Misr University for Science & Technology

College of Information Technology

Computer Science Department

CS341 (Sec: F)
Project Title: Airline Booking System

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1.1 System Domain

The domain of an airline booking system encompasses various key components. It involves the management of flights, including information about schedules, routes, and aircraft details. The system must provide real-time data on seat availability and allow users to make reservations and book seats for their chosen flights. User authentication and profile management are integral, accommodating passengers, travel agents, and airline staff with distinct levels of access. The system also incorporates secure payment processing, generating booking confirmations and electronic tickets upon successful transactions. Handling cancellations, modifications, and refunds in accordance with airline policies is crucial. Integration with external systems, such as global distribution systems (GDS), enhances the system's capabilities. Notification features keep users informed about flight status and changes through various channels. Security measures and compliance with aviation regulations ensure data protection. Additionally, the system may offer reporting and analytics functionalities to analyze booking trends, performance, and customer behavior. Addressing these aspects within the domain is essential for creating a comprehensive and effective airline booking system.

1.2   Requirements Specifications

Glossary

Term	Definition
User	A person who uses the system to book and check information about flights
Travel agents	A travel agent is a professional or a business that assists individuals or groups in planning and booking travel arrangements
GDS	A computerized network system that facilitates the transactions and information exchange within the travel industry

Table 1.1: Glossary

1.3   Functional Requirements Specification

- Users must register for an account.
- Users must authenticate themselves through a secure login process.
- Users must be able to update their profiles.
- Users must be able to check seat availability for selected flights.
- Users must receive payment confirmation for successful transactions.
- Users must have the option to request cancellations or modifications to their bookings.
- Users can opt-in to receive SMS alerts for critical updates.
- The system can provide different user roles for passengers, travel agents, and airline staff.
- The system must display available flights based on user input.
- The system can offer advanced search options for users to filter flights based on preferences.
- The system must update flight information in real-time.
- The system must allow users to select and book seats for their preferred flights.
- The system must generate electronic tickets for confirmed bookings.
- The system must integrate a secure payment gateway for processing transactions.
- The system can provide a secure payment history for users.
- The system must follow airline policies for handling cancellations and modifications.
- The system must integrate with Global Distribution Systems (GDS) to expand the range of available flights.
- The system must send email notifications for booking confirmations, changes, and flight updates.
- The system must encrypt sensitive user data to ensure security.
- The system must be designed to support users with disabilities.

1.4   Non-Functional Requirements

- The system should be easy to use without any previous prerequisites.
- Response times must be quick for user interactions.
- The system should handle a specified number of transactions per second.
- The system must be available 24/7.
- Fault tolerance should ensure critical functions during failures.

-The system must be scalable to accommodate an increasing number of users, flights, and transactions.

1.5   Unified Modeling Language (UML)
1.5.1   Use case modeling
1.5.1.1   Use case description

1.   Book ticket online

Function	Book ticket online
Description	This use case describes the process of a user booking an airline ticket online through a web-based booking system.
Input	The online ticket booking process involves several key inputs. Firstly, the passenger provides personal details such as their name and contact information. Subsequently, they input their flight preferences, including the desired date, destination, class, and the number of passengers. Finally, the passenger enters payment information, which typically includes credit card details for transaction processing.
Output	Upon successful completion of the online ticket booking process, several outputs are generated. The primary output is a booking confirmation, acknowledging the successful reservation. Additionally, the system generates an electronic ticket, serving as the official document for the booked flight. These outputs are crucial for both the passenger and the booking system to track and confirm the reservation.
Action	The actions involved in the online ticket booking process encompass a series of steps. Firstly, the passenger selects a preferred flight based on specific criteria. Following this, they provide personal information and choose seats for the journey. The passenger then confirms the booking details, initiating the payment process. Subsequently, they enter their credit card information, and the system securely processes the payment. Upon successful payment, the booking system generates an electronic ticket. Finally, the system sends a confirmation notification to the passenger, completing the booking process.
Pre-condition	-The passenger has access to the internet and a device capable of making online transactions. -The passenger has selected a flight based on preferences.
Post condition	-The booking system records the reservation details.

	-The passenger receives a booking confirmation along with the electronic ticket. -The system updates seat availability and flight records.

2. Cancel online booking:

Function	Cancel online booking
Description	Process by which a passenger cancels a previously made booking through the airline's online booking system.
Input	Canceling an online booking involves specific inputs from the passenger. Initially, the passenger must provide identification details, such as their name and booking reference number. Additionally, they input the reason for cancellation, which could include personal reasons, schedule changes, or unforeseen circumstances. These inputs are crucial for the system to identify and process the cancellation request accurately.
Output	Upon successful cancellation of an online booking, the primary output is a cancellation confirmation. This confirmation serves as proof that the booking has been successfully canceled. Additionally, the system may issue a refund confirmation if applicable. These outputs are essential for both the passenger and the booking system to confirm the cancellation and manage associated changes.
Action	The actions involved in canceling an online booking include the passenger accessing the booking management section of the website or application. Here, they enter their identification details and booking reference number. Subsequently, the passenger selects the booking to be canceled and provides a reason for cancellation. After confirming the cancellation, the system processes the request, updates relevant records, and issues a cancellation confirmation. If applicable, the system calculates and processes a refund.
Pre-condition	-The passenger has a valid booking reference number for the reservation to be canceled. -The passenger has a clear reason for canceling the reservation
Post condition	-The booking system updates its records, marking the canceled reservation. -The passenger receives a cancellation confirmation. -If applicable, the system processes a refund. -Financial transactions are updated to reflect the refund. -Seat availability and flight records are adjusted to reflect the cancellation, ensuring accurate data for future bookings.

3. Book via agent:

Function	Book via Agent
Description	The "Book via Agent" use case in the Airplane Booking System involves a customer contacting an agent to book an airplane ticket. The agent assists the customer in the booking process, ensuring a seamless and efficient experience.
Input	The agent has to enter the customer details (full name and contact information), then enter the flight details (departure and arrival location, travel dates, passenger information and cabin class) then enter the preferred booking options like seat preferences or special requests such as dietary restrictions or wheelchair assistance.
Output	If the process is valid the system will show the payment confirmation including details of the payment method, and the ticket confirmation with the booking reference number.
Action	The customer contacts the agent, either by phone, email, or in-person visit, to request the booking of an airplane ticket, then the agent collects necessary information from the customer, including their full name, contact details, desired departure and arrival airports, travel dates, passenger details, and cabin class preferences, then the agent checks the availability of flights based on the customer's preferences, considering factors such as airline, schedule, and pricing. If suitable flights are available, the agent reserves the requested flight and passenger seats in the airline's reservation system. Then the agent collects the customer's payment details and processes the payment using the chosen payment method. The agent provides the customer with a confirmation of the booked ticket, including a unique booking reference number and the all details, and share it with the customer via email or communication channels.
Pre-condition	- The agent is available and accessible to handle the customer's booking request. - Flights matching the customer's preferences and travel details are available for booking. - The customer provides accurate and valid information required for the booking process.
Post condition	The customer's requested flight is successfully booked and reserved. - The customer receives confirmation of the booked ticket, along with a unique booking reference number.

	- Payment for the ticket is successfully processed.

4. Cancel ticket via agent:

Function	Cancel Ticket via Agent
Description	The "Cancel Ticket via Agent" use case involves a customer contacting an agent to cancel a previously booked airplane ticket. The agent assists the customer in the cancellation process, ensuring a smooth and hassle-free experience.
Input	The agent has to enter the customer details (full name and contact information), then enter the booking reference number and flight details
Output	If the process is valid the system will show the cancellation confirmation and refund details (if applicable)
Action	The customer contacts the agent, either by phone, email, or in-person visit, to request the cancellation of a previously booked airplane ticket, then the agent collects necessary information from the customer, including their full name, contact details, and the booking reference number of the ticket to be canceled. Then the agent verifies the ticket details by cross-checking the provided booking reference number and customer information. If the ticket is eligible for cancellation, the agent proceeds with the cancellation process. The agent initiates the cancellation request in the airline's reservation system, following the necessary procedures and policies. If a refund is applicable based on the ticket's fare rules and cancellation policy, the agent initiates the refund process. The agent provides the customer with information regarding the refund amount and the expected timeline for the refund to be processed. The agent provides the customer with a confirmation of the ticket cancellation, acknowledging the successful cancellation of the ticket.
Pre-condition	- The agent is available and accessible to handle the customer's cancellation request. - The customer possesses a valid booking reference number for the ticket to be canceled. - The ticket is eligible for cancellation based on the airline's fare rules and cancellation policy.
Post condition	- The customer's ticket is successfully canceled, and the booking is updated accordingly. - If applicable, the customer is informed about any refund or credit due to them

	for the canceled ticket.
	- The agent updates the airline's reservation system with the cancellation details.
	- The customer receives a confirmation of the ticket cancellation and any related refund information.
	- The customer's refund, if applicable, is processed according to the airline's refund policy and timeline.

5. Cancel ticket at counter:

Function	Cancel ticket at counter
Description	This use case involves the process of canceling a ticket at a physical counter, where counter staff interact with the ticketing system to process the cancellation.
Input	To cancel a ticket at the counter, the counter staff relies on a simple set of inputs. The customer provides the Ticket ID associated with the ticket they wish to cancel. Optionally, the counter staff may request additional customer information for identity verification. These inputs are essential for the counter staff to initiate the cancellation process within the ticketing system accurately.
Output	After canceling a ticket at the counter, the system provides the customer with a clear confirmation of the canceled ticket. If a refund is applicable, the system also communicates the relevant refund details to the customer. Concurrently, the counter staff ensures that details of the canceled ticket are securely stored within the system for future reference. These straightforward outputs serve to inform the customer about the cancellation status and maintain organized records within the system.
Action	To cancel a ticket at the counter, the staff, logged in, takes the customer's request. They enter the Ticket ID, check its validity, and if valid, update it to "canceled." The system might start a refund. The staff confirms the cancellation to the customer, keeps a record, and that's it. If the ticket can't be canceled, both know, and if there are tech issues, the staff follows the right steps. It's a straightforward process for canceling a ticket at the counter.
Pre-condition	Counter staff is logged into the ticketing system.
Post condition	Counter staff receives a customer's request to cancel a ticket.

6. Book at counter:

Function	Book at counter
Description	This use case involves the process of booking a ticket at a physical counter, where counter staff interact with the ticketing system to facilitate the booking.
Input	To book a ticket at the counter, the customer provides basic information such as their name and details about their journey, including the destination, date, and time. Additionally, the customer submits their payment information to complete the booking process. These inputs are essential for the counter staff to enter into the ticketing system and facilitate the reservation.
Output	Upon successful completion of the ticket booking at the counter, the customer receives a confirmation of the booked ticket. Additionally, the system generates a printed or electronic ticket, which is handed over to the customer by the counter staff. These outputs ensure that the customer has tangible proof of their reservation for the upcoming journey.
Action	The counter staff, logged into the system, helps the customer with their ticket booking. The customer shares journey details, and the staff enters this into the system. After processing the payment, the system confirms the booking and generates a ticket. The staff hands over this confirmed ticket to the customer, completing the process. The system also updates its records with the new booking information. This simple sequence ensures a smooth ticket booking experience at the counter.
Pre-condition	Counter staff is logged into the ticketing system
Post condition	-System gets updated -Customer gets a confirmed ticket -Counter staff keeps a record
Pre-condition	The student has to enter the username and password and his ID and the teacher has to set his grades.
Post condition	The student will see his grades.

1.6   Use Case Diagram

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    └───────────────┘              │cancel flight if│
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    │ enter payment │                      ▼
    │  information  │              Yes──◇──No
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  │information │            │ reservation   │
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  │choose flight│          ┌───────────────┐
  └───────────┘            │cancel flight if│
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  │ payment   │             Yes ◇ No
  │information│             ┌────┴────┐
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   ▼       ▼         │  flight   │ │  flights  │
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     │give personal │                      │    give      │
     │ information  │                      │ reservation  │
     └──────────────┘                      │ information  │
             │                             └──────────────┘
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     ┌──────────────┐                             ▼
     │choose flight │                      ┌──────────────┐
     └──────────────┘                      │cancel flight if│
             │                             │  available   │
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     ┌──────────────┐                             │
     │   payment    │                             ▼
     │ information  │                      Yes ◇ No
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     No ◇ Yes                      ┌──────────┐  ┌──────────┐
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User

- name: string
- Email: string
- password: string
- age: int
- phone number: int
- ID: int

+ login():
+ logout():
+ update_password():
+ search_flights():
+ book_flight():
+ cancel_booking():
+ make_payment():
+ geting_history():

Customer

- customerID: int
- loyaletyPoints: int

+ Update_profile_info():

counter

- staffID: int
- staff_name: string

+ login():
+ logout():
+ update_password():
+ search_flights():
+ book_flight():
+ cancel_booking():
+ make_payment():
+ geting_history():

travel agent

- agentID: int
- agency_name: string

+ get_agancyID():
+ get_agency_name():

flight

- flight_Number: int
- departure_Airport: string
- Arrival_Airport: string
- Departure_DateTime: int
- Arrival_DateTime: int
- ticket_Price: int

+ get_flight_details():
+ available_seats():
+ flight_availability():

books a ticket >

books a ticket >

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