Introduction to Data Management: Assignment 1

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Problem Statement:

Our goal in this project is to design a database of a centralized reservation system for a chain of hotels to easily manage locations, customers, and reservations. This database will enable them to streamline internal operations and develop an online presence to quickly expand the business further. To achieve this goal, we created a transaction table (Bookings) and six master tables (Locations, Features, Credit Cards, Rooms, Customers, Discounts) and two mapping tables (LocationFeaturesMap and BookingsRoomsMap).

Database Tables:

Bookings

This table logs every reservation made in the system against a unique confirmation number (Primary Key). It also captures Customer ID (Foreign Key) along with other pertinent data for a reservation. We also added two columns for tracking credits earned/expended for a booking to be able to capture credits history of a customer. The bookings table had a many-many relationship with the Rooms table, causing us to create a mapping table to break this relationship.

Rooms

This master table maintains data on all rooms at all locations. Room Number and Location ID together form a composite primary key for this table since a Room Number can repeat across multiple locations.

BookingsRoomsMap

This table breaks the many-many relationship between Bookings and Rooms tables. It also stores the information regarding number of guests occupying a room against a booking and the dates for the same.

Locations

This master table maintains data on all locations. This table has a many-many relationship with the Features table, causing us to create a LocationsFeaturesMap table to break this relationship.

Features

This master table keeps track of all available features across locations.

LocationsFeaturesMap

This table breaks the many-many relationship between Locations and Features tables.

Customers

This master table maintains data for all customers. For security purposes, the credit card information of a customer has been stored in a different table and the primary key for the CreditCards table is captured in Customers as a Foreign Key.

CreditCards

This master table maintains credit card information for all customers. The credit card number was not used a Primary Key to avoid exposing it as a Foreign Key in the Customers table. Assuming that the phone number and email address differ for customer and the associated credit card, we have provided these fields in the credit cards table as well.

Discounts

This master table stores all the discount codes issued to a particular customer on their birthday. A separate table was maintained assuming a pileup of multiple discount codes against a single customer over time.

Conclusion:

Our database has separated entities to ensure easy scalability. By virtue of this, we have created a forward-looking database that accounts for any future expansions or process improvements planned by the hotel chain. This system is designed as a Single Source of Truth for all data on reservations at the hotel chain. Multiple version of this truth can be built upon this for running further analytics.

Entity Relationship Diagram:

Customers

PK	Id int NOT NULL
FK	CreditCardId int NOT NULL
	FirstName char(50) NOT NULL
	LastName char(50) NOT NULL
	Email char(50) NOT NULL
	AddressLine1 char(50) NOT NULL
	AddressLine2 char(50)
	City char(50) NOT NULL
	State char(2) NOT NULL
	Zipcode char(5) NOT NULL
	PhoneNumber char(10) NOT NULL
	BirthDate date

Bookings

PK	ConfirmationNumber char(7) NOT NULL
FK	CustomerId int NOT NULL
	CheckInDate date NOT NULL
	CheckOutDate date NOT NULL
	DiscountCode char(12)
	ConfirmationDate date NOT NULL
	Status char(1) NOT NULL
	Rating int
	Notes char(500)
	ReservationTotal int NOT NULL
	CreditsEarned int
	CreditsSpent int

Locations

PK	Id int NOT NULL
	Name char(50) NOT NULL
	AddressLine1 char(50) NOT NULL
	AddressLine2 char(50)
	City char(50) NOT NULL
	State char(2) NOT NULL
	Zipcode char(5) NOT NULL
	PhoneNumber char(10) NOT NULL
	Url char(100) NOT NULL

LocationsFeaturesMap

PK, FK	LocationId int NOT NULL
PK, FK	FeatureId int NOT NULL

CreditCards

PK	Id int NOT NULL
	FirstName char(50) NOT NULL
	MiddleName char(50)
	LastName char(50) NOT NULL
	CardType char(4) NOT NULL
	CardNumber char(16) NOT NULL
	ExpirationDate date NOT NULL
	CCID char(3) NOT NULL
	Email char(50) NOT NULL
	AddressLine1 char(50) NOT NULL
	AddressLine2 char(50)
	City char(50) NOT NULL
	State char(2) NOT NULL
	Zipcode char(5) NOT NULL
	PhoneNumber char(10) NOT NULL

BookingsRoomsMap

PK, FK	BookingId int NOT NULL
PK, FK	RoomId int NOT NULL
	Date date NOT NULL
	NumberOfGuests int NOT NULL

Features

PK	Id int NOT NULL
	Name char(50) NOT NULL

Rooms

PK, FK	RoomNumber int NOT NULL
PK, FK	LocationId int NOT NULL
	Floor int NOT NULL
	Type char(1) NOT NULL
	Size int NOT NULL
	MaxCapacity int NOT NULL
	WeekdayRate int NOT NULL
	WeekendRate int NOT NULL

Discounts

PK	DiscountCode char(12) NOT NULL
FK	CustomerId int NOT NULL
	Date date NOT NULL
	Validity boolean NOT NULL