

I. Requirement Analysis

Purpose

Our project involves the development of a database application for a travel agency. The database stores information from an online reservation (booking) system. The application focuses on representing the following concepts and their relationships: vacation packages, bookings, hotels, transportation, customers, insurance, and consultations between customers and travel agents. It is important for travel agencies or booking companies to keep track of the bookings associated with different customers. Quick retrieval of data will allow companies to keep track of purchases, aid customers if they need modifications in their bookings, and efficiently provide customized options for customer usage.

Scope & special requirements

The scope covered for the project primarily focuses on the consumer aspect of booking a trip. Specifically, it describes the options provided to the customer for a trip including transportation, hotels, insurance, car rentals, attractions and consultations with travel agency employees. We limited the database such that the main focus of the database system would involve consumers rather than travel agency employees, as well as include a necessary amount of data that is well-represented for database storage.

Application description

As defined, real-world applications of this project involve actual travel agencies who would utilize this database to store data in regards to their consumers. In addition to simply storing data, companies can analyze the information in multiple formats: customization of options based on repetitive past selections, suggestion of different destinations in consideration to customer preference, and improved travel packages for popular destinations.

Inspiration

<https://www.voyagestransat.com/en/travel-agencies/montreal/voyages-transat-centre-ville-42526>
https://www.expedia.ca/?gclid=CjwKCAiAyeTxBRBvEiwAuM8dnWM8B3USrYAhsYcqnaXzuv8bYJgXbuVD6Q2R49197gD02rF-4WkHZhoCIW4QAvD_BwE&langid=4105&pwaLob=wizard-package-pwa&semcid=CA.B.GOOGLE.BT-c-EN.GENERIC&semddl=a1742992456.b140549586844.r1.g1kwd-162305413.i1.d1174528553401.e1c.j19060796.k1.f11t1.n1.l1g.h1e.m1

Database Description

Relationships, Entities and their attributes

The following entity sets will be stored in tables of a relational database:

Customers

- **Customers** are uniquely identified by their customer id.
- Additionally, their full name, birth date (dd-mm-yy), address, phone-number, passport number, and email are recorded
- Furthermore, customers have a boolean attribute regarding whether they have a valid drivers license.

Bookings

- **Bookings** are uniquely identified by a booking id. Additionally, they have date of travel, departure location, arrival location, and total price.
- Each **booking** must be associated with at least one customer. A customer can only be associated with one booking, and the total number of customers involved with one booking is stored.
- Each **booking** must have one of the following statuses: successful, pending, or incomplete
- Each **booking** may also have a boolean attribute indicating the booking type: whether or not the booked vacation package is refundable or not
- Each **booking** must be associated with at least one form of **transportation**
- A **booking** might be associated with a **discount package**
- All **bookings** must include a plain-text disclaimer to protect the travel agency

Employees

- Travel agency **employees** are uniquely identified by their employee id. Additionally, their full names are stored.
- Customers may choose to have consultations with travel agency **employees**. A customer can choose to have consultations with different travel agency employees of their choice at different time points. A travel agency employee must provide at least one consultation as definition of their job. The consultation session id, date and time must be stored.

Hotels

- All bookings should include at least one **hotel** in their itinerary.
- **Hotels** are uniquely identified by their hotel id as coded by the travel agency
- Additionally, they have a name and location. Check-in and check-out dates, as well as the total charge are included.
- Hotel room type is also included

Insurance

- Customers must buy **insurance** for their travels. They can purchase several types of insurance (health, car, etc.). Moreover, an insurance company can offer a certain type of insurance at any time to many customers.
- The **insurance** is uniquely identified by an insurance contract number. It also includes the name of the company that is providing the insurance, the coverage, and the cost of the insurance

Package

- Customers may choose to purchase a travel **package** to have a more structured and guided travel experience. Packages are more catered to different groups of people, such as families, couples and senior customers. A particular package can be bought by many different customers.
- **Packages** are determined by their package discount type (eg: senior, student, family, couple), and each package contains a description of the activities and the trip. Each **package** has a price.

Attractions

- Customers have the option to purchase tickets for entry to none or multiple attractions in advance
- Every attraction is uniquely identified by their name and the location
- The entry fee is stored

Car-rental

- Customers may select a car-rental add-on at the destination
- Each rental car is uniquely identified by a license plate and location. Additionally, car model information should be stored.
- A car.booking number, start and end date of car rental are also included in each booking

Transportation

- Each booking includes a form of transportation to the destination.
- Transportation is uniquely identified by transportation id (e.g., B for bus; A for airplane; T for train). In addition, price, date, time (both departure and return) are stored.
- Three types of transportation are available: they are bus, airplane and train
- Bus bookings have the following attributes: bus route for both departure and arrival
- Train bookings have the following attributes: train number for both departure and arrival
- Airplane bookings have the following attributes: flight number for both departure and arrival

II. E/R diagram

Limitations: The ER model is not capable of modeling the concept of time. For example, it is not able to record distinct time periods in which a customer has made a booking, and distinct time periods where a mode of transportation is being reserved. The ER model also cannot represent the checking of a boolean attribute, such as checking whether a customer has a valid driver's license. A True or False value is simply stored.

III. Relations

Entities:

- **Customer**(cust.id, full.name, birth.date, address, phone.number, passport.number, email, driver.license, insurance no., booking.id)
- **Insurance**(insurance.number, company.name, coverage, price)
- **Booking**(booking.id, date.travel, dept.location, arrv.location, price, status, booking.type, disclaimer, no.of.customers, hotel.id, t.id)
- **Employee**(e.id, full.name)
- **Hotel**(hotel.id, name, location, checkin.date, checkout.date, price, roomtype)
- **Attraction**(name, location, price)
- **CarRent**(license.plate, location, model)
- **Transportation**(transport.id, price, dep.date, re.date, dep.time, re.time)
- **Bus**(t.id, dep.route, arrv.route)
- **Airplane**(t.id, dep.fl, arrv.fl)
- **Train**(t.id, dep.tr, arrv.tr)

Weak entities:

- Package**(booking.id, type, price, description)

Relationships:

- **Consult**(cust.id, eid session.id, date, time)
- **Rent**(cust.id, license.plate, location, rental confirmation number, start.date, end.date)
- **Booking.include.attraction**(booking.id, a.id)
- **Booking.include.transportation**(booking.id, t.id)
- **Booking.include.hotel**(booking.id, h.id)

**Relationships are combined into entity sets as attributes to reduce redundancy in the relational model*