Travel Reservations Service

CS 4400: Introduction to Database Systems

Course Project: Fall 2021 Semester

Version History

Version	Date	Notes
0	September 16, 2021	Initial release

Scenario Description

The following is a text description of the system you are being tasked to develop. The system requirements – explicit and implicit – are included in this document, and they need to be identified and reflected in your Enhanced Entity-Relationship Diagram (EERD).

You are being asked to design and develop a system to handle travel reservations. This system will support a "third party" travel reservations agency. Customers will make flights reservations and hotel\AirBnB bookings for their trips. After confirming the bookings, the agency will be paid electronically by the customer.

Attributes that are used to identify entities in our system will normally consist of fifty (50) or fewer alphanumeric characters in some regular pattern/format. This will be the default format for entity-identifying and "entity unique" attributes in our system unless otherwise noted. Dates will be represented in the "*yyyy-mm-dd*" date format; this will be the default format for dates in our system unless otherwise noted.

Our system will have accounts for admin users and clients of the system.
Every account will have a unique email address and a password. It will also store the name of the account holder as first and last name. Some people might have relatively long first and/or last names, so we will ensure that we can manage names that have one hundred (100) or fewer characters. The email addresses will serve as usernames in the system.

Admins are special users that have already been pre-populated into the database. One cannot register them in the system.

The clients can be of 2 types: owners and customers. All clients have a unique phone number, which can be used to identify them, and they have a rating. The ratings will get generated as the owners and customers rate each other. The number of ratings can be derived from information in the database.

The owners will add their properties to our system, and customers can book these properties. The system should be able to track the total income of an owner up to a given date.

The system will hold the credit card info for each customer. This information will be useful when the customer is booking a property and/or a flight. The credit card info will consist of a 16-digit credit card

number, a 3-digit CVV, and the expiration date of the card. Additionally, the system should also store the current location of every customer. This will be useful when booking flights and/or properties.

Airlines, which are primarily identified by their airline name, offer several flights, but a flight only belongs to one airline. In fact, a flight must be associated with an airline name. The system stores each airline's rating since customers like to see which airlines offer good services. However, this system does not support functionality to rate airlines; since airlines are independent companies, their ratings are prepopulated externally by admins.

Customers can book flights. Flights are identified by the airline they belong to and strings of 5 characters that is are sequences of letters and numbers. Flights have a departing date along with arrival and departure times and a maximum capacity of passengers. The system needs to list the cost of one ticket for each flight. For simplicity, this system only sells economy seating on flights, so all tickets have the same cost. The customer will provide the number of seats that need to be purchased when booking the flight, so the system should be able to calculate the total cost of the flight booking based on this information. The system should also be able to calculate the number of seats left on the airplane after customers reserve seats on a flight. Customers will be charged upon booking their flight reservations. If a customer wants to cancel their flight booking at any time before their flight, they will be charged a cancellation fee that is 20% of the original cost of the flight booking, but the rest of their money will be returned. When a customer cancels a flight reservation, all the seats that the customer previously booked will be canceled.

Every flight departs from an airport and arrives at an airport. All airports have a unique 3-letter abbreviation, a unique name, and an address that can be used to identify them. The system handles an address as four separate components: street, city, state, and zip code. States will be stored as two letter abbreviations, and zip code consists of 5 characters. Additionally, it is important for the system to store the time zone of each airport to avoid confusion since customers may be travelling through different time zones throughout their journey. Customers often like to visit attractions during their vacations, so each airport will also have a list of nearby attractions.

Customers also book properties where they can stay while on vacation. Each booking will have a start date, end date, and the number of guests staying under the booking. The travel plans of a customer may include many property bookings since a customer can visit many locations. It is also important to note that many customers can book the same property—especially with properties like hotels that can accommodate several customers at a time. Owners can own many properties, but a property can only have one owner. Properties are uniquely identified by their address. An address consists of street, city, state, and zip code. Each property will have a name and a short description (less than 300 characters) in our system. Additionally, for each property our system should also store the amenities available, the per night per person cost of a stay, and the number of customers it can host at a time. Properties are situated close to airports. The system will store the distance between a property and its nearby airport to help customers better plan their trip. At any time before their stay begins, customers may also cancel their property booking(s). In this case, a cancellation fee will be charged to the customer for the cancelled booking (20% of the original cost). Our system will also calculate and maintain the total cost associated with each booking. The total cost can be computed from the duration of the booking, number of guests, the cost per night per person of the property and any cancellation fees, if applicable.

After the trip, customers can rate the owners of the properties they stayed at during their vacation. Owners can also rate the customers that stayed at their properties. Ratings are stored as integers between one and five. However, the system calculates and stores average ratings (in the format #.#) for each customer and owner. A rating of one implies that the services were bad, and a rating of five implies that the services were excellent. Customers can also review the properties that they stayed at. Reviews allow customers to describe their experience in under 500 characters. Note that newly registered customers and owners will not have any ratings. Similarly, a newly added property will not have any reviews.

Sample Data Elements

The following data is provided to assist you in visualizing and/or validating the system design you are being tasked to develop. You are not required to submit this data. The intent is that you can use the data to check if your EERD can store the data values, relationships, etc. that we've provided in a reasonable manner. If there are elements of the data that can't be represented in an appropriate attribute, entity, or relationship, then perhaps you need to revise your design. Similarly, if there are attributes, entities, relationships, etc. that haven't been used after you've stored all the data, then perhaps your design has unnecessary elements. This exercise doesn't guarantee that your EERD is fully correct, but it does offer some validation that you are on the correct track.

Jim Halpert, a customer, registers with email 'jhalpert1@gmail.com' and password 'cc123456'. Jim's rating is null since he has not booked any reservations yet. Jim is currently located in Atlanta, GA. Jim adds his credit card information to the system. Card #: 4789 1011 2478 0934. CVV: 710 EXP DATE: 2025-05-19.

Michael Scott, an owner, registers with email 'mscott22@gmail.com' and password 'cool456789'. Michael adds 2 properties to the system. The first property is 4-bedroom, 3-bathroom beach villa located on Hilton Head Island. The property has a pool, laundry, full-size kitchen, and 2 sleeper sofas. The property can sleep 12 adults. The property address is 350 Sutherland Ct. Hilton Head Island, SC 29928. The beach villa is a 2-minute walk from the beach and is about 6 miles from the Hilton Head Island Airport. The cost is $300 per person per night. Michael's 2nd property is a 2-bedroom, 2-bathroom condominium located in downtown Savannah near the Savannah River. It is located on the 3rd floor of a 5-story building. It comes with free parking, laundry, a full-size kitchen, and 1 sleeper sofa. The address for the property is 646 W Bay St APT 305, Savannah, GA 31041. It is located about 10 miles from Savannah Airport. The cost is $155 per person per night.

Jim Halpert, a customer, plans to book a one-week trip to Savannah, GA from October 24th to October 31st, 2021. Jim needs to book a flight from Scranton, PA to Savannah, GA. Jim finds a round-trip flight on Delta Airlines for $160 and books it for himself. His flight to Savannah (flight #: DL2698) departs at 8:15 am and arrives at 9:15 am on October 24th. His return flight from Savannah to Scranton (flight #: Dl1462) departs at 8:00 pm and arrives at 9:15 pm on October 31st. Jim plans to stay at Michael Scott's condo which is in downtown Savannah. Jim books his Delta flight along with a reservation at Michael's condo from October 24 to October 31st. The total cost of his reservation at Michael's condo is $1,085 (155*7 = 1085). The total cost including the flight is $1,245. Jim's credit card gets charged $1,245.

Mark Moss, an admin, logs into the system with the username ‘mmoss1@travelagency.com’ and password ‘12345678’. Mark adds Hartsfield-Jackson Airport (ATL) as an airport. It is located at 6000 N Terminal Pkwy, Atlanta, GA 30320, and it operates in Eastern time. Mark adds Stone Mountain, Georgia Aquarium, and World of Coca-Cola as attractions near Hartsfield-Jackson Airport (ATL). Additionally, he adds Dallas Love Field Airport (DAL) as an airport. It is located at 8008 Herb Kelleher Way, Dallas, TX 75235, and it operates in Central time. He adds Dallas Museum of Arts, Dallas Zoo, and Six Flags over Texas as attractions near Dallas Love Field Airport (DAL). Mark also adds Delta airlines to the system with a rating of 4.6/5 since Hartsfield-Jackson Airport is a major hub for the airline.

Monica Geller, a customer, recently came back to New York from Los Angeles, CA where she stayed at a hotel owned by Jack Smith. Monica loved Jack’s hospitality and quick responses to her concerns, so she logs in to the database with her username ‘mgeller3@yahoo.com’ and password ‘hello123’ and gives Jack Smith a rating of 5/5. Monica also reviews Jack’s property and writes, “I enjoyed my stay here, but it would have been better if the air conditioning was working.”

Sheldon Cooper, an owner and customer in the travel reservation system, had originally booked 3 seats on Spirit Airline’s flight AB123 from Hartsfield-Jackson Airport (ATL) to Dallas Love Field Airport (DAL) that will depart on 2021-09-15 at 5:30 PM ET and arrives at 8:30 PM CT. When he booked the flight, an amount of $300 was charged to the credit card (number: 1234123412341234, expiry: 2025-08-08, cvv: 789) saved in his account since each ticket costs $100. Just days before the flight, Sheldon and his friends test positive for COVID-19. Sheldon must cancel his booking. Sheldon logs on to the system with his username ‘electrons@gmail.com’ and password ‘smartperson101’ and cancels his flight. Sheldon is refunded an amount of $240 after being charged with a 20% cancellation fee of $60 (300 - (0.2)300 = 240). The number of seats left on the flight increases by three after this cancellation.

Arthur Read, an existing owner in the database, recently rented out a house he owns located at 1010 Spring Street, Hinsdale, IL, 60521 for $100 per person per night. The customer who rented his house, Dora Winifred, was not so great. The customer left the house a total mess and ripped the hot tub’s leather cover. The hot tub was one of the house’s best amenities. Disappointed, Arthur logs into the system with his username ‘aread50@gmail.com’ and password ‘icecream87’ and gives Dora a rating of 1/5. Dora had previously received a rating of 2/5 from a different owner, so Dora’s average rating is now 1.5.