STEP 1: Topic/Domain Selection

Selected Topic: Hotel Booking Management System

Introduction:

The Hotel Booking Management System is a comprehensive database project designed to streamline and enhance the management of customer, accounts, property information, reservations, transactions, and rewards within the hotel industry. This system caters to the dynamic needs of hotel management by integrating various aspects of customer interaction and rewards programs. The database encompasses detailed customer profiles, capturing essential information such as personal details, preferences, and historical interactions with the hotel. It incorporates a robust account management module, enabling customers to create and maintain profiles, along with tracking subscription details and expiration dates.

The reservation and transaction components facilitate seamless booking processes, capturing reservation details, check-in/check-out dates, and financial transactions. Furthermore, the system incorporates a rewards module that tracks and manages customer loyalty programs, offering insights into earned rewards, redemption history, and overall engagement. This Hotel Booking Management System optimizes operations by providing a holistic view of customer interactions, allowing hotel administrators to tailor services, improve customer satisfaction, and strategically enhance loyalty programs. With its user-friendly interface and comprehensive data organization, this database project stands as a powerful tool for effective hotel management in the ever-evolving hospitality industry.

Advantages:

The advantages of implementing the Hotel Booking Management System database model are multifaceted, offering valuable insights and strategic benefits for decision-makers within the hotel industry. The database allows decision-makers to analyze customer reservation data, identifying popular and unpopular Properties. This insight enables the hotel management to refine and enhance customer experience and business model, tailoring them to customer preferences and increasing overall subscription sales.

The centralized database ensures data accuracy and consistency. This helps prevent errors or inconsistencies in customer profiles, reservations, and rewards data. Accurate and reliable information is crucial for delivering seamless customer experiences and maintaining operational efficiency. In summary, the Hotel Booking Management System's database model empowers decision-makers in the hotel industry by providing valuable insights into customer behavior, subscription preferences, and property popularity. The advantages encompass strategic decision-making, improved customer satisfaction, and streamlined operational efficiency, contributing to the overall success of hotel management.

Use Cases

The Hotel Booking Management System serves as a sophisticated solution for the hotel industry, akin to popular booking platforms like Hilton or Marriott in its approach to customer-centric services. Similar to hotel booking platforms' membership structures, this database centralizes customer accounts, preferences, and transaction histories, offering a comprehensive view of customer interactions.

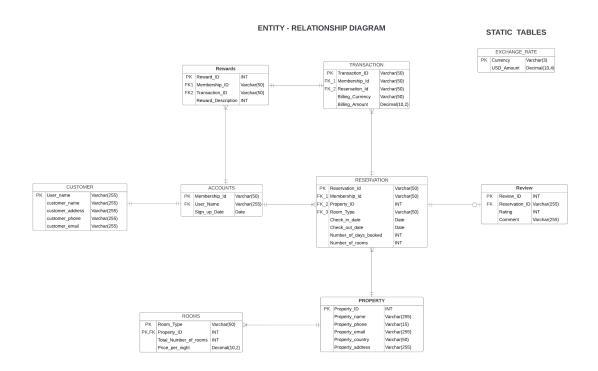
The system allows for efficient reservation management, tracking check-in/check-out dates and financial transactions, mirroring the content delivery models of streaming platforms. The inclusion of a rewards module aligns with the loyalty programs providing insights into earned rewards and redemption history. This adaptable database model extends beyond hotels, finding relevance in physical stores. Overall, the Hotel Booking Management System stands as a powerful tool for optimizing customer relations and loyalty programs in the dynamic hospitality landscape.

STEP 2: Conceptual Data Modeling and Database Design

Business Logic:

- 1. Each Customer can have multiple Accounts
- 2. Each account contains a Membership Id.
- 3. A Customer should have a Valid account and membership Id to be eligible for rewards Program.
- 4. A Customer can view into his account and look for analytical details such as Number of reservations, Total Amount spent on transactions.
- 5. Each Customer is classified into Platinum, Gold and silver members based on his spendings.
- 6. A Customer can reserve multiple rooms at a time.
- 7. A Customer can Pay for reservation in any currency of their choice.
- 8. A Property has multiple rooms and different room types.
- 9. A Customer earns One reward point for every 50 dollars transactions made.

ER/EER DIAGRAM:



Relational Model:



STEP 3: Database Implementation

SQL Commands to Create Tables for Database:

Below are the SQL commands that were used to create tables for the database The SQL commands used to create the tables for the database can also be found in an attached word file called EDM_GROUP2_BASE_TABLES_QUERIES.docx

CUSTOMER TABLE

CREATE TABLE 'customer' (

'User name' varchar(255) NOT NULL,

```
'customer_name' varchar(255) NOT NULL,
 'customer address' varchar(255) NOT NULL,
 'customer phone' varchar(15) NOT NULL,
 'customer email' varchar(255) NOT NULL,
 PRIMARY KEY ('User name')
);
                             ACCOUNTS TABLE
CREATE TABLE 'accounts' (
 'Membership Id' varchar(50) NOT NULL,
 'User_Name' varchar(255) DEFAULT NULL,
 'Sign up Date' date DEFAULT NULL,
 PRIMARY KEY (`Membership_Id`)
);
                             PROPERTY TABLE
CREATE TABLE 'property' (
 'Property ID' int NOT NULL,
 'Property name' varchar(255) DEFAULT NULL,
 'Property phone' varchar(15) DEFAULT NULL,
 'Property email' varchar(255) DEFAULT NULL,
 'Property country' varchar(50) DEFAULT NULL,
 'Property address' varchar(255) DEFAULT NULL,
 PRIMARY KEY ('Property ID')
);
                               ROOMS TABLE
CREATE TABLE 'rooms' (
 'Room Type' varchar(50) NOT NULL,
```

```
'Property ID' int NOT NULL,
 'Total Number of rooms' int NOT NULL,
 'Price per night' decimal(10,2) DEFAULT NULL,
 PRIMARY KEY ('Room Type', 'Property ID'),
 KEY 'Property ID' ('Property ID'),
 CONSTRAINT 'rooms ibfk 1' FOREIGN KEY ('Property ID') REFERENCES
'property' ('Property ID')
);
                             RESERVATION TABLE
CREATE TABLE 'reservation' (
 'Reservation Id' varchar(50) NOT NULL,
 'Membership Id' varchar(50) DEFAULT NULL,
 'Property ID' int DEFAULT NULL,
 'Check in date' date DEFAULT NULL,
 'Check out date' date DEFAULT NULL,
 'Number of days booked' int GENERATED ALWAYS AS ((to days('Check out date') -
to_days('Check_in_date'))) STORED,
 'Number of rooms' int DEFAULT NULL,
 'Room Type' varchar(50) DEFAULT NULL,
 PRIMARY KEY ('Reservation Id'),
 KEY 'Membership Id' ('Membership Id'),
 KEY 'Property ID' ('Property ID'),
 CONSTRAINT 'reservation ibfk 1' FOREIGN KEY ('Membership Id') REFERENCES
'accounts' ('Membership Id'),
 CONSTRAINT 'reservation ibfk 2' FOREIGN KEY ('Property ID') REFERENCES
'property' ('Property ID')
);
```

TRANSACTIONS TABLE

```
CREATE TABLE 'transactions' (
 'Transaction ID' varchar(50) NOT NULL,
 'Membership Id' varchar(50) DEFAULT NULL,
 'Reservation Id' varchar(50) DEFAULT NULL,
 'Billing Currency' varchar(50) DEFAULT NULL,
 'Billing Amount' decimal(10,2) DEFAULT NULL,
 PRIMARY KEY ('Transaction ID'),
 KEY 'Membership Id' ('Membership Id'),
 CONSTRAINT `transactions_ibfk_1` FOREIGN KEY (`Membership_Id`) REFERENCES
'reservation' ('Membership Id')
);
                               REVIEW TABLE
CREATE TABLE 'review' (
 'Review ID' int NOT NULL,
 'Reservation_ID' varchar(50) DEFAULT NULL,
 'Rating' int DEFAULT NULL,
 'Comments' varchar(255) DEFAULT NULL,
 PRIMARY KEY ('Review ID'),
 KEY 'Reservation ID' ('Reservation ID'),
 CONSTRAINT 'review ibfk 1' FOREIGN KEY ('Reservation ID') REFERENCES
'reservation' ('Reservation Id')
);
                              REWARDS TABLE
CREATE TABLE 'rewards' (
 'Reward ID' int NOT NULL,
 'Membership Id' varchar(50) DEFAULT NULL,
```

```
'Transaction_Id' varchar(50) DEFAULT NULL,

'Reward_Description' varchar(255) DEFAULT 'Membership Rewards',

PRIMARY KEY ('Reward_ID'),

KEY 'Membership_Id' ('Membership_Id'),

KEY 'Transaction_Id' ('Transaction_Id'),

CONSTRAINT 'rewards_ibfk_1' FOREIGN KEY ('Membership_Id') REFERENCES 'accounts' ('Membership_Id'),

CONSTRAINT 'rewards_ibfk_2' FOREIGN KEY ('Transaction_Id') REFERENCES 'transactions' ('Transaction_ID')

);

EXCHANGE RATE TABLE

CREATE TABLE exchange_rate (

Currency varchar(3) NOT NULL,

USD_Amount decimal(10,4) DEFAULT NULL,

PRIMARY KEY (Currency)
```

SQL Commands to Insert Data Into Database:

A fake data set with a total of 180 rows was created using Excel Sheet (MIS 686 Hotel Rewards Management)

(https://ldrv.ms/x/s!AsnQHN524fFshmgG5zllOAdY6zvV?e=fDLIoV) . The data consists of data for the tables of Customer, Account, Property, Rooms, Reservation, Transaction, Rewards, Review and Exchange Rate. The corresponding INSERT commands can be found in the Word Document. These INSERT INTO commands were then used to populate the database on MYSQL Workbench. A link to the Word document with all the insert commands is provided with the report

https://ldrv.ms/w/s!AsnQHN524fFshmxTV8ts8E_eFez8?e=94FRGv.

VIEWS AND TRIGGERS:

);

Account View

```
CREATE VIEW 'account_view' AS select 'a'.'Membership Id' AS 'Membership Id',
```

```
'a'.'User Name' AS 'User Name',
'a'.'Sign up Date' AS 'Sign up Date',
count(distinct 'r'. 'Reservation Id') AS 'Number of Reservations',
coalesce(sum('t'.'Adjusted Amount USD'),0) AS 'Total Transaction Amount',
(case when (coalesce(sum('t'.'Adjusted Amount USD'),0) >= 1000) then 'Platinum' when
(coalesce(sum('t'.'Adjusted Amount USD'),0) between 750 and 999.99) then 'Gold' else
'Silver' end) AS 'Member Level',
coalesce(sum('rw'.'Reward Points'),0) AS 'Total Reward Points'
from ((('accounts' 'a' left join 'reservation' 'r' on(('a'.' Membership Id' =
`r`.`Membership_Id`))) left join `transactions_view` `t` on((`r`.`Reservation_Id` =
't'. 'Reservation Id'))) left join 'rewards view' 'rw' on(('r'. 'Reservation Id' =
'rw'.'Reservation Id'))) group by 'a'.'Membership Id';
                                   Reservation View
CREATE VIEW 'reservation view' AS
select 'r'. 'Reservation Id' AS 'Reservation Id',
'r'. 'Membership Id' AS 'Membership Id',
'r'. 'Property ID' AS 'Property ID',
'r'.'Check in date' AS 'Check in date',
'r'. 'Check out date' AS 'Check out date',
'r'. 'Number of days booked' AS 'Number of days booked',
'r'.'Number of rooms' AS 'Number of rooms',
'r'.'Room Type' AS 'Room Type',
(('r'.'Number of days booked' * 'r'.'Number of rooms') * 'rooms'.'Price per night') AS
```

Rewards View

from ('reservation' 'r' join 'rooms' on((('r'.'Property ID' = 'rooms'.'Property ID') and

CREATE VIEW `rewards_view` AS select `t`.`Transaction_ID` AS `Transaction_ID`, `a`.`Reservation_Id` AS `Reservation_Id`,

('r'.'Room Type' = 'rooms'.'Room Type'))))

'Reservation Amount'

```
`t`.`Membership_Id` AS `Membership_Id`,
```

'Memberlevel Rewards' AS 'Rewards Description'

from (`transactions_view` `t` join `reservation` `a` on((`t`.`Reservation_Id` =
 `a`.`Reservation_Id`)))

Rooms View

CREATE VIEW 'rooms view' AS

select distinct 'r'. 'Room Type' AS 'Room Type',

'r'. 'Property ID' AS 'Property ID',

'r'. 'Total Number of rooms' AS 'Total Number of rooms',

're'.'Number of rooms' AS 'Number of rooms Booked',

('r'.'Total_Number_of_rooms' - 're'.'Number_of_rooms') AS 'Number_of_rooms_available',

`r`.`Price_per_night` AS `Price_per_night`

from ('rooms' 'r' join 'reservation' 're' on(('re'. 'Room Type' = 'r'. 'Room Type')))

Transaction View

CREATE VIEW 'transactions view' AS

select 't'. 'Transaction_ID' AS 'Transaction_ID',

- 't'. 'Reservation Id' AS 'Reservation Id',
- 't'. 'Membership Id' AS 'Membership Id',
- 't'. 'Billing_Currency' AS 'Billing_Currency',
- 't'. 'Billing Amount' AS 'Billing Amount',

truncate(('t'.'Billing_Amount' * 'e'.'USD_Amount'),2) AS 'Adjusted_Amount_USD'

Trigger

Trigger to Calculate Reward Points after every Transaction:

```
DELIMITER //

CREATE TRIGGER calculate_reward_points

BEFORE INSERT ON REWARDS

FOR EACH ROW

BEGIN

DECLARE adjusted_amount DECIMAL(10, 2);

-- Fetch the adjusted amount from the associated transaction

SELECT Adjusted_Amount_USD INTO adjusted_amount

FROM transactions

WHERE Transaction_ID = NEW.Transaction_Id;

-- Calculate and set the Reward_Points based on the adjusted amount

SET NEW.Reward_Points = ROUND(adjusted_amount / 50);

END;

//

DELIMITER;
```

Analytical Questions and SQL Queries:

1. Which Property has Performed well in terms of number of reservations?

```
SELECT p.'Property_name', COUNT(r.'Reservation_Id') AS
'Number_of_Reservations'
FROM 'property' p
JOIN 'reservation' r ON p.'Property_ID' = r.'Property_ID'
GROUP BY p.'Property_name'
ORDER BY 'Number_of_Reservations' DESC
LIMIT 1;
```

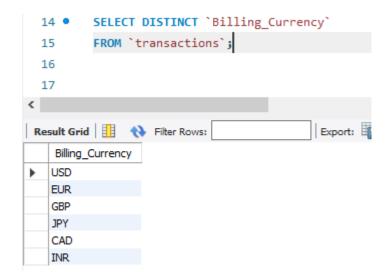
```
SELECT p. Property_name', COUNT(r. Reservation_Id') AS 'Number_of_Reservations'
  2
        FROM 'property' p
        JOIN `reservation` r ON p.`Property_ID` = r.`Property_ID`
  3
        GROUP BY p. Property_name
  4
        ORDER BY 'Number of Reservations' DESC
        LIMIT 1;
  6
                                          Export: Wrap Cell Content: A Fetch rows:
Result Grid
             Filter Rows:
   Property_name
                Number_of_Reservations
 Cosy Lodge
```

2. Which Room type has the highest number of Bookings across all Properties?

```
SELECT 'Room Type', COUNT('Reservation Id') AS 'Number of Bookings'
FROM 'reservation'
GROUP BY 'Room_Type'
ORDER BY 'Number of Bookings' DESC
LIMIT 1;
          SELECT `Room_Type`, COUNT(`Reservation_Id`) AS `Number_of_Bookings`
          FROM `reservation`
   9
          GROUP BY 'Room Type'
  10
          ORDER BY 'Number_of_Bookings' DESC
  11
  12
          LIMIT 1;
 Result Grid
                                          Export: Wrap Cell Content: TA Fetch rows:
               Filter Rows:
                 Number_of_Bookings
    Room_Type
   Standard Room
```

3. Which currencies were used to pay for reservations across all Properties?

```
SELECT DISTINCT `Billing_Currency` FROM `transactions`;
```



4. Which Customer Spends the Most on reservations?

```
SELECT a. 'User Name', SUM(t.'Adjusted Amount USD') AS 'Total Spending'
FROM 'accounts' a
JOIN 'reservation' r ON a. 'Membership Id' = r. 'Membership Id'
JOIN 'transactions view' t ON r. 'Reservation Id' = t. 'Reservation Id'
GROUP BY a.'User Name'
ORDER BY 'Total Spending' DESC
LIMIT 1;
  19 •
         SELECT a. `User_Name`, SUM(t. `Adjusted_Amount_USD`) AS `Total_Spending`
  20
         FROM 'accounts' a
          JOIN `reservation` r ON a.`Membership_Id` = r.`Membership_Id`
  21
          JOIN `transactions_view` t ON r.`Reservation_Id` = t.`Reservation_Id`
  22
         GROUP BY a. User Name'
  23
  24
         ORDER BY 'Total_Spending' DESC
  25
         LIMIT 1;
                                           Export: Wrap Cell Content: TA Fetch rows:
 Result Grid
               Filter Rows:
    User_Name
              Total_Spending
   john doe
              3531.50
```

5. List of Top three customers who spent most on reservations?

```
SELECT a.'User_Name', SUM(t.'Adjusted_Amount_USD') AS 'Total_Spending'
FROM 'accounts' a

JOIN 'reservation' r ON a.'Membership_Id' = r.'Membership_Id'

JOIN 'transactions_view' t ON r.'Reservation_Id' = t.'Reservation_Id'

GROUP BY a.'User_Name'

ORDER BY 'Total_Spending' DESC

LIMIT 3;
```

```
27 •
         SELECT a. User_Name', SUM(t. Adjusted_Amount_USD') AS 'Total_Spending'
 28
         FROM 'accounts' a
         JOIN `reservation` r ON a.`Membership Id` = r.`Membership Id`
 29
         JOIN `transactions_view` t ON r.`Reservation_Id` = t.`Reservation Id`
 30
         GROUP BY a. `User Name`
 31
         ORDER BY 'Total_Spending' DESC
 32
         LIMIT 3;
 33
Result Grid
                                           Export: Wrap Cell Content: A Fetch rows:
             Filter Rows:
   User_Name
               Total_Spending
  john_doe
                3531.50
  emma_wilson
                3456.00
  michael_brown 2871.50
```

6. Which Property has the highest total revenue from reservations?

```
SELECT p. 'Property name', SUM(t.'Adjusted Amount USD') AS 'Total Revenue'
FROM 'property' p
JOIN 'reservation' r ON p. 'Property ID' = r. 'Property ID'
JOIN 'transactions view' t ON r. 'Reservation Id' = t. 'Reservation Id'
GROUP BY p. Property name
ORDER BY 'Total Revenue' DESC
LIMIT 1;
   35 •
          SELECT p. Property_name`, SUM(t. Adjusted_Amount_USD`) AS `Total_Revenue`
   36
          FROM 'property' p
           JOIN `reservation` r ON p.`Property_ID` = r.`Property_ID`
          JOIN `transactions_view` t ON r.`Reservation_Id` = t.`Reservation_Id`
   38
          GROUP BY p. Property_name
   39
          ORDER BY 'Total_Revenue' DESC
   40
          LIMIT 1;
   41
                                          Export: Wrap Cell Content: TA Fetch rows:
  Property_name
                   Total_Revenue
    Riverside Retreat
                   4356.00
```

7. What is the average duration of stay for each Room Type?

```
SELECT `Room_Type`, AVG(`Number_of_days_booked`) AS 
`Average_Stay_Duration`
FROM `reservation`
GROUP BY `Room_Type`;
```

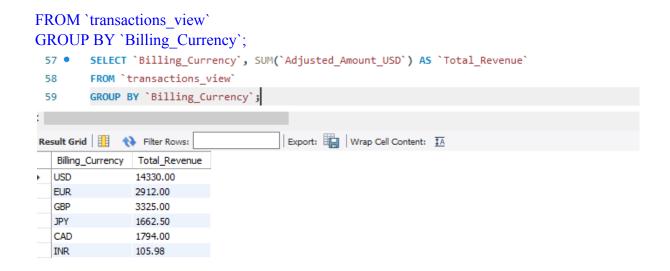
```
SELECT `Room_Type`, AVG(`Number_of_days_booked`) AS `Average_Stay_Duration`
 43 •
 44
          FROM `reservation`
          GROUP BY `Room_Type`;
 45
 46
Result Grid
                                                Export: Wrap Cell Content: IA
                Filter Rows:
   Room_Type
                     Average_Stay_Duration
  Deluxe Suite
                    6.0000
                   5.0000
  Ocean View Room
  Mountain Cabin
                    5.0000
  City View Suite
                   7.0000
  Rural Cottage
                    4.0000
  Standard Room
                    5.5000
  Lake View Suite
                    5.0000
  Cityscape Room
                 5.0000
  Riverside Cabin
                    6.5000
  Tranquility Suite 5.0000
  Executive Suite
                    6.0000
  Beachfront Villa
                   5.0000
  Forest Cabin
                    5.0000
  Mountain View S... 7.0000
  Garden Cottage
                    4.0000
```

8. Which month had the highest number of reservations?

```
SELECT MONTH('Check_in_date') AS 'Reservation_Month', COUNT('Reservation_Id') AS 'Number_of_Reservations' FROM 'reservation'
GROUP BY 'Reservation_Month'
ORDER BY 'Number_of_Reservations' DESC
LIMIT 1;
```

9. What is the total revenue from reservations for each currency?

```
SELECT 'Billing Currency', SUM('Adjusted Amount USD') AS 'Total Revenue'
```



10. Which Customer made the earliest reservation?

```
SELECT a.'User Name', MIN(r.'Check in date') AS 'Earliest Reservation Date'
FROM 'accounts' a
JOIN 'reservation' r ON a. 'Membership Id' = r. 'Membership Id'
GROUP BY a.'User Name'
ORDER BY 'Earliest Reservation Date'
LIMIT 1;
         SELECT a.'User_Name', MIN(r.'Check_in_date') AS 'Earliest_Reservation_Date'
  61 •
         FROM 'accounts' a
  62
          JOIN `reservation` r ON a.`Membership_Id` = r.`Membership_Id`
  63
          GROUP BY a. User_Name
          ORDER BY `Earliest Reservation Date`
  65
  66
          LIMIT 1;
<
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 Result Grid
              Filter Rows:
    User Name | Earliest Reservation Date
```

11. How many customers are Platinum Members?

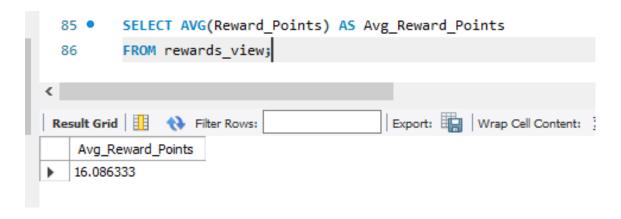
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john_doe

```
SELECT COUNT(Membership_Id) AS Platinum_Members_Count FROM account_view
WHERE Member_Level = 'Platinum';
```

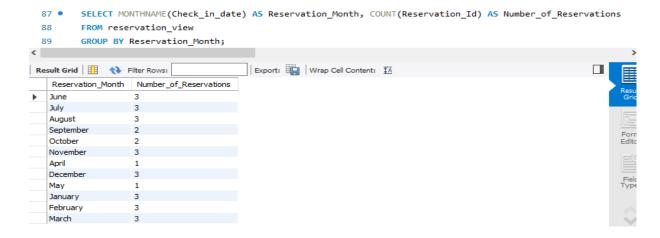
12. What is the average number of reward points earned per reservation?

SELECT AVG(Reward_Points) AS Avg_Reward_Points FROM rewards view;



13. How many reservations were made each month?

SELECT MONTHNAME(Check_in_date) AS Reservation_Month, COUNT(Reservation_Id) AS Number_of_Reservations FROM reservation_view
GROUP BY Reservation Month;



STEP 4: Enterprise (web) Database Dashboard

The database dashboard can be found under the following link:

Hotel Booking Management System | Tableau Public

(https://public.tableau.com/app/profile/saurabh.kumar3759/viz/HotelRewardsManagementSystem/Story2?publish=yes)

Hotel Management System Dashboard by Sharon, Bhavana, Kiran and Saurabh



Hotel Booking Analytics-1 Hotel Booking Analytics-2



