AIRLINE MANAGEMENT SYSTEM

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Maximum Marks	

Chapter-3

3 Requirement Analysis

 Requirement Analysis: Airlines Management System on Salesforce

 Functional Requirements

These define **what the system should do**:

- ☒ **Flight Management**
  - Create, update, and delete flight schedules
  - Assign crew and aircraft dynamically
  - Alert users about delays or cancellations
- **Reservation and Ticketing**
  - Real-time booking and cancellation
  - Multiple payment gateway integration
  - E-tickets and boarding pass generation
- **Customer Relationship Management (CRM)**
  - Track customer profiles, preferences, and history
  - Segment passengers based on travel behavior
  - Send personalized communications via email/SMS
- **Loyalty Program Module**
  - Enroll members and assign tiers
  - Manage points, rewards, and redemption
  - Generate promotions and upgrade campaigns
- **Fleet and Crew Operations**
  - Schedule maintenance, track aircraft health
  - Assign crew shifts and monitor compliance
  - Log staff performance and feedback
- **Analytics and Reporting**
  - Generate dashboards for ticket sales, flight occupancy
  - Predict demand trends and customer satisfaction
  - Export reports for stakeholders

 Non-Functional Requirements

These define **how the system should perform**:

- ⚡ **Scalability**: Support increasing passenger and data volume as the airline grows
- ☐ **Security**: Role-based access control, encryption, GDPR and aviation compliance
- ☐ **Usability**: Intuitive UX using Salesforce Lightning for both passengers and staff
- ☐ **Performance**: Minimal latency in data retrieval and booking confirmation
- ☐ **Availability**: 24/7 uptime with disaster recovery and backup protocols
- ☐ **Integration**: Ability to connect with GDS systems, airport APIs, payment systems

☐ Stakeholders

- Airline Operations Manager
- Marketing and Customer Experience Teams
- Flight Crew and Maintenance Staff
- Passengers and Loyalty Members
- IT Administrators

3.1 **Journey Map: Passenger Experience**

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Phase	Actions	Thoughts & Feelings	Touchpoints / System Features	Pain Points	Opportunities
Search & Plan	Browses flights, checks fares	"I want the best deal." "I need flexibility."	Website, Mobile App (Salesforce Experience Cloud)	Info overload, confusing filters	Personalized offers using CRM segmentation
Booking	Selects flight, enters details	"I hope this is secure." "Is my data safe?"	Reservation portal, Payment gateway (Salesforce + APIs)	Slow page load, limited options	Seamless UI with Lightning Components
Pre-Departure	Checks itinerary, upgrades seat	"Did they change my gate?" "What are my benefits?"	Email/SMS alerts, Loyalty dashboard, App notifications	Unclear loyalty benefits	Dynamic notifications using Marketing Cloud
Check-In	Mobile/web check-in, baggage info	"I hope this is fast." "Is my bag safe?"	E-ticket, Digital boarding pass, Chatbot support	Baggage policy confusion	Conversational bot support via Service Cloud
In-Flight	Uses Wi-Fi, requests services	"Wish I could upgrade." "I need support."	Crew app interface, Passenger feedback channel	Service inconsistency	AI-driven crew coordination and feedback loops
Arrival	Gets baggage, leaves feedback	"Hope my review helps." "Was this trip worth it?"	Feedback form, CRM profile updates	No acknowledgment of feedback	Sentiment analysis with Salesforce Einstein

☐ **Key Takeaways:**

- Use data-driven personalization to anticipate passenger needs.
- Improve real-time communication through automated alerts and omnichannel support.
- Strengthen post-flight loyalty engagement with meaningful feedback loops.

Would you like a Journey Map for airline staff or crew managers next? I can sketch that out too! □✦

3.2 Software Requirements

⬜ Functional Requirements

These define what the system should do:

- **Flight Management**
  - Create and manage flight records (Flight ID, Name, Company)
  - Schedule flights with source, destination, departure/arrival times
  - Track flight status: Open, In Progress, Closed, Canceled
- **Pilot Management**
  - Maintain pilot profiles with experience levels and contact info
  - Assign pilots to scheduled flights
  - Validate age and experience criteria
- **Reservation System**
  - Search flights by city, date, and time
  - Book, modify, and cancel reservations
  - Handle passenger details and payment info
- **Notifications**
  - Email alerts for flight scheduling, departure, arrival, and cancellations
  - Notify pilots of their assignments
- **Reports & Dashboards**
  - Daily and monthly flight schedules
  - Pie charts for flight status (Closed vs. Canceled)
  - Historical flight data reports

⬜ Non-Functional Requirements

These define how the system performs:

- **Security**
  - Role-based access control (e.g., CEO, Manager, Operators)
  - Data sharing rules based on flight destination
  - Encryption for sensitive data
- **Performance**

- o Fast response time for flight searches and bookings
- o Robust error handling and fault tolerance
- **Usability**
  - o Intuitive interface for users with varying technical skills
  - o Mobile-friendly design for on-the-go access
- **Scalability**
  - o Support for growing number of flights, users, and data
  - o Easy integration with third-party systems

☐ Salesforce-Specific Setup

- **Objects & Relationships**
  - o Custom objects: Flight, FlightSchedule, Pilot, PilotSchedule
  - o Master-detail and lookup relationships for data integrity
- **Validation Rules**
  - o Prevent same source and destination
  - o Ensure logical departure and arrival times
- **Workflow Rules**
  - o Automate status updates and email alerts
- **User Roles & Hierarchy**
  - o Define user roles and reporting structure
  - o Restrict data access based on role
- **Public Folders & Sharing**
  - o Share flight records based on arrival city
  - o Assign users to city-specific folders

3.3 Data Flow Diagrams

☐ DFD Level 0 – Context Diagram

This is the highest-level view of the system:

- **External Entities**:
  - o Passenger
  - o Pilot
  - o Admin
- **Main Process**:
  - o Airline Management System
- **Data Flows**:
  - o Booking requests, flight schedules, pilot assignments, notifications
- **Data Stores**:
  - o Flight Database
  - o Reservation Records
  - o Pilot Profiles

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This level shows how external users interact with the system as a single process.

☐ **DFD Level 1 – Major Subsystems**

Breaks the system into core modules:

Subprocess	Inputs	Outputs	Data Stores
Flight Scheduling	Flight details	Schedule confirmation	Flight DB
Reservation System	Passenger info	Schedule confirmation	Reservation DB
Pilot Assignment	Pilot profiles	Assignment notice	Pilot DB
Notification Engine	Events	Email/SMS alerts	—

Each subprocess handles a specific function and interacts with relevant data stores.

☐ **DFD Level 2 – Detailed Processes**

Zooms into each module:

- **Reservation System**:
  - Search Flights → Select Flight → Enter Passenger Info → Confirm Booking
- **Flight Scheduling**:
  - Create Flight → Assign Route → Set Departure/Arrival → Save Schedule

- **Pilot Assignment**:
    - Select Flight → Match Pilot → Validate Experience → Notify Pilot
    - This level helps developers understand the internal logic and data movement.

3.4 Technology Stack

☁ **Core Platform**

- **Salesforce CRM**: Central platform for managing flights, pilots, reservations, and user roles
- **Salesforce Lightning Experience**: Modern UI for building responsive apps
- **Salesforce Apex**: Server-side programming language for custom logic
- **Visualforce**: For creating custom user interfaces (if Lightning isn't used)
- **SOQL (Salesforce Object Query Language)**: For querying Salesforce data

☐ **Integration & Middleware**

- **Salesforce Flow / Process Builder**: Automate workflows like flight status updates and pilot notifications
- **REST/SOAP APIs**: Integrate with external systems (e.g., payment gateways, weather services)
- **MuleSoft**: For enterprise-level integrations and API management
- **Heroku (optional)**: Host external services or microservices that complement Salesforce

☐ **Data & Reporting**

- **Salesforce Reports & Dashboards**: Visualize flight schedules, cancellations, and pilot assignments
- **Einstein Analytics (Tableau CRM)**: Advanced analytics and predictive insights
- **Data Loader / Data Import Wizard**: For bulk data operations

☐ **Security & Access Control**

- **Role Hierarchy & Profiles**: Define access levels for CEO, Managers, Operators
- **Permission Sets**: Grant additional access without changing profiles
- **Shield Platform Encryption**: Protect sensitive passenger and pilot data

☐ **User Experience & Mobility**

- **Salesforce Mobile App**: Access system on-the-go
- **Lightning App Builder**: Drag-and-drop interface customization
- **Custom Tabs & Components**: Tailor navigation and layout

☐ **Testing & Deployment**

- **Sandbox Environments**: For development and testing
- **Change Sets / Salesforce DX**: Deploy metadata between orgs
- **Jenkins / GitHub Actions**: CI/CD pipelines for automated deployment