Md Labeeb Hasan

Joseph Heifner

Eugene Ruiz

Professor Ceh-Varela

CSCI 2210 - Project Stage 1

2/8/2026

System Overview

For our project, we have selected the Airline Management System. The software for this system will allow customers to interface in order to purchase airline tickets through bookings for scheduled flights, becoming passengers of the airline. Sales and ticketing processes will be available for new customers who will enter their information (e.g., ID, credit card details) in order to make purchases. The system will support back-end functions used by airline staff for managing airline operations, including but not limited to flight manifests, crew assignments, status checks/updates, asset tracking, customer claims processing, fleet management, expense auditing and accounting, security oversight, weather assessments, and general administration. Login credentials and roles-based (permissions and authentication by role) access security concepts will be present throughout the system to ensure only secure system access occurs. The system is made up of 9 fundamental classes, where additional relationships will be derived and refined as the system is rolled out. The following provides class definitions for each of the core entities:

Mandatory Entities

1. Passenger: The traveler on a Flight and the customer of the Airline. This individual will create Bookings for themselves. Passengers will:
    - Holds personal information such as their name, email, phone number, passport, and payment info (card number, exp, PIN, etc.).
    - Create, review, or cancel Bookings.
    - Be associated with one or more Bookings.
2. Staff: The staff are the Employees of the Airline, such as the Pilots, Cabin Crew, Ground Staff, etc. Staff will handle the personnel responsible for manning and supporting Flights, maintaining the Airport facilities, and addressing Passenger concerns before, during, and after boarding/travel. Staff can:
    - Be assigned to Flights (e.g., crew roster).

- Perform role-specific tasks (fly, serve, check-in, process baggage claims, etc.).
- Retain staff-specific info (Employee ID, Role, Department).

3. Flight: Specific flight instances such as takeoffs and landings. This will run travel operations linked to Schedules, Bookings, Aircrafts, and the Airport terminals. Flights will:
    - Follow a Schedule.
    - Be assigned an Aircraft and..
    - Depart from, and arrive at, Airports.
    - Manage Timezones for an on-time itinerary.
    - Have a value in Bookings for many confirmations, or zero.
    - Track seating capacities and resolve errors such as overbooking.
    - Track status (Scheduled, Delayed, Cancelled, etc.).
    - Be able to receive/check Weather Conditions.
4. Airline: The company operating Flights. They own the fleet, manage Routes, and plan operations for the organization. Airline will:
    - Owns and manages Aircraft.
    - Operates Flights and associated Routes.
    - Provides business identity (codes, names, headquarters).
5. Schedule: The template flight patterns, recurring on a regular basis (e.g., weekly). This needs to support flight planning by Staff, as well as automatically generate Flight instances. Schedules must be persistent, i.e., if a Flight is Cancelled the Schedule will remain in place. Schedules must:
    - Define recurring departure/arrival times and days.
    - Generate Flight instances.
    - Have a template for route/timing standards.
6. Booking: This deals with the reservation for a Seat on a Flight, including for Cabin location((for service class: Economy, Business, First, etc.). Booking should deal with passenger reservations, payments, and display the Status of Flights. It's important that Booking acts exclusive to its Flight, because if the Flight is modified (deleted, cancelled, etc.), then the Bookings for the Flight will be invalid; Bookings don't change Flights when their Flight is changed, so that the only way to change a Booking is to create a new one from another Flight. Bookings will:
    - Link each Passenger to a Flight.
    - Track booking Date, Status (Confirmed, Pending, Cancelled, etc.), and Price.
    - Have a value in Baggage for many items, or zero.
    - Be able to confirm or cancel reservations based on the Passenger.

Proposed Entities

7. Aircraft: The planes and aerial vehicles of the Airline's fleet. This will separate craft-specific information from Flight, and can be used by Staff if maintenance is necessary for the vehicles. Should be accessible, as needed, as an asset of the Airline. The system will log vehicle models, capacities (i.e., seating), and statuses (e.g., whether ready or grounded). Aircraft will:
    - Carry passengers on assigned Flights.
    - Track maintenance status and seat capacity.
    - Assigned to, or reassigned from, Flights.
8. Airport: The physical airport center, including origin and destination locations. This will provide location data that validates Schedules and Bookings. Airport will
    - Serve as departure and arrival locations for Flights.
    - Hold Airport codes (e.g., LAX), name, city, and country information.
    - Act as a shared reference for multiple Flights.
9. Baggage: Any of the checked or carry-on luggage declared in the Booking. Baggage will handle movement, tracking, weight limits, and any claims made on the various types of luggage being taken on by Passengers. Baggage can:
    - Be put into the system by Booking.
    - Track the weight, type (Checked/Carry On), tag number, and status (Checked In, Loaded, Claimed, Lost) of its luggage items.
    - Support tracking and status updates throughout the Flight..