Database Design Term Project (CS4347)

Project Description

Paradise Tours and Travels is a travel agency with 3 branches. They want to develop a database system that allows to maintain consistency among all the three branches. The agency has five main modules: Employee, Customer, Booking, Branch and Payment.

Employees are salespersons, managers, or receptionist. Salespersons are further classified as floor salesperson or internet salesperson. Employees work for branches and each branch can have one manager. The Employee ID, Name (First, Middle ,Last), Address (Street, city, pin code), Date of birth, Phone number(can have more than one phone number), Date of joining and Salary of each employee is recorded. The Employee ID must be in the format "EXXX" where X can have a value from 0 to 9.

A customer can either be an individual or a company. Customer details such as Customer ID, Name (First, Middle, Last), Address (Street, city, pin code), Phone Number, Email Address, Date of Visit (either online or in person) are recorded. Date of Birth (must be in the year 2001 or before) is recorded for an individual. One person can have more than one phone number or email. Each branch has a Branch ID, Branch Name, Address(Street, city, pincode), Phone number and email. Customers have choice to be members in the agency. The membership details such as membership ID, membership level and other information are stored. Members are entitled to cash gift cards.

Different branches offer promotions. Each promotion has a promotion ID and other promotion information such as name and promotion description. Each promotion ID is not unique and cannot be used to identify a promotion in the agency.

Booking details of the purchases made by the customer such as booking ID, destination, travel date (arrival and departure), number of individuals travelling are stored. Each booking contains details of package tour. One booking can have one associated package tour. Promotions offered at branches are applied to the package tours. Booking also contains transportation details such as mode of transport and other information.

A customer makes a booking and the booking details, payment details, customer details, the salesperson details who made the booking and the date of booking is stored together.

Package Tour contains details such as hotel details, number of days offered in the package, destination and other information are stored. The hotel details such as hotel name, ID and location are stored separately. Each package includes hotel information.

Each payment transaction has a unique payment ID, payment amount, payment type and transaction date. A customer can pay using more than one payment method for the same transaction. A person can pay by cash, or by gift card or pay via a combination of both. The cash amount is recorded if a person pays by cash. For gift card, the membership details along with the gift card ID are recorded.

Project Questions

1. Is the ability to model superclass/subclass relationships likely to be important in an agency environment such as Paradise Tours and Travels? Why or why not?

2. Can you think of 5 more business rules (other than the one explicitly described above) that are likely to be used in a travel agency environment? Add your rules to the above requirement to be implemented.

3. Justify using a Relational DBMS like Oracle for this project.

Project Exercises

Phase I. Draw an EER to accurately represent this set of requirements. This will be your Conceptual Design. Clearly specify any assumptions that you are making. You can use any tools (software) to draw the EER.

Phase II. It has been decided to use a relational DBMS to implement the database. Perform the following steps.

a. Convert your Conceptual model (Phase I) to a Logical model that can be implemented in a relational DBMS like Oracle. During this process you replace M-N relationships and multi-valued attributes with constructs that can be implemented in the relational DBMS. Draw EER for the logical model after your modifications. Feel free to change your conceptual model (first delivery) if needed.

b. Convert the EER (item a) to a database design. Document your design in Database Schema format like the one we discussed in the class.

Phase III. Now, you are ready for implementation. Use appropriate naming conventions for all of your tables and attributes.

a. Normalize all of your tables to third normal form. Make any necessary changes to the EER from Phase II b. Explain why these changes needed to be made.
b. Draw a dependency diagram for each table from Phase III a.
c. Write SQL statements to create database, tables and all other structures. Primary key and foreign keys must be defined as appropriate.
d. Update data dictionary from previous delivery (phase III c.) to add data type for each attribute in addition to specifying if it is primary key, foreign key, NULL is permitted, or its value is UNIQUE.
e. Use the Create View statement to create the following views:
    1. TopSalesmen- This view returns the First Name, Last Name and Date of Joining of those salesmen who have made more than 5 bookings in the last month.
    2. TopCustomers- This view returns the list of customers who have booked holidays budgeting over $10,000.

3. PopularDestination- This view returns the name and the expense associated with the most common visited destination in the past 3 years.
4. PotentialMember- This view returns the name, phone number and ID of customers who booked more than 3 tours in the past year but are not enrolled into any membership.
5. PopularPromotion- This view returns the promotion details for year with the maximum bookings.

f. Answer the following Queries. Feel free to use any of the views that you created in part (e.):
   1. Find the most visited destination.
   2. For each salesperson class, list the number of employees belonging to this class.
   3. Find the year with the maximum bookings.
   4. Find the age of top 5 salesmen in the agency.
   5. Find the most common mode of payment used by customers.
   6. Find the name and membership level of members, who booked the most expensive tour in the past year.
   7. Find the names of customers and city they live in who have spent over $10,000.
   8. Find salesmen who have not made any sale or have no sale in the past 5 months.
   9. Find the details of customers who are senior citizens (age>65).
   10. Find the salesmen who made a booking within a month of joining.
   11. List all the sales that have been made after the most current employee was hired.
   12. Find the names of customers who have visited the travel agency but have not made any bookings.
   13. Find the list of customers who have made more than one bookings in the past year but were booked by different salesmen.
   14. Find the count of bookings made by individuals and count of bookings made by companies.
   15. Find the count of bookings made by members in the year having maximum bookings.

Phase IV. Document the final term project report.

a. Problem description (Copy it from Web site).
b. Project questions (Answer 3 questions listed in the project, justify your solution).
c. EER diagram with all assumptions (Solution for Phase II a).
d. Relational Schema after normalization. All relations must be in 3NF. The relational schema should include Primary key as well as foreign keys (if any) for all relations. (Solution for Phase III a).
e. All requested SQL statements (Solution for Phase III-c, e and f).
f. Dependency diagram (Solution for Phase III-b).