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Magis Air

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CSCI 41: Information Management

Table of Contents

1.1 Description of the System

The database system is designed for Magic Air to keep track of (1) flights, (2) flight schedules, (3) flight bookings, (4) flight routes, and (5) crew assignments.

Flights are defined by a flight number, with each flight composed of one or more routes. Flights can either be nonstop or direct, with direct flights including at least one stopover and non-stop flights having no stopovers (Singapore Airlines). Cities in the system serve as either origin or destination points for flights.

The system also maintains data on flight routes, where each city has a single airport and can be added without active flights initially. Routes between cities store travel times, and flights may have stopovers, though the system only records the origin and final destination for scheduling purposes. Travel time from one city to another is variable because it depends on which flights the passenger chooses to book. However, routes have fixed travel time and scheduled flights have fixed durations because Magis Air always departs and arrives on time.

Magis Air crew can be assigned to a scheduled flight, with each assigned crew member having a single specific role and every scheduled flight having the necessary personnel on board. Crew members can be new hires who have not yet been assigned to flights.

For passenger management, passengers can book flights and avail additional items, such as extra baggage or terminal services, for their trip. The booking system records the flight itinerary and calculates the total cost based on flight tickets and additional items availed. Passengers can also book different flights to reach cities that may not be serviced by direct flights.

In addition, the database system supports the generation of reports in the future. A ticket sales report can be generated by querying flight tickets that were booked from a flight booking with the Book_Date within the relevant period of time. A report for the assignments of a particular crew member can be made by getting the crew data using their Crew_ID and querying scheduled flights that have departed and arrived within the relevant period that is related to that crew member. Similarly, a travel history can be generated for a specific passenger by looking up their entry using their passport number, then getting all of their flight tickets from all of their flight bookings and sorting them by departure.

Assumptions

Flight Routes

- Each city served by Magis Air is limited to one airport.
- Cities can be added to the flight network even if no flights are currently departing from or arriving in them.

Flight Schedules

- Each scheduled flight's departure time acts as a partial identifier, as no flight can depart from the same location at the same time more than once.

Flight Booking

- A passenger may have multiple flight bookings under their name.
- Passengers can choose whether or not to purchase additional items as part of their booking.
- Every flight booking must include at least one flight ticket.
- The total cost of a flight booking is calculated based on the price of the flight ticket(s) and any additional items selected.
- Flights can be scheduled before any tickets are sold.
- Additional items are identified by their type, and the same item can be added across multiple bookings.
- Passengers have the option to book multiple different flights to serve as a connecting flight in order to reach destinations that are not accessible via direct or non-stop flights.
- To be recognized as a passenger in the system, an individual must complete a flight booking.
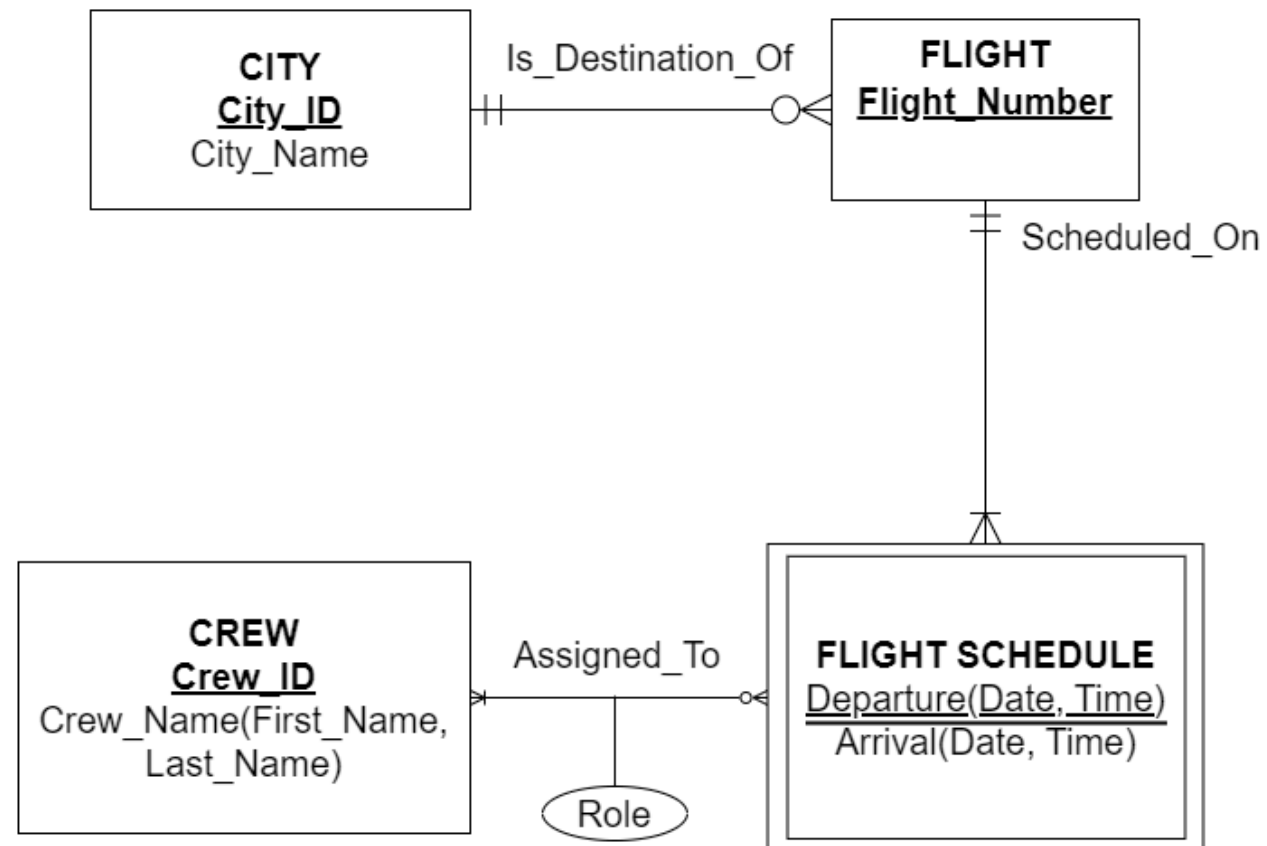
Crew Assignments

- Once assigned, the crew for a scheduled flight remains unchanged, even if the flight includes stopovers.
- Every scheduled flight must have at least one crew member as a flight would require a pilot.
- Crew members can only hold one role per scheduled flight.
- A crew member may be in the system without being assigned to a flight, such as a new hire awaiting assignment.
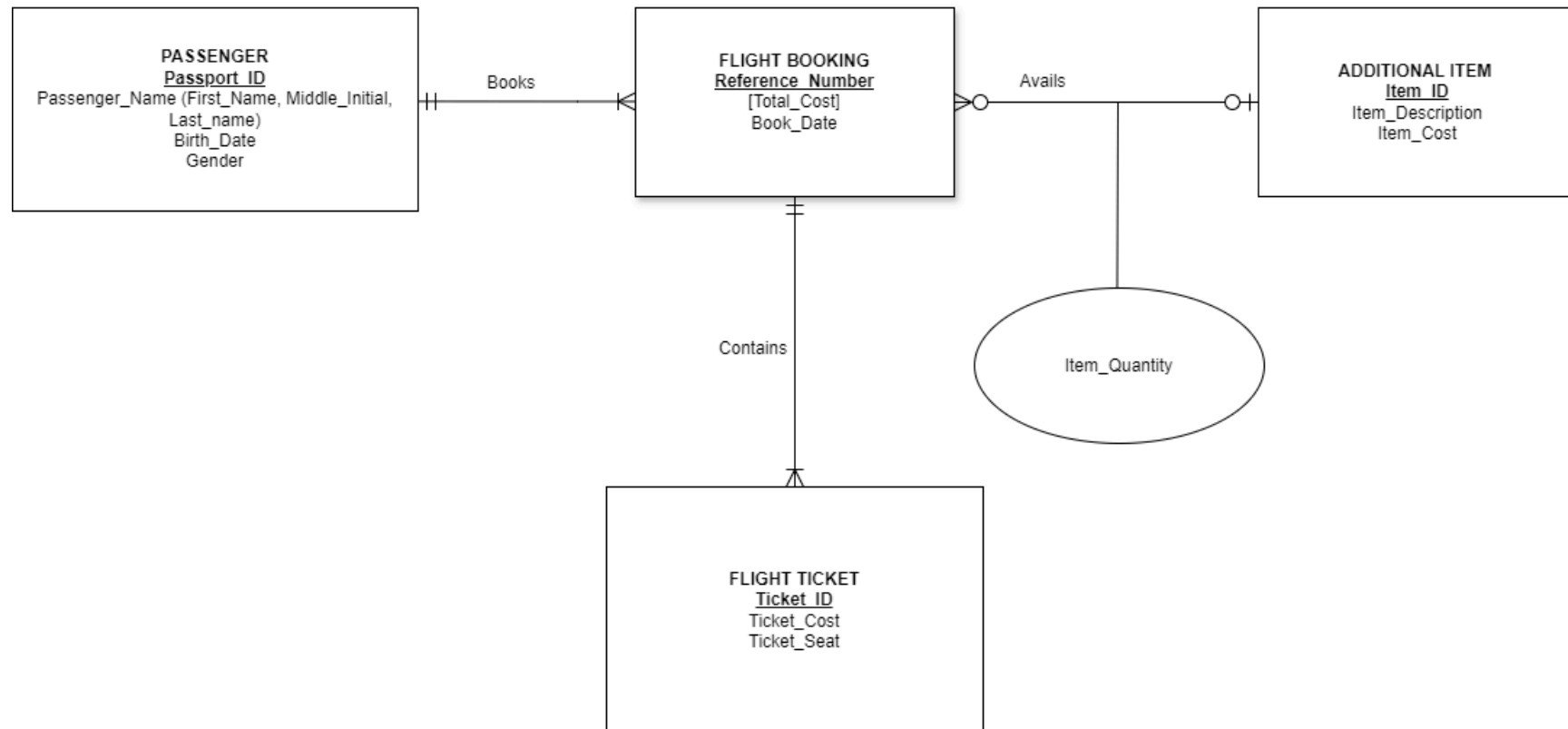
Limitations and restrictions

- The departure and arrival of stopovers aren't stored, only the departure and arrival of the overall flight. This means that the trip itinerary generated for a flight booking can't display layover times if a passenger books a direct flight.

- The database system allows the passenger to search for scheduled flights as a database user, but the **searches themselves aren't stored in the database**. Storing passenger searches could be useful to Magis Air to generate reports in order to identify consumer trends, however **data privacy** might be an issue.
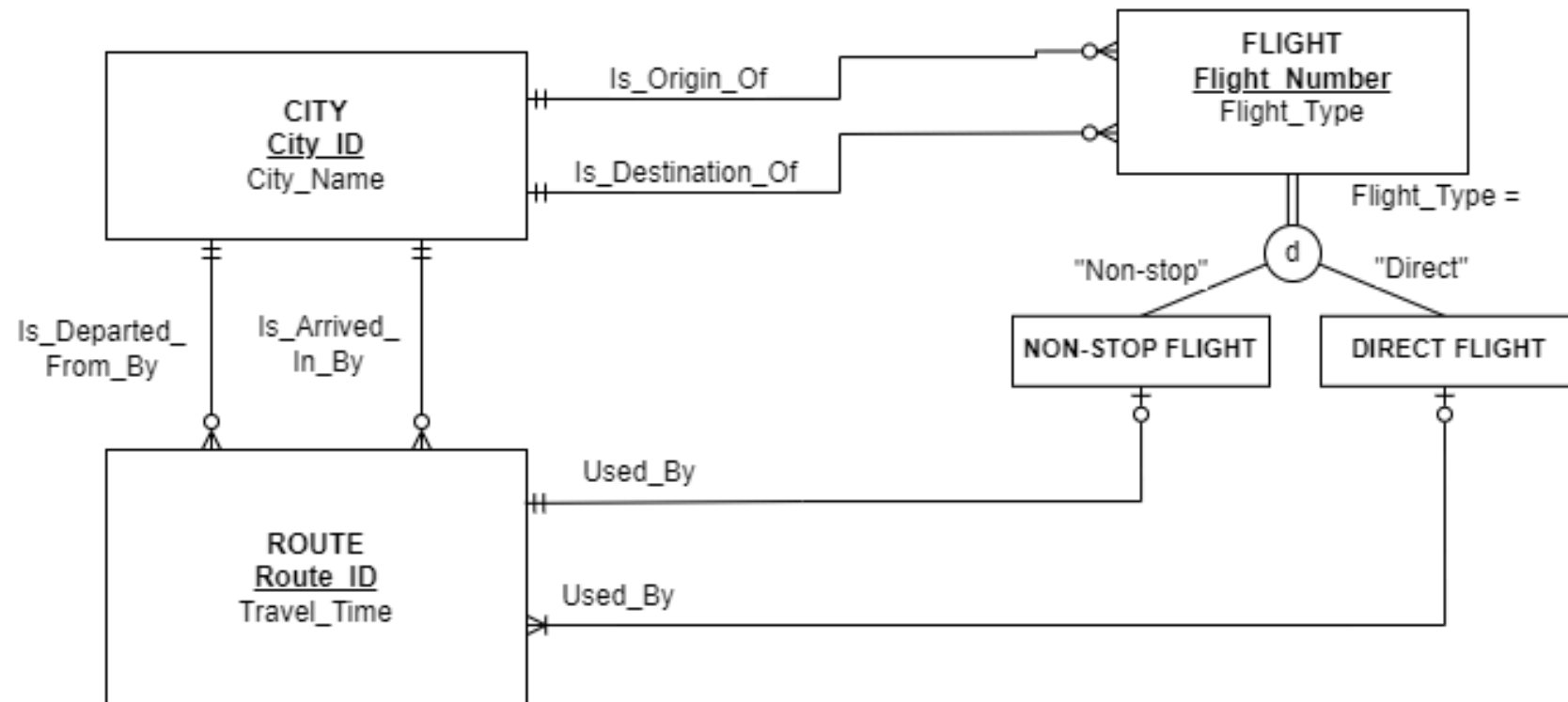
2.1. Conceptual Data Model: Separate EERD

Crew Assignment View

Flight Booking View

Flight Route View

Flight Schedules View

CITY
City_ID
City_Name

Is_Origin_Of

Is_Destination_Of

FLIGHT
Flight_Number
Flight_Type

Scheduled_On

FLIGHT SCHEDULE
Departure(Date, Time)
Arrival(Date, Time)
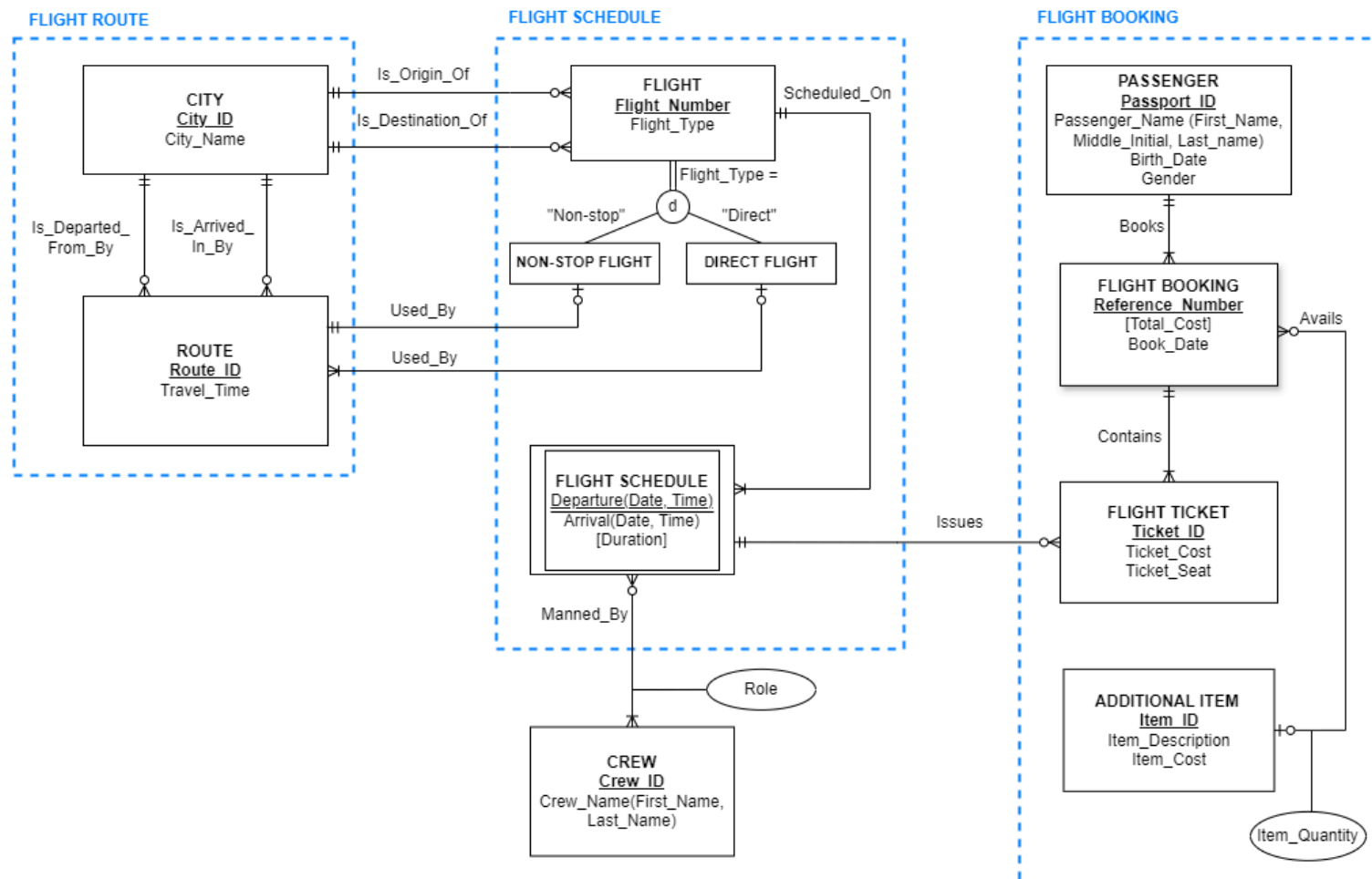[Duration]
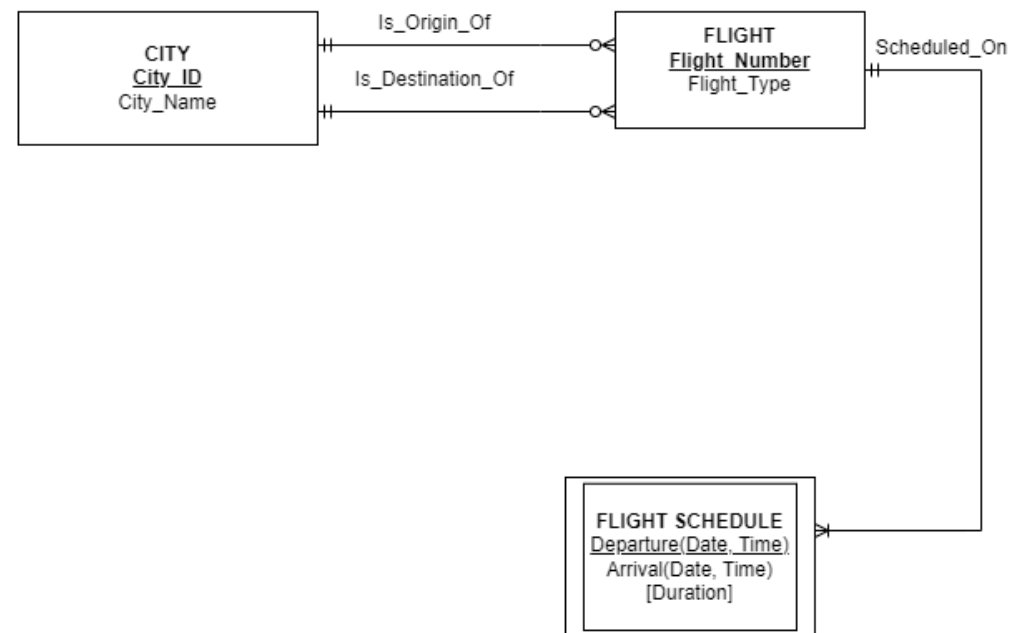
2.2. Conceptual Data Model: Integrated EERD

Magis Air Integrated EERD

3.0. Data Dictionary

DATA DICTIONARY

System Title: Magis Air   Date: September 17 2024

Analyzed by: chikichuka

Entity Name	Flight
Entity Description	A flight is an airline service from an origin city to a destination city that is characterized by a single flight number and uses one aircraft. It may have intermediate stopovers.

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Flight_Number	Date and time the flight is departing from origin city	Yes	NA	Combination of characters and digits	No
Flight_Type	A flight can be either non-stop or direct.	No	Non-stop	Non-stop or Direct	No

Entity Name	Direct Flight
Entity Description	A direct flight is a flight that has at least one stopover during the duration of the flight

Entity Name	Non-Stop Flight
Entity Description	A non-stop flight is a flight that has no stops during its duration.

Entity Name	Route
Entity Description	A route that Magis Air aircrafts are allowed to use. It is a flight path to and from ground locations which in this case are cities.

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Route_ID	Unique identifier for routes	Yes	NA	Combination of characters and digits	No
Travel_Time	Travel time from a city to another city in minutes	No	NA	Digits	No

Entity Name	City
Entity Description	Cities that have routes in Magis Air that flights can fly to

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
City_ID	Unique identifier for the city	Yes	NA	Digits	No
City_Name	The name of a city	No	NA	String	No

Entity Name	Crew
Entity Description	A crew member employed by Magis Air

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Crew_ID	Unique identifier for the crew member	Yes	NA	Digits	No

Crew_Name	Full name of the crew member	No	NA	String	No

Relationship Name	Manned_By
Relationship Description	Assignment of a crew member to a scheduled flight

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Role	Name of the role of the assigned crew member for that particular scheduled flight	No	Flight Attendant	String	No

Entity Name	Flight Booking
Entity Description	Details of flight/s booked by *Passenger*

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Reference_Number	Unique identifier for the flight booking of the passenger	Yes	NA	Digits	No
Total_Cost	Derived attribute from costs of flight ticket/s and additional item/s; total cost of the flight booking	No	0	Digits	No
Book_Date	Date the booking is confirmed	No	NA	Date	No

Entity Name	Flight Schedule
Entity Description	A schedule that a flight is in service

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Departure	Date and time the flight is departing from origin city	No. Partial Identifier.	NA	Date, time	No
Arrival	Date and time the flight will land in the final destination city	No	NA	Date, time	No

Entity Name	Passenger
Entity Description	Person that books/boards/searches the flights

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Passport_ID	Unique identifier of the passenger on their passport	Yes	NA	Combination of letters and numbers	No
Passenger_Name	Full name of the passenger	No	NA	Letters	No
Birth_Date	Birth date of the passenger	No	NA	Date	No
Gender	Gender of the passenger	No	NA	Male/Female	No

Entity Name	Additional Item
Entity Description	Additional products/services availed along with *Flight Ticket*

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Item_Description	Description of the item	No	NA	String	Yes
Item_Cost	Cost of the item	No	NA	Digits	No

| Entity Name	Flight Ticket
Entity Description	Ticket received by passenger upon booking

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Ticket_ID	Unique identifier of the flight ticket	Yes	NA	Combination of letters and numbers	No
Ticket_Cost	Cost of the flight ticket	No	NA	Digits	No
Ticket_Seat	Seat of the passenger in the airplane	No	NA	Combination of letters and numbers	No

Relationship Name	Avails
Relationship Description	Items availed for a specific flight booking

Attribute Name	Description	Primary Key?	Default Value	Possible Values	Can be Null?
Item_Quantity	Number of instances of *Additional Item* availed	No	0	Digits	Yes

4.0. Appendix A
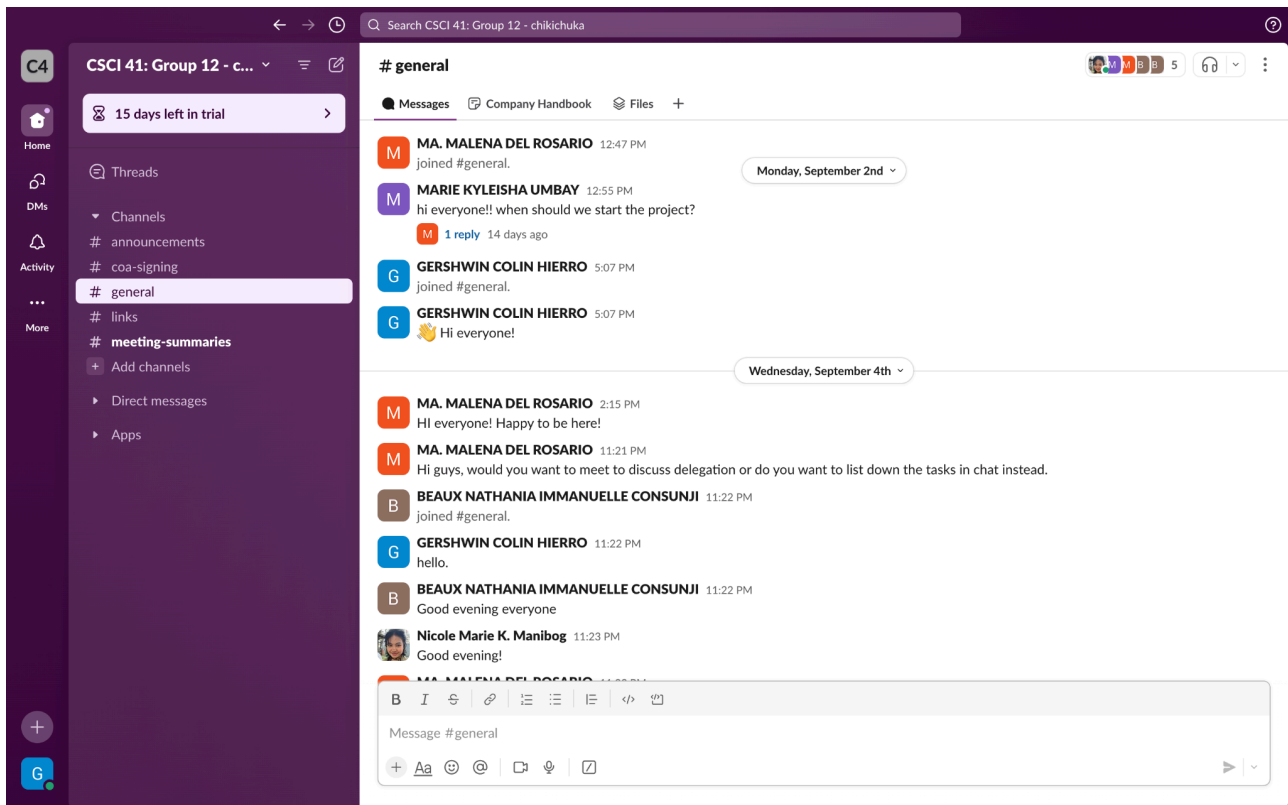
5.0. Appendix B

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CERTIFICATE OF AUTHORSHIP

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Instructions
- Download and fill this PDF form completely.
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Title of Submission: Project Deliverable 1

Type of Submission: ☐ Program   ☑ Project   ☐ Report   ☐ Paper
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Date of Submission: September 18, 2024

Certification

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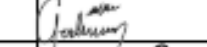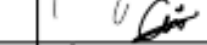
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Purpose:

We have reviewed and revised the content as we see fit. We take full responsibility for the content and ownership of the submitted / published work.

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