Introduction to Data Management: HW1 Database Design Assignment

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Executive Summary:

The data for Sour Apple's reservation system has been divided into 6 main entities and 2 join tables. The system aims at ensuring data is quickly accessible, while also being robust enough to accommodate changes and updates with minimal effort in the future. This is particularly important, because with the expansion plan of Sour Apple in place, the system will face an influx of new information, which should be integrated seamlessly.

Information pertaining to customers such as name, email, mailing address, phone number, credits used and earned are all present in the 'Customers' table. Each customer is assigned a unique ID to maintain table structure. The mailing address and name have been split into separate components to aid analysis if necessary and to future-proof against scenarios where the information might be needed. Customer birthday is also recorded to help Sour Apple's policy of emailing customers a birthday card and a discount count on the day. Customer credit card information has been provided in a separate table, for security purposes, to prevent that information being easily accessible. This includes the card number, type, billing address and expiry date.

Location information is provided in a separate 'Locations' table, with the location address, number of rooms, phone and URL being provided. Each location is assigned a unique ID as well. This is a small subset of information currently, but this will expand in the future with Sour Apple opening new locations in various areas. Features for the locations are provided in a separate table with unique IDs, which is linked to the locations table by a join table using the location ID to prevent many-to-many join scenario due to overlap of features between locations, which would cause data redundancy.

Information for the rooms is present in 'Rooms' table, which specifies the room number, type, location the room is in, area of the room, maximum occupancy and its prices. Since multiple location can have the same room number, the primary key of this table is a composite key of room number and location ID.

The final primary entity is the 'Reservations' table, which contains all the information related to the reservations, such as check in date, check out date, number of guests and rooms, if there is a discount code used, amount charged, customer rating, customer requests and the status of the booking. Each reservation has a unique confirmation number, which is used as the primary key. The underlying assumption is that one reservation would only include rooms from one location. Hence, this table can be linked to the 'Rooms' table using a join table, which helps identify the occupancy status of any room at any given point of time. This table is also connected to the location table by the Location ID.

As stated before, the 2 main goals for the database structure are to ensure seamless access to data and robustness. Thus, the database has been structured in such a way as to ensure that if there are any changes in the way data is recorded in the future, there will be changes to only some specific entities, while the other entities function uninterrupted. However, the data also must allow for quick analyses, because with the new expansion plan, Sour Apple will definitely have to analyze the data to check the effectiveness of marketing strategies and discounts. Hence, although the data can be normalized further, it has been retained in this specific structure to prevent unnecessary joins to access pertinent data, which lowers efficiency.

With such an information source fixed, the scope of analysis for Sour Apple is endless. A few examples could be identifying most popular areas for visitors to aid in identifying new Sour Apple locations, checking which types of discounts are successful in getting more customers, identifying most popular types of rooms amongst different demographics, which could also be helpful in designing new locations based on the demographics in the area and so on. With Sour Apple expanding rapidly in the near future, these analyses would be very helpful in aiding the expansion process and ensuring the venture is profitable.