.
- Regular backups and disaster recovery mechanisms should be in place.

4.3 Security:
- Compliance with data protection regulations.
- Multi-factor authentication and encryption of sensitive data.

4.4 User Interface:
- An intuitive UI for easy navigation and operation.
- Accessibility support for differently-abled users.

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5. Future Considerations

5.1 Scalability:
- The system should be scalable to handle the growth of the airline, additional flights, and increased user volume.

5.2 Upgradeability:
- The DBMS should be built in a modular fashion, allowing for easy upgrades or the addition of new functionalities.

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6. Approval & Amendments

Entities and their Attributes

Passenger

- PassengerID (Primary Key)
- Name
- Date of birth
- PassportNumber
- Email
- Phone

Flight

- FlightID (Primary key)
- Origin
- Destination
- Arrival Time
- Departure Time
- Airline Company
- AircraftID (Foreign Key)

Aircraft

- AircraftID (Primary Key)
- Model
- Manufacturer
- Seats

Crew

- CrewID (Primary Key)
- Name
- Position
- Experience

Ticket

- TicketNumber (Primary Key)
- FlightID (Foreign Key)
- PassengerID (Foreign Key)
- SeatNumber
- Price

Booking

- BookingID (Primary Key)
- PassengerID (Foreign Key)
- FlightID (Foreign Key)
- DateOfBooking

Airport

- AirportCode (Primary Key)
- City
- Country
- Terminals

Schedule

- ScheduleID (Primary Key)
- FlightID (Foreign Key)
- GateID (Foreign Key)
- DepartureTime
- ArrivalTime

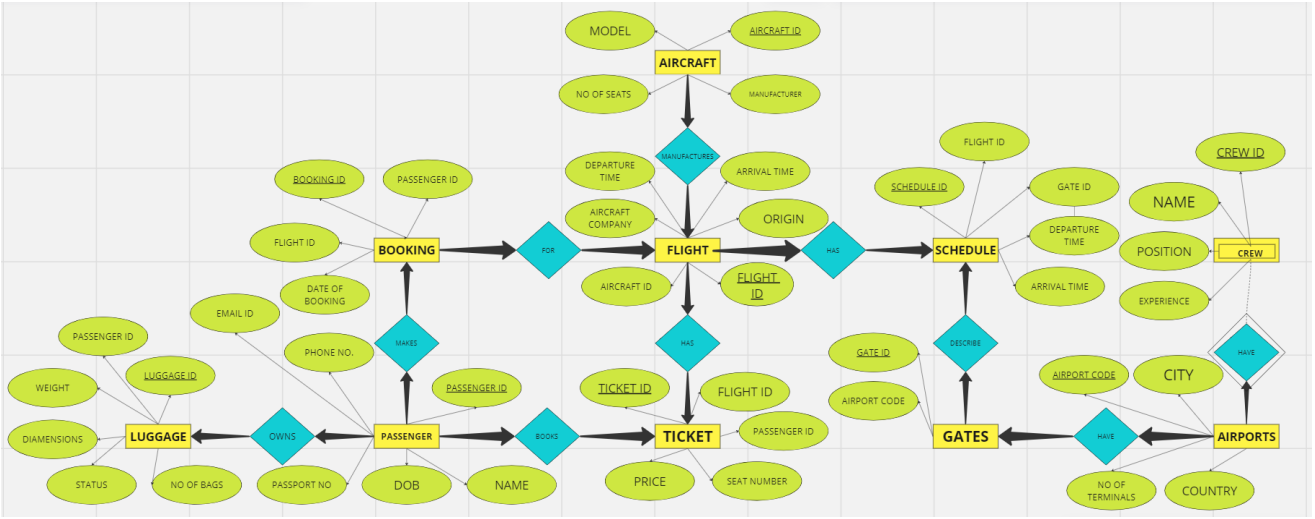
Gate

- GateID (Primary Key)
- Airport Code

Luggage

- LuggageID (Primary Key)
- PassengerID (Foreign Key)
- Weight
- Dimensions
- Status
- No. of bags

ER DIAGRAM



RELATIONAL SCHEMA