### **Hotel Management System Data Model Documentation**

#### **Overview**

This document describes the data model for a hotel management system, designed using a star schema. The model comprises one fact table and five dimension tables, ensuring efficient data storage, analysis, and reporting within Power BI. The primary goal of this model is to provide a structured, normalized framework that reduces redundancy and enhances data integrity.

#### **Fact and Dimension Tables**

##### **1. Fact Table: FactReservations**

The FactReservations table contains the transactional data related to hotel reservations. It captures key metrics such as total revenue and reservation statuses, and includes foreign keys linking to various dimension tables for descriptive context.

* **Columns:**
  + reservation\_id (INT, Primary Key): Unique identifier for each reservation.
  + check\_in\_date (INT, Foreign Key to DimDate): Reference to the date when the guest checks in.
  + check\_out\_date (INT, Foreign Key to DimDate): Reference to the date when the guest checks out.
  + guest\_id (INT, Foreign Key to DimGuest): Reference to the guest making the reservation.
  + room\_id (INT, Foreign Key to DimRoom): Reference to the room being reserved.
  + payment\_method\_id (INT, Foreign Key to DimPaymentMethod): Reference to the method of payment used.
  + employee\_id (INT, Foreign Key to DimEmployee): Reference to the employee managing the reservation.
  + total\_amount (DECIMAL): Total amount charged for the reservation.
  + status (VARCHAR): Status of the reservation (e.g., Confirmed, Cancelled).
  + booking\_date (INT, Foreign Key to DimDate): Date when the reservation was made.

##### **2. Dimension Table: DimGuest**

The DimGuest table stores detailed information about the guests.

* **Columns:**
  + guest\_id (INT, Primary Key): Unique identifier for each guest.
  + full\_name (VARCHAR): Full name of the guest.
  + email (VARCHAR): Email address of the guest.
  + phone\_number (VARCHAR): Contact number of the guest.
  + gender (VARCHAR): Gender of the guest.
  + country (VARCHAR): Country of residence of the guest.

##### **3. Dimension Table: DimRoom**

The DimRoom table contains information about the hotel rooms.

* **Columns:**
  + room\_id (INT, Primary Key): Unique identifier for each room.
  + room\_number (VARCHAR): Room number within the hotel.
  + room\_type (VARCHAR): Type of room (e.g., Single, Double, Suite).
  + price\_per\_night (DECIMAL): Cost per night for the room.
  + floor (INT): Floor number where the room is located.
  + view\_type (VARCHAR): Description of the view from the room (e.g., Sea, City).

##### **4. Dimension Table: DimDate**

The DimDate table is a standard date dimension table used for time-based analysis.

* **Columns:**
  + date\_key (INT, Primary Key): Unique identifier for each date.
  + full\_date (DATE): Full date.
  + year (INT): Year component of the date.
  + quarter (INT): Quarter of the year.
  + month (INT): Month of the year.
  + day (INT): Day of the month.
  + day\_of\_week (VARCHAR): Name of the day of the week.

##### **5. Dimension Table: DimPaymentMethod**

The DimPaymentMethod table stores information about the payment methods used for transactions.

* **Columns:**
  + payment\_method\_id (INT, Primary Key): Unique identifier for each payment method.
  + payment\_method\_name (VARCHAR): Name of the payment method (e.g., Credit Card, Cash).

##### **6. Dimension Table: DimEmployee**

The DimEmployee table contains details about the employees handling reservations and other operations.

* **Columns:**
  + employee\_id (INT, Primary Key): Unique identifier for each employee.
  + full\_name (VARCHAR): Full name of the employee.
  + position (VARCHAR): Job position or title.
  + department (VARCHAR): Department in which the employee works.

#### **Data Model Relationships**

The data model establishes relationships between the fact and dimension tables based on primary and foreign keys. These relationships enable efficient data retrieval and analysis by linking descriptive data with the core transactional data.

* **FactReservations.guest\_id** → **DimGuest.guest\_id**
* **FactReservations.room\_id** → **DimRoom.room\_id**
* **FactReservations.check\_in\_date**, **check\_out\_date**, **booking\_date** → **DimDate.date\_key**
* **FactReservations.employee\_id** → **DimEmployee.employee\_id**