TOURISM MANAGEMENT

A PROJECT REPORT

Submitted by

Diva Merja [RA2211003011034]
Sree Charanya [RA2211003011046]

Under the Guidance of

Dr. M. Kandan

Assistant Professor, Department of Computing Technologies

in partial fulfillment of the requirements for the degree of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

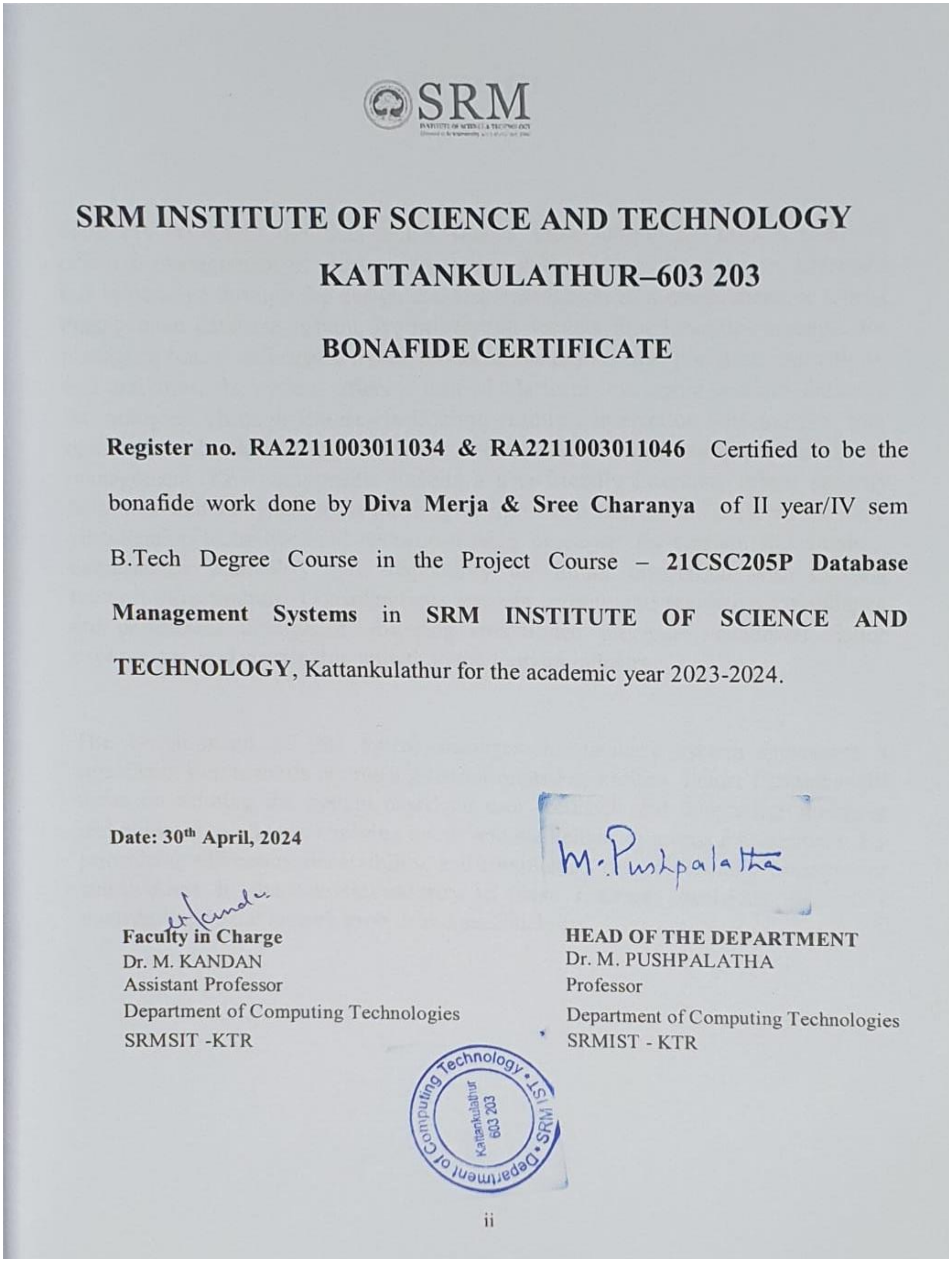
DEPARTMENT OF COMPUTING TECHNOLOGIES

COLLEGE OF ENGINEERING AND TECHNOLOGY

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

KATTANKULATHUR– 603 203

MAY 2024



SRM

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
KATTANKULATHUR–603 203

BONAFIDE CERTIFICATE

Register no. RA2211003011034 & RA2211003011046 Certified to be the bonafide work done by **Diva Merja & Sree Charanya** of II year/IV sem B.Tech Degree Course in the Project Course – **21CSC205P Database Management Systems** in **SRM INSTITUTE OF SCIENCE AND TECHNOLOGY**, Kattankulathur for the academic year 2023-2024.

Date: 30th April, 2024

[illegible]

Faculty in Charge
Dr. M. KANDAN
Assistant Professor
Department of Computing Technologies
SRMSIT -KTR

M.Pushpalatha

HEAD OF THE DEPARTMENT
Dr. M. PUSHPALATHA
Professor
Department of Computing Technologies
SRMIST - KTR

Department of Computing Technology • SRM IST •
Kattankulathur
603 203

ABSTRACT

Tourism's economic significance has soared, underscoring the critical need for effective management of tourist information and services. This project addresses this imperative through the design and implementation of a comprehensive tourist management database system. By integrating various functionalities essential for managing tourist information such as accommodation, transportation, attractions, and activities, the system offers a unified platform leveraging modern database technologies. Through features facilitating seamless interaction with tourists, tour operators, and stakeholders, the system ensures efficient data storage, retrieval, and management. Key components include a user-friendly interface, robust security measures, and analytical tools for insights into tourist trends and preferences. Data visualization techniques aid decision-making processes for tourism stakeholders, emphasizing scalability and adaptability for future integration with existing tourism infrastructure. Considerations for data privacy and regulatory compliance are paramount throughout, fostering streamlined processes, enhanced visitor experiences, and sustainable growth in the tourism industry.

The development of this tourist management database system represents a significant step towards optimizing tourist-related operations. Future iterations will focus on refining the system based on user feedback and integrating emerging technologies to address evolving needs and challenges in tourist management. By prioritizing efficiency, accessibility, and compliance, this project aims to empower stakeholders in the tourism industry to make informed decisions, ultimately contributing to the sector's growth and sustainability.

TABLE OF CONTENTS

Chapter-1

Problem understanding, Identification of Entity and Relationships, Construction of DB using ER Model for the project

The problem statement for tourism management databases encompasses a myriad of challenges that demand strategic solutions for effective management and optimization of tourism operations. One of the primary challenges revolves around the fragmented nature of data sources within the tourism industry. Information pertinent to bookings, reservations, customer profiles, and inventory often exists in disparate systems, making it difficult to consolidate and utilize data efficiently. This fragmentation impedes seamless information flow, leading to inconsistencies and integrity issues within databases.

Customer Relationship Management (CRM) presents another critical challenge in tourism management databases. The tourism industry relies heavily on building and maintaining strong relationships with customers. This entails meticulous handling of sensitive customer data, tracking interactions across various touchpoints, and implementing targeted marketing strategies to enhance customer satisfaction and loyalty. However, ensuring data security, privacy, and compliance with regulations such as GDPR (General Data Protection Regulation) and CCPA (California Consumer Privacy Act) is paramount due to the sensitive nature of customer information.

Additionally, seamless integration with external systems is essential for tourism management databases to operate efficiently. This includes coordination with suppliers, such as hotels, airlines, and tour operators, to facilitate real-time bookings and updates. Integration with external booking platforms and distribution channels is also crucial for maximizing visibility and reaching a broader audience. Without seamless integration capabilities, tourism businesses may face difficulties in managing inventory, pricing, and availability across various channels.

Furthermore, robust reporting and analytics capabilities are indispensable for informed decision-making in the tourism sector. Access to timely and accurate data insights enables businesses to identify trends, monitor performance, and optimize strategies to stay competitive in a dynamic market environment. Analyzing customer behavior, booking patterns, and market trends empowers tourism businesses to make data-driven decisions that drive growth and profitability.

In summary, the challenges associated with tourism management databases are multifaceted, spanning data fragmentation, reservation complexities, CRM intricacies, integration hurdles, reporting needs, and industry adaptability. Addressing these challenges requires a holistic approach encompassing technological innovation, strategic planning, and a commitment to data security and compliance. By overcoming these challenges, tourism businesses can unlock new opportunities for growth, enhance customer experiences, and maintain a competitive edge in the dynamic tourism landscape.

1.1 Existing System

Existing solutions for tourism management databases often rely on Customer Relationship Management (CRM) and Enterprise Resource Planning (ERP) systems to streamline operations, manage reservations, and handle customer data. While these systems offer certain benefits, they also come with several disadvantages that can hinder their effectiveness in addressing the complex needs of the tourism industry.

One significant drawback of existing solutions is the high implementation costs associated with CRM and ERP systems. The initial investment required for software licenses, customization, and implementation services can be substantial, particularly for small and medium-sized tourism businesses with limited resources. Additionally, ongoing maintenance and support costs further contribute to the total cost of ownership, making these solutions financially prohibitive for some organizations.

Integration complexities present another challenge for existing tourism management databases. Integrating CRM and ERP systems with existing infrastructure, external booking platforms, and distribution channels can be a complex and time-consuming process. Compatibility issues, data migration challenges, and the need for custom development can prolong implementation timelines and increase project risks.

1.1 Objective of the Project

The objective of this project is to develop an innovative and comprehensive tourism management database system that addresses the multifaceted challenges faced by the tourism industry. This system aims to streamline operations, enhance customer experiences, and optimize business processes through efficient handling of reservations, dynamic inventory management, and robust customer relationship management (CRM) capabilities.

The primary goal is to create a solution that overcomes the limitations of existing CRM and Enterprise Resource Planning (ERP) systems, offering a more cost-effective, flexible, and user-friendly alternative. By leveraging modern technologies such as cloud computing, artificial intelligence, and data analytics, the proposed system seeks to deliver superior performance and scalability while accommodating the evolving needs of tourism businesses.

Integration and Consolidation: Develop a unified platform that integrates fragmented data sources and consolidates information related to bookings, reservations, customer profiles, and inventory. This will facilitate seamless information flow, minimize data redundancy, and improve data integrity within the database.

Real-time Booking and Inventory Management: Implement functionalities for handling real-time bookings, coordinating with suppliers, and dynamically adjusting inventory based on demand fluctuations. This will help prevent overbooking situations, optimize resource utilization, and enhance operational efficiency.

Reporting and Analytics: Implement robust reporting and analytics capabilities to provide insights into customer behavior, booking patterns, and market trends. This will empower tourism businesses to make informed decisions, identify opportunities for growth, and stay ahead of competitors.

Overall, the project aims to deliver a cutting-edge tourism management database system that addresses the complex needs of the industry, fosters innovation, and drives sustainable growth in the tourism sector.

2) ER Diagram

2.1 Entity and Their Attributes

List out all the entity with its attributes one by one.

Login Entity:

Contains login credentials for users.login_ID serves as the primary key.Includes Login_username, login_role_ID, and User_password attributes.Facilitates authentication and authorization processes.

User Entity:

It has UserId, Email, address, phone no, name. Name is composite attribute of firstname and lastname. Phone no is multi valued attribute. UserId is the Primary Key for User entity. It also has age attribute which is a derived attribute .

Hotel Entity:

Manages hotel booking information.Attributes include Htl_ID, Htl_rent, Htl_desc, Htl_name, and Htl_type.Provides comprehensive details about each hotel.Essential for tracking and managing hotel accommodations.

Booking Entity:

Handles booking information.Attributes include book_ID, book_title, book_desc, book_type, and book_date.Facilitates efficient tracking and management of bookings.Crucial for scheduling and organizing travel arrangements.

Travel Agent Entity:

Contains information about travel agents.TA_ID serves as the primary key.Includes TA_name and TA_desc attributes.Offers insights into services provided by travel agents.Integral for coordinating travel arrangements and services.

2.2 Relationships between Entities:

HAS:

Relationship between Login and User entities.

Explanation: Each login is associated with a user, indicating which user the login credentials belong to.

MANAGE:

Relationship between User and Booking entities.

Explanation: Each user manages one or more bookings, indicating the user's association with booking activities.

MANAGE:

Relationship between Booking and Hotel entities.

Explanation: Each booking is associated with a hotel, indicating the hotel where the booking is made.

HAS:

Relationship between Booking and TravelAgent entities.

Explanation: Each booking is associated with a travel agent, indicating the travel agent involved in arranging the booking.

ER DIAGRAM:

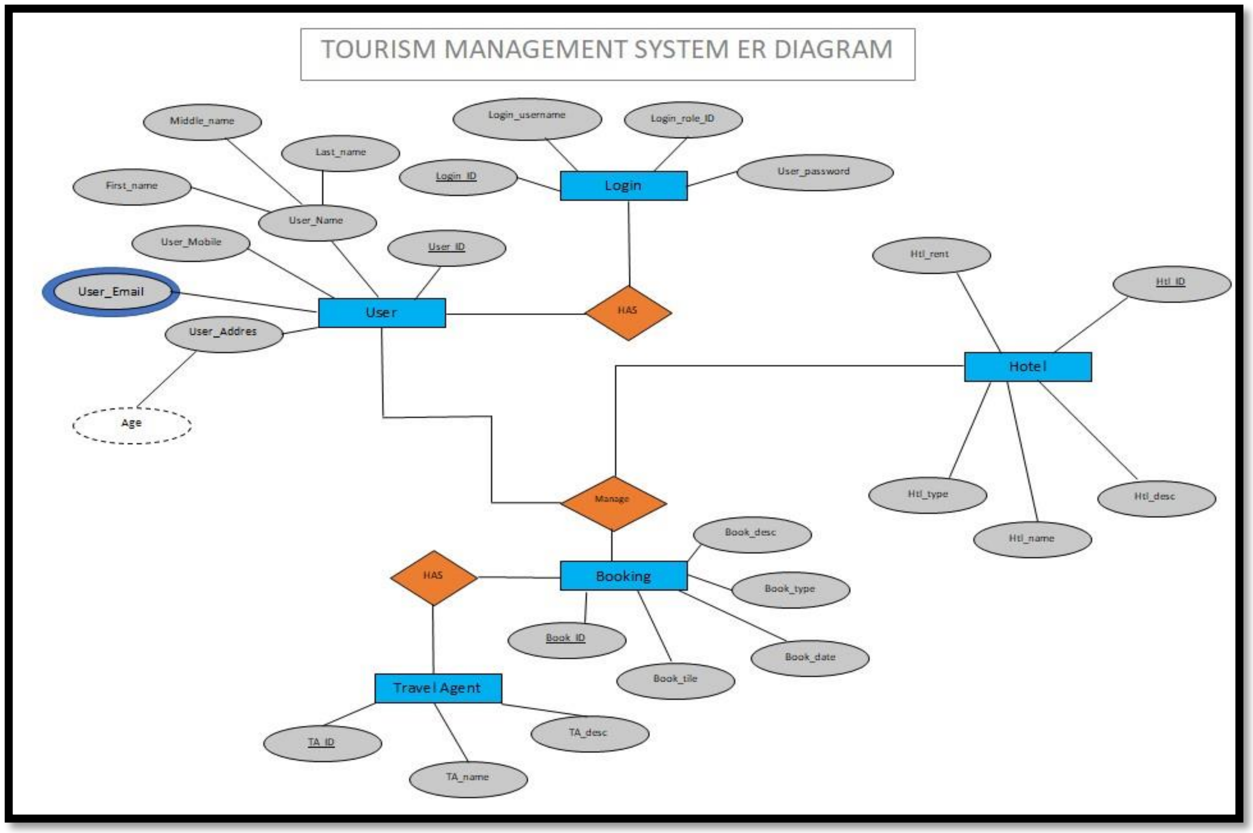


Figure 2.1 ER Diagram for Tourism Management.

Chapter-2

Design of Relational Schemas, Creation of Database Tables for the project

3. Relational Tables and Schema

3.1 Schema Diagram

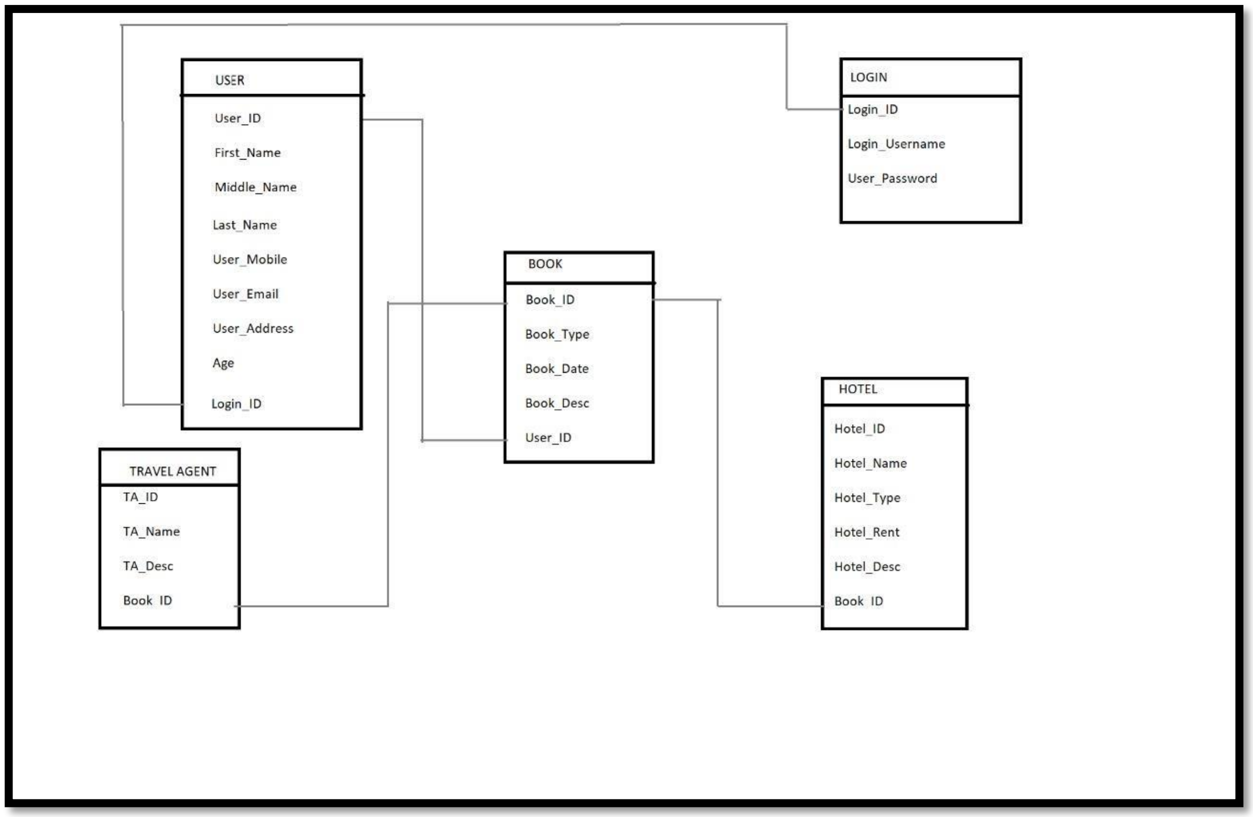


Figure 3.1 Schema Diagram for Tourism Management

3.1.1 Schema

Entities:

Login(Login_ID , Login_username , User_password)

User(User_ID , User_name ,User_mobile ,User_email ,User_address ,Age ,Login_ID)

Booking(Book_ID ,Book_Type ,Book_Date ,Book_Desc ,User_ID)

Hotel(Hotel_ID ,Hotel_Name ,Hotel_Type ,Hotel_Rent ,Hotel_Desc ,Book_ID)

TravelAgent(TA_ID ,TA_Name ,TA_Desc ,Book_ID)

Relationships:

HAS(Login_ID,User_ID)

MANAGE(User_ID,Book_ID)

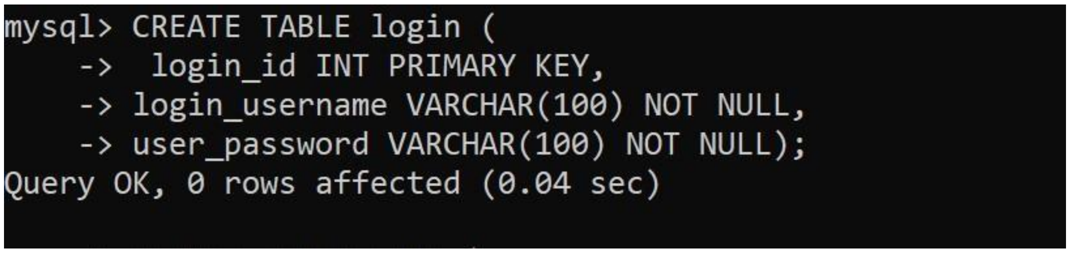
MANAGE(Book_ID,Hotel_ID)

HAS(Book_ID,TA_ID)

3.2 Relational Tables

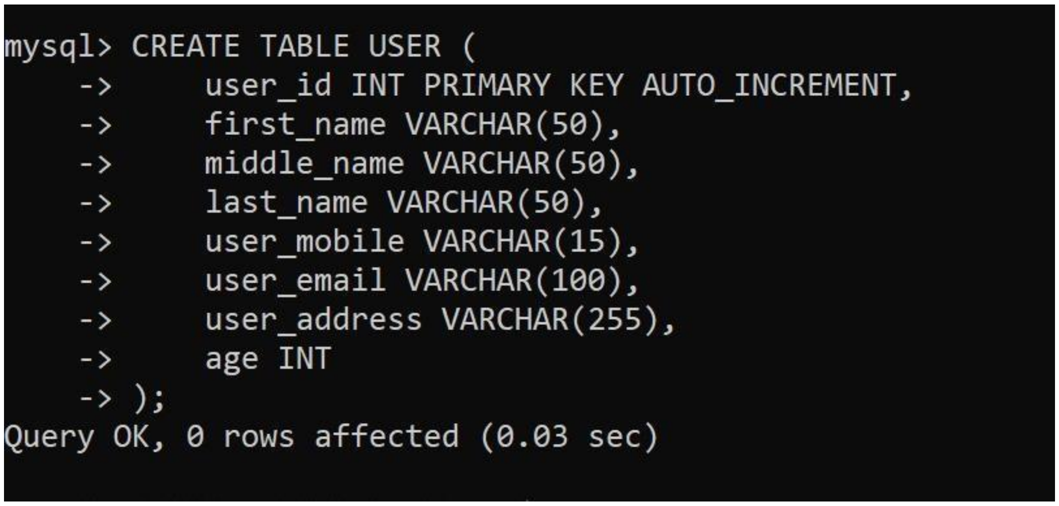
3.2.1 DDL Commands and Results

1) **Creating the Login Table:**



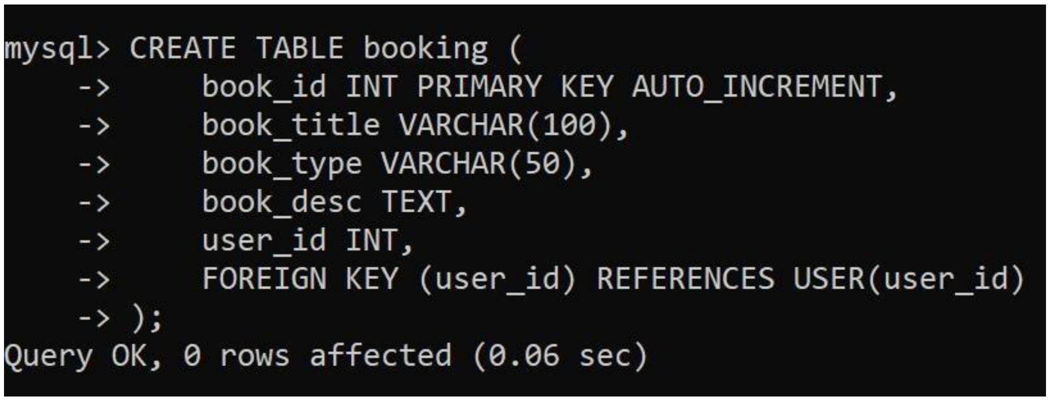
```
mysql> CREATE TABLE login (
    ->  login_id INT PRIMARY KEY,
    -> login_username VARCHAR(100) NOT NULL,
    -> user_password VARCHAR(100) NOT NULL);
Query OK, 0 rows affected (0.04 sec)
```

2) **Creating the User Table:**



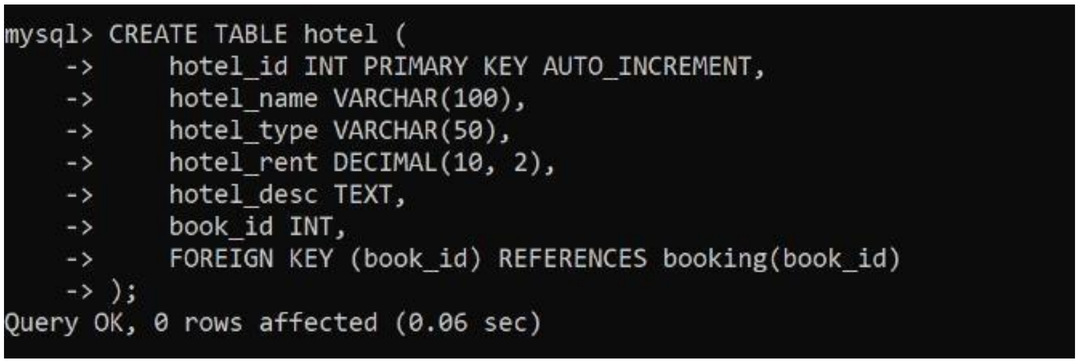
```
mysql> CREATE TABLE USER (
    ->     user_id INT PRIMARY KEY AUTO_INCREMENT,
    ->     first_name VARCHAR(50),
    ->     middle_name VARCHAR(50),
    ->     last_name VARCHAR(50),
    ->     user_mobile VARCHAR(15),
    ->     user_email VARCHAR(100),
    ->     user_address VARCHAR(255),
    ->     age INT
    -> );
Query OK, 0 rows affected (0.03 sec)
```

3) **Creating the Booking Table:**



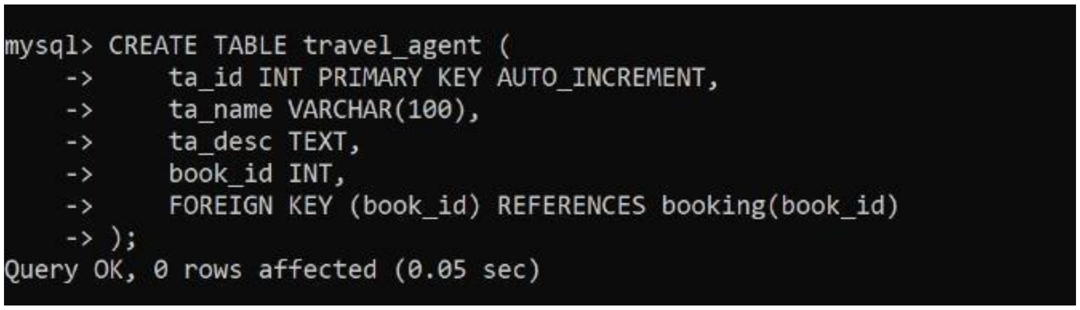
```
mysql> CREATE TABLE booking (
    ->     book_id INT PRIMARY KEY AUTO_INCREMENT,
    ->     book_title VARCHAR(100),
    ->     book_type VARCHAR(50),
    ->     book_desc TEXT,
    ->     user_id INT,
    ->     FOREIGN KEY (user_id) REFERENCES USER(user_id)
    -> );
Query OK, 0 rows affected (0.06 sec)
```

4) Creating the Hotel Table:



```
mysql> CREATE TABLE hotel (
    ->     hotel_id INT PRIMARY KEY AUTO_INCREMENT,
    ->     hotel_name VARCHAR(100),
    ->     hotel_type VARCHAR(50),
    ->     hotel_rent DECIMAL(10, 2),
    ->     hotel_desc TEXT,
    ->     book_id INT,
    ->     FOREIGN KEY (book_id) REFERENCES booking(book_id)
    -> );
Query OK, 0 rows affected (0.06 sec)
```

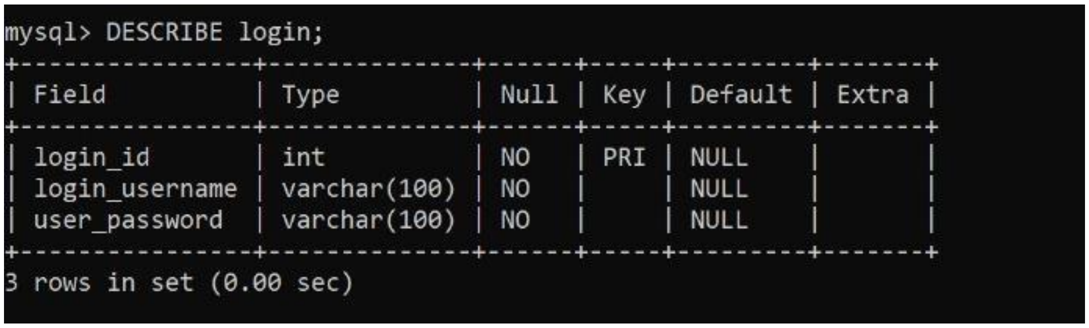
5) Creating the Travel Agent Table:



```
mysql> CREATE TABLE travel_agent (
    ->     ta_id INT PRIMARY KEY AUTO_INCREMENT,
    ->     ta_name VARCHAR(100),
    ->     ta_desc TEXT,
    ->     book_id INT,
    ->     FOREIGN KEY (book_id) REFERENCES booking(book_id)
    -> );
Query OK, 0 rows affected (0.05 sec)
```

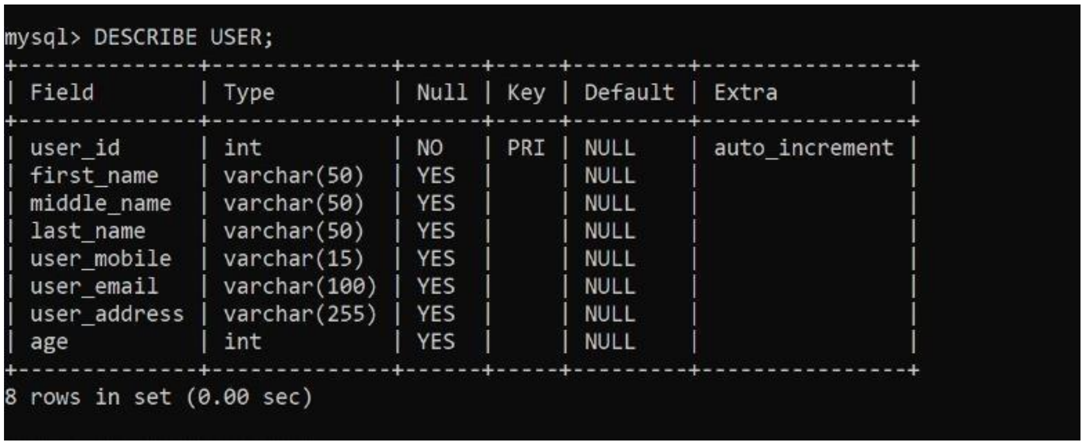
The Tables will be created as following :

(a)Login Table:



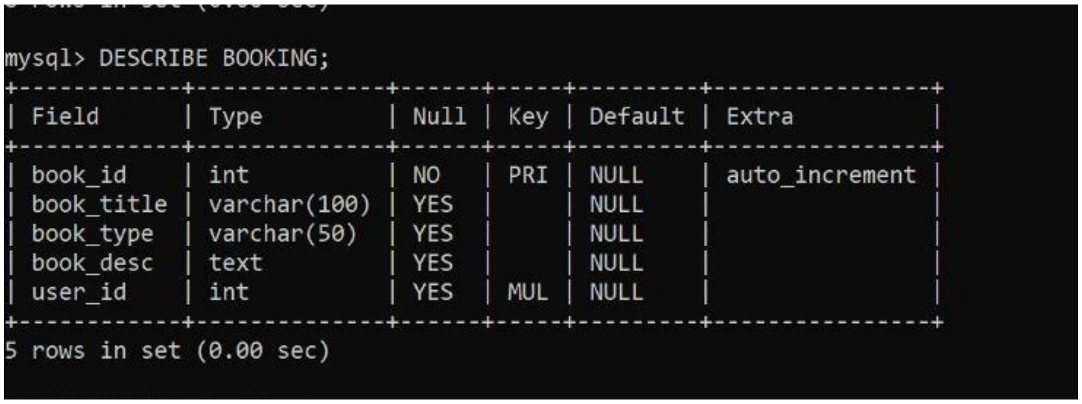
```
mysql> DESCRIBE login;
+----------------+--------------+------+-----+---------+-------+
| Field          | Type         | Null | Key | Default | Extra |
+----------------+--------------+------+-----+---------+-------+
| login_id       | int          | NO   | PRI | NULL    |       |
| login_username | varchar(100) | NO   |     | NULL    |       |
| user_password  | varchar(100) | NO   |     | NULL    |       |
+----------------+--------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

(b) User Table:



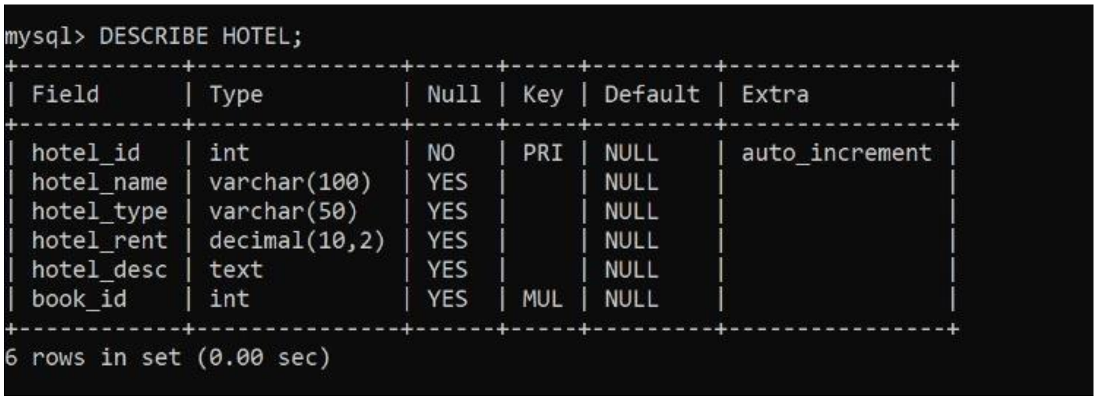
```
mysql> DESCRIBE USER;
+--------------+--------------+------+-----+---------+----------------+
| Field        | Type         | Null | Key | Default | Extra          |
+--------------+--------------+------+-----+---------+----------------+
| user_id      | int          | NO   | PRI | NULL    | auto_increment |
| first_name   | varchar(50)  | YES  |     | NULL    |                |
| middle_name  | varchar(50)  | YES  |     | NULL    |                |
| last_name    | varchar(50)  | YES  |     | NULL    |                |
| user_mobile  | varchar(15)  | YES  |     | NULL    |                |
| user_email   | varchar(100) | YES  |     | NULL    |                |
| user_address | varchar(255) | YES  |     | NULL    |                |
| age          | int          | YES  |     | NULL    |                |
+--------------+--------------+------+-----+---------+----------------+
8 rows in set (0.00 sec)
```

(c) Booking Table:



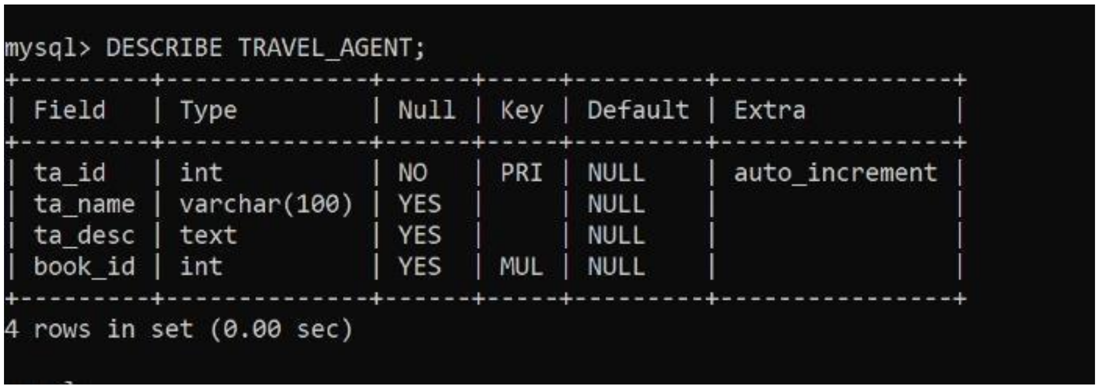
```
mysql> DESCRIBE BOOKING;
+------------+--------------+------+-----+---------+----------------+
| Field      | Type         | Null | Key | Default | Extra          |
+------------+--------------+------+-----+---------+----------------+
| book_id    | int          | NO   | PRI | NULL    | auto_increment |
| book_title | varchar(100) | YES  |     | NULL    |                |
| book_type  | varchar(50)  | YES  |     | NULL    |                |
| book_desc  | text         | YES  |     | NULL    |                |
| user_id    | int          | YES  | MUL | NULL    |                |
+------------+--------------+------+-----+---------+----------------+
5 rows in set (0.00 sec)
```

(d) Hotel Table:



```
mysql> DESCRIBE HOTEL;
+------------+---------------+------+-----+---------+----------------+
| Field      | Type          | Null | Key | Default | Extra          |
+------------+---------------+------+-----+---------+----------------+
| hotel_id   | int           | NO   | PRI | NULL    | auto_increment |
| hotel_name | varchar(100)  | YES  |     | NULL    |                |
| hotel_type | varchar(50)   | YES  |     | NULL    |                |
| hotel_rent | decimal(10,2) | YES  |     | NULL    |                |
| hotel_desc | text          | YES  |     | NULL    |                |
| book_id    | int           | YES  | MUL | NULL    |                |
+------------+---------------+------+-----+---------+----------------+
6 rows in set (0.00 sec)
```

(e) Travel Agent Table:

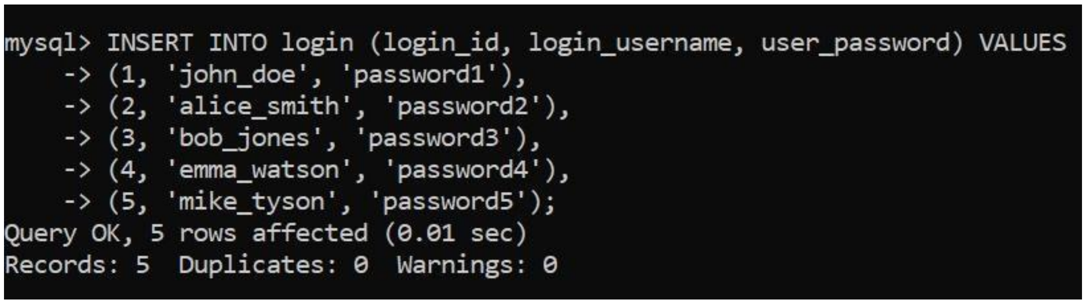


```
mysql> DESCRIBE TRAVEL_AGENT;
+---------+--------------+------+-----+---------+----------------+
| Field   | Type         | Null | Key | Default | Extra          |
+---------+--------------+------+-----+---------+----------------+
| ta_id   | int          | NO   | PRI | NULL    | auto_increment |
| ta_name | varchar(100) | YES  |     | NULL    |                |
| ta_desc | text         | YES  |     | NULL    |                |
| book_id | int          | YES  | MUL | NULL    |                |
+---------+--------------+------+-----+---------+----------------+
4 rows in set (0.00 sec)
```

Figure 3.2 Create a Tables using DDL Commands for Your Topic

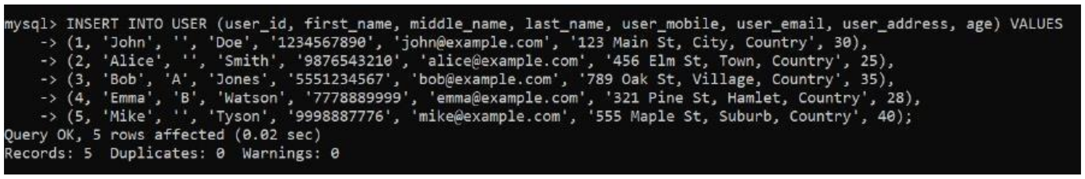
3.2.1 DML Commands (INSERT) and Results:

1. **Insertion of data into login table:**



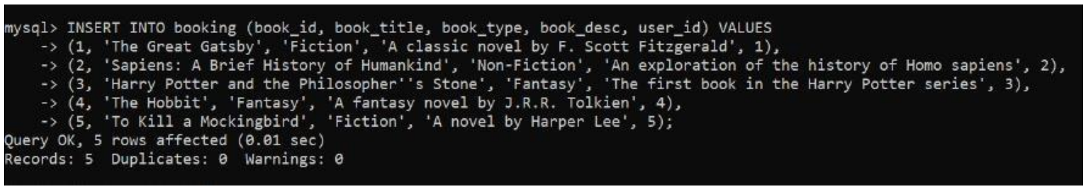
```
mysql> INSERT INTO login (login_id, login_username, user_password) VALUES
    -> (1, 'john_doe', 'password1'),
    -> (2, 'alice_smith', 'password2'),
    -> (3, 'bob_jones', 'password3'),
    -> (4, 'emma_watson', 'password4'),
    -> (5, 'mike_tyson', 'password5');
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

2. **Insertion of data into user table:**



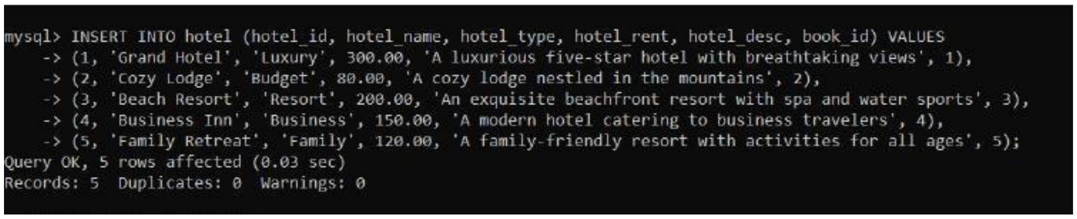
```
mysql> INSERT INTO USER (user_id, first_name, middle_name, last_name, user_mobile, user_email, user_address, age) VALUES
    -> (1, 'John', '', 'Doe', '1234567890', 'john@example.com', '123 Main St, City, Country', 30),
    -> (2, 'Alice', '', 'Smith', '9876543210', 'alice@example.com', '456 Elm St, Town, Country', 25),
    -> (3, 'Bob', 'A', 'Jones', '5551234567', 'bob@example.com', '789 Oak St, Village, Country', 35),
    -> (4, 'Emma', 'B', 'Watson', '7778889999', 'emma@example.com', '321 Pine St, Hamlet, Country', 28),
    -> (5, 'Mike', '', 'Tyson', '9998887776', 'mike@example.com', '555 Maple St, Suburb, Country', 40);
Query OK, 5 rows affected (0.02 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

3. **Insertion of data into booking table:**



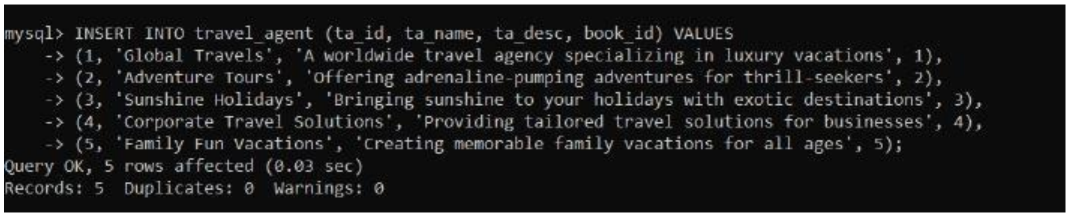
```
mysql> INSERT INTO booking (book_id, book_title, book_type, book_desc, user_id) VALUES
    -> (1, 'The Great Gatsby', 'Fiction', 'A classic novel by F. Scott Fitzgerald', 1),
    -> (2, 'Sapiens: A Brief History of Humankind', 'Non-Fiction', 'An exploration of the history of Homo sapiens', 2),
    -> (3, 'Harry Potter and the Philosopher''s Stone', 'Fantasy', 'The first book in the Harry Potter series', 3),
    -> (4, 'The Hobbit', 'Fantasy', 'A fantasy novel by J.R.R. Tolkien', 4),
    -> (5, 'To Kill a Mockingbird', 'Fiction', 'A novel by Harper Lee', 5);
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

4. **Insertion of data into hotel table:**



```
mysql> INSERT INTO hotel (hotel_id, hotel_name, hotel_type, hotel_rent, hotel_desc, book_id) VALUES
    -> (1, 'Grand Hotel', 'Luxury', 300.00, 'A luxurious five-star hotel with breathtaking views', 1),
    -> (2, 'Cozy Lodge', 'Budget', 80.00, 'A cozy lodge nestled in the mountains', 2),
    -> (3, 'Beach Resort', 'Resort', 200.00, 'An exquisite beachfront resort with spa and water sports', 3),
    -> (4, 'Business Inn', 'Business', 150.00, 'A modern hotel catering to business travelers', 4),
    -> (5, 'Family Retreat', 'Family', 120.00, 'A family-friendly resort with activities for all ages', 5);
Query OK, 5 rows affected (0.03 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

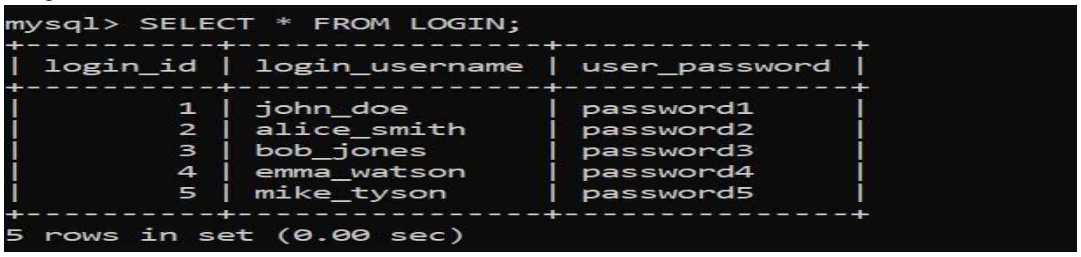
5. **Insertion of data into travel agent table:**



```
mysql> INSERT INTO travel_agent (ta_id, ta_name, ta_desc, book_id) VALUES
    -> (1, 'Global Travels', 'A worldwide travel agency specializing in luxury vacations', 1),
    -> (2, 'Adventure Tours', 'Offering adrenaline-pumping adventures for thrill-seekers', 2),
    -> (3, 'Sunshine Holidays', 'Bringing sunshine to your holidays with exotic destinations', 3),
    -> (4, 'Corporate Travel Solutions', 'Providing tailored travel solutions for businesses', 4),
    -> (5, 'Family Fun Vacations', 'Creating memorable family vacations for all ages', 5);
Query OK, 5 rows affected (0.03 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

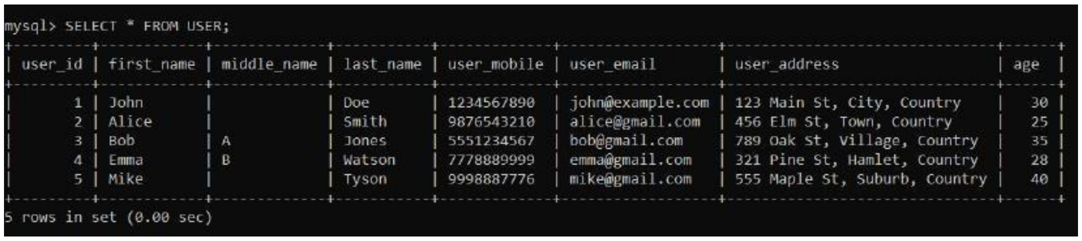
The data will be inserted in the table as follows:

1. **Login Table:**



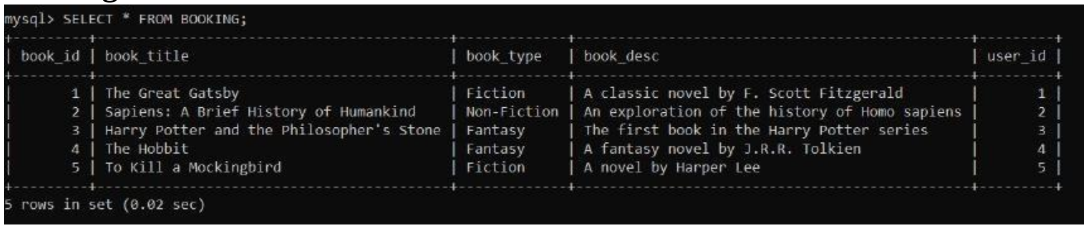
```
mysql> SELECT * FROM LOGIN;
+----------+----------------+----------------+
| login_id | login_username | user_password  |
+----------+----------------+----------------+
|        1 | john_doe       | password1      |
|        2 | alice_smith    | password2      |
|        3 | bob_jones      | password3      |
|        4 | emma_watson    | password4      |
|        5 | mike_tyson     | password5      |
+----------+----------------+----------------+
5 rows in set (0.00 sec)
```

2. **User Table:**



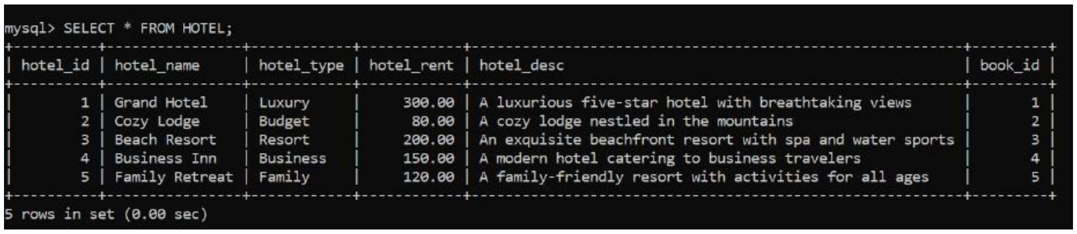
```
mysql> SELECT * FROM USER;
+---------+------------+-------------+-----------+-------------+-------------------+------------------------------+------+
| user_id | first_name | middle_name | last_name | user_mobile | user_email        | user_address                 | age  |
+---------+------------+-------------+-----------+-------------+-------------------+------------------------------+------+
|       1 | John       |             | Doe       | 1234567890  | john@example.com  | 123 Main St, City, Country   |   30 |
|       2 | Alice      |             | Smith     | 9876543210  | alice@gmail.com   | 456 Elm St, Town, Country    |   25 |
|       3 | Bob        | A           | Jones     | 5551234567  | bob@gmail.com     | 789 Oak St, Village, Country |   35 |
|       4 | Emma       | B           | Watson    | 7778889999  | emma@gmail.com    | 321 Pine St, Hamlet, Country |   28 |
|       5 | Mike       |             | Tyson     | 9998887776  | mike@gmail.com    | 555 Maple St, Suburb, Country|   40 |
+---------+------------+-------------+-----------+-------------+-------------------+------------------------------+------+
5 rows in set (0.00 sec)
```

3. **Booking Table:**



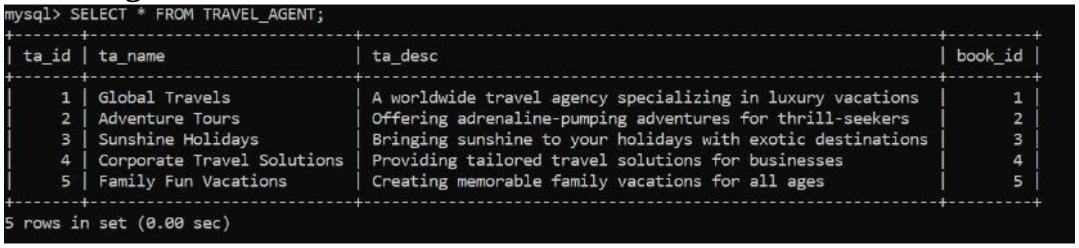
```
mysql> SELECT * FROM BOOKING;
+---------+------------------------------------------+-------------+-------------------------------------------------+---------+
| book_id | book_title                               | book_type   | book_desc                                       | user_id |
+---------+------------------------------------------+-------------+-------------------------------------------------+---------+
|       1 | The Great Gatsby                         | Fiction     | A classic novel by F. Scott Fitzgerald          |       1 |
|       2 | Sapiens: A Brief History of Humankind    | Non-Fiction | An exploration of the history of Homo sapiens   |       2 |
|       3 | Harry Potter and the Philosopher's Stone | Fantasy     | The first book in the Harry Potter series       |       3 |
|       4 | The Hobbit                               | Fantasy     | A fantasy novel by J.R.R. Tolkien               |       4 |
|       5 | To Kill a Mockingbird                    | Fiction     | A novel by Harper Lee                           |       5 |
+---------+------------------------------------------+-------------+-------------------------------------------------+---------+
5 rows in set (0.02 sec)
```

4. **Hotel Table:**



```
mysql> SELECT * FROM HOTEL;
+----------+----------------+------------+------------+-------------------------------------------------------+---------+
| hotel_id | hotel_name     | hotel_type | hotel_rent | hotel_desc                                            | book_id |
+----------+----------------+------------+------------+-------------------------------------------------------+---------+
|        1 | Grand Hotel    | Luxury     |     300.00 | A luxurious five-star hotel with breathtaking views   |       1 |
|        2 | Cozy Lodge     | Budget     |      80.00 | A cozy lodge nestled in the mountains                 |       2 |
|        3 | Beach Resort   | Resort     |     200.00 | An exquisite beachfront resort with spa and water sports |    3 |
|        4 | Business Inn   | Business   |     150.00 | A modern hotel catering to business travelers         |       4 |
|        5 | Family Retreat | Family     |     120.00 | A family-friendly resort with activities for all ages |       5 |
+----------+----------------+------------+------------+-------------------------------------------------------+---------+
5 rows in set (0.00 sec)
```

5. **Travel Agent Table:**



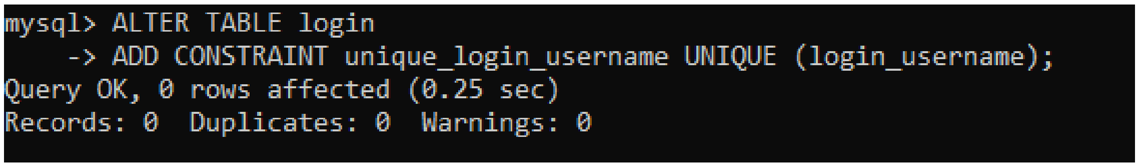
```
mysql> SELECT * FROM TRAVEL_AGENT;
+-------+----------------------------+------------------------------------------------------------+---------+
| ta_id | ta_name                    | ta_desc                                                    | book_id |
+-------+----------------------------+------------------------------------------------------------+---------+
|     1 | Global Travels             | A worldwide travel agency specializing in luxury vacations |       1 |
|     2 | Adventure Tours            | Offering adrenaline-pumping adventures for thrill-seekers  |       2 |
|     3 | Sunshine Holidays          | Bringing sunshine to your holidays with exotic destinations |      3 |
|     4 | Corporate Travel Solutions | Providing tailored travel solutions for businesses         |       4 |
|     5 | Family Fun Vacations       | Creating memorable family vacations for all ages           |       5 |
+-------+----------------------------+------------------------------------------------------------+---------+
5 rows in set (0.00 sec)
```

Figure 3.3 Inserting values into Tables using DML Commands for Your

Chapter-3

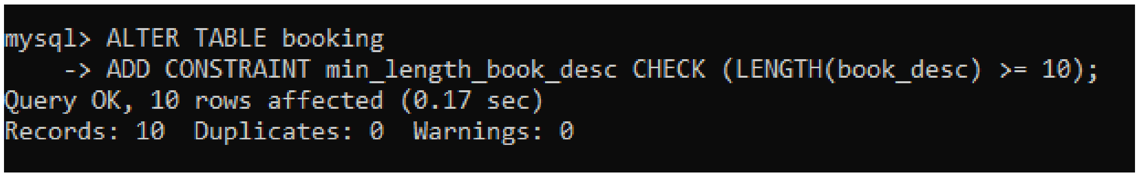
Complex queries based on the concepts of constraints, sets, joins, views, Triggers and Cursors

1. **Constraint to enter only distinct values in Login_username.**



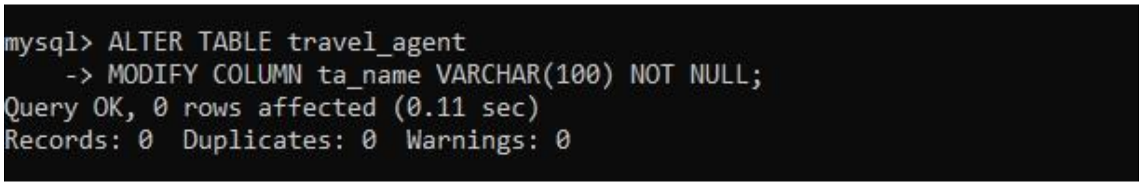
```
mysql> ALTER TABLE login
    -> ADD CONSTRAINT unique_login_username UNIQUE (login_username);
Query OK, 0 rows affected (0.25 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

2. **Constraint to have book_desc length higher than 10.**



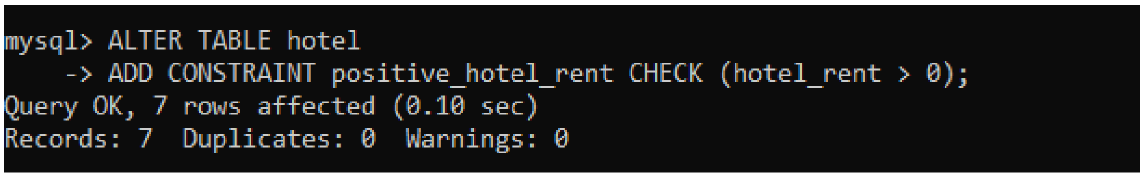
```
mysql> ALTER TABLE booking
    -> ADD CONSTRAINT min_length_book_desc CHECK (LENGTH(book_desc) >= 10);
Query OK, 10 rows affected (0.17 sec)
Records: 10  Duplicates: 0  Warnings: 0
```

3. **Constraint to have ta_name for every tuple entry(not null).**



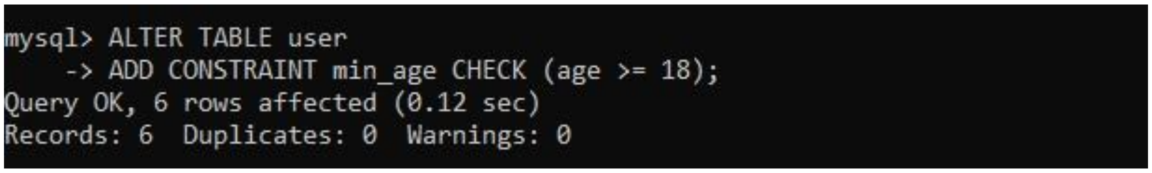
```
mysql> ALTER TABLE travel_agent
    -> MODIFY COLUMN ta_name VARCHAR(100) NOT NULL;
Query OK, 0 rows affected (0.11 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

4. **Constraint to have hotel rent higher than zero.**



```
mysql> ALTER TABLE hotel
    -> ADD CONSTRAINT positive_hotel_rent CHECK (hotel_rent > 0);
Query OK, 7 rows affected (0.10 sec)
Records: 7  Duplicates: 0  Warnings: 0
```

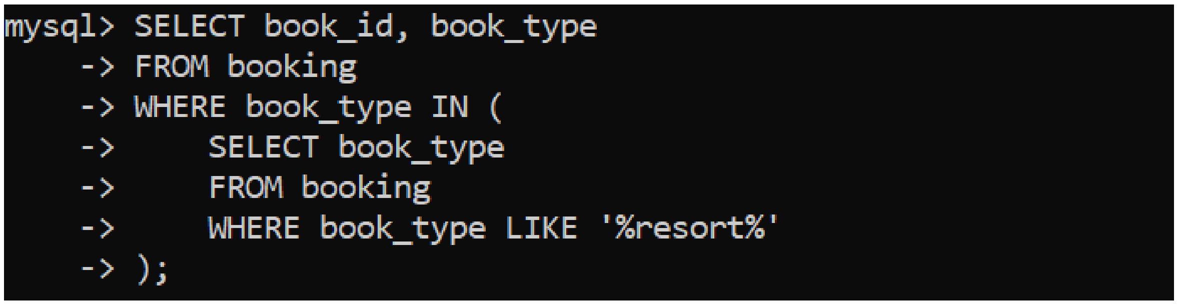
5. **Constraint to have minimum age of 18.**



```
mysql> ALTER TABLE user
    -> ADD CONSTRAINT min_age CHECK (age >= 18);
Query OK, 6 rows affected (0.12 sec)
Records: 6  Duplicates: 0  Warnings: 0
```

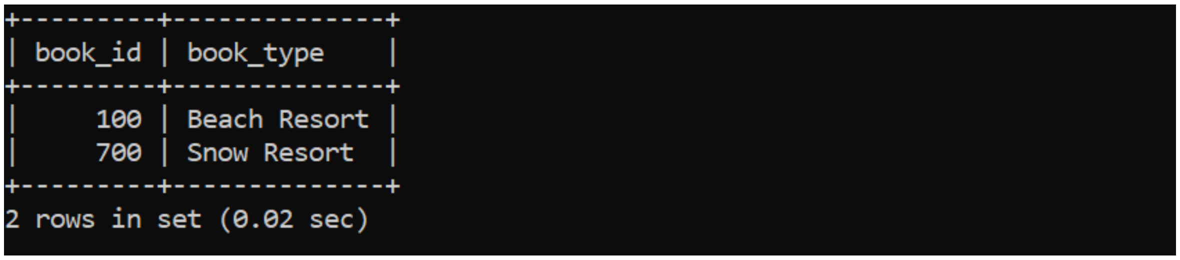
3.1 Sub Queries

1. Sub Query to get bookings that are for a resort.



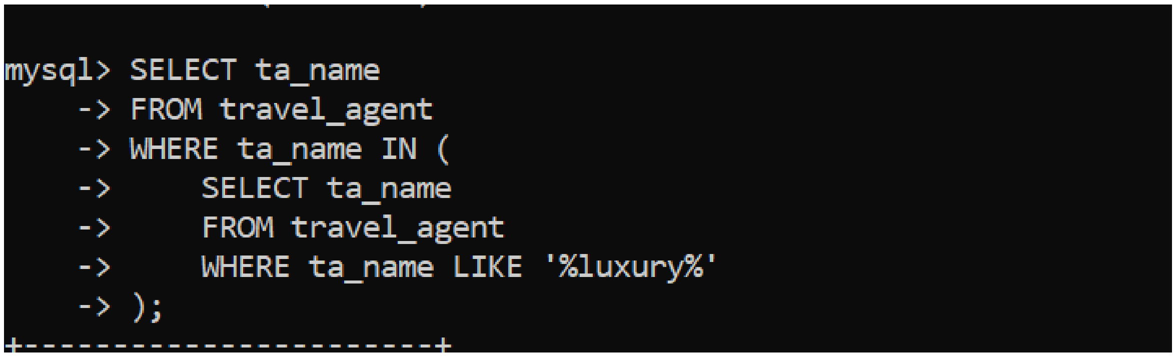
```
mysql> SELECT book_id, book_type
    -> FROM booking
    -> WHERE book_type IN (
    ->     SELECT book_type
    ->     FROM booking
    ->     WHERE book_type LIKE '%resort%'
    -> );
```

<u>Output:</u>



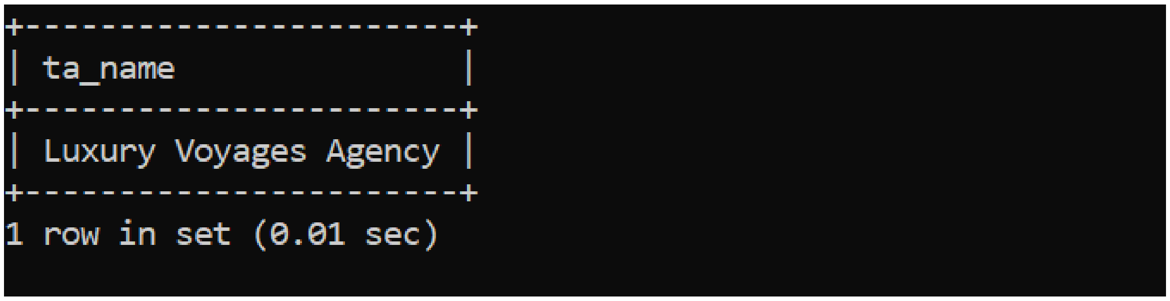
```
+---------+--------------+
| book_id | book_type    |
+---------+--------------+
|     100 | Beach Resort |
|     700 | Snow Resort  |
+---------+--------------+
2 rows in set (0.02 sec)
```

2. Sub Query to get travel agent that is Luxury class.



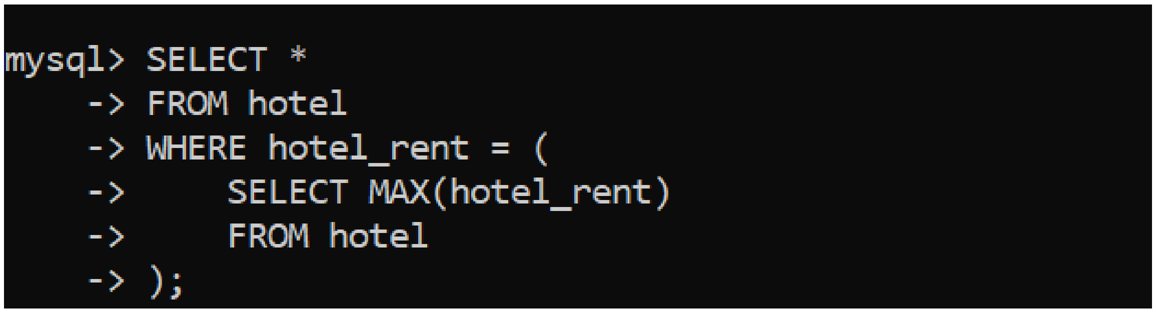
```
mysql> SELECT ta_name
    -> FROM travel_agent
    -> WHERE ta_name IN (
    ->     SELECT ta_name
    ->     FROM travel_agent
    ->     WHERE ta_name LIKE '%luxury%'
    -> );
+-----------------------+
```

<u>Output:</u>



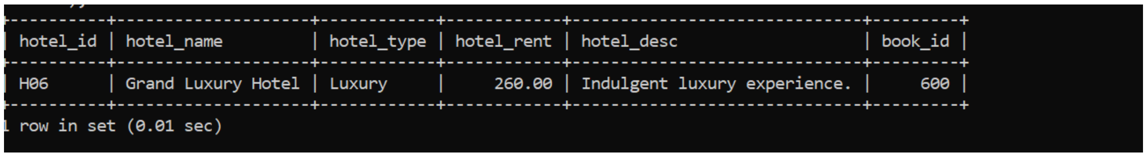
```
+-----------------------+
| ta_name               |
+-----------------------+
| Luxury Voyages Agency |
+-----------------------+
1 row in set (0.01 sec)
```

3.Sub Query to get most expensive hotel.



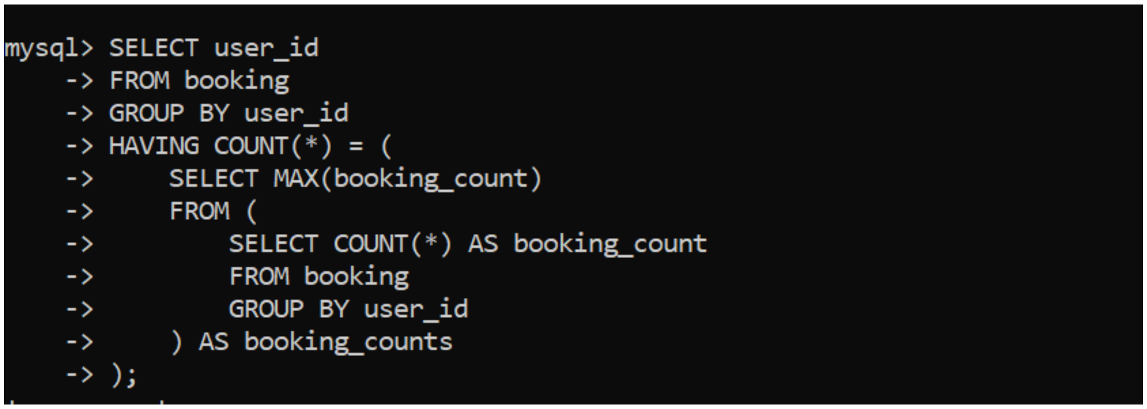
```
mysql> SELECT *
    -> FROM hotel
    -> WHERE hotel_rent = (
    ->     SELECT MAX(hotel_rent)
    ->     FROM hotel
    -> );
```

Output:



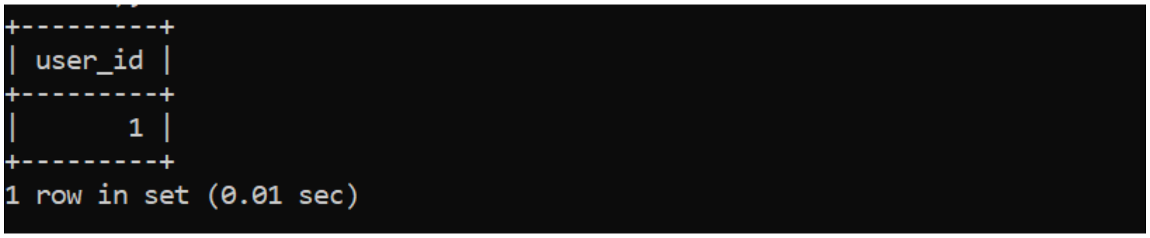
```
+----------+-------------------+-----------+------------+-----------------------------+---------+
| hotel_id | hotel_name        | hotel_type | hotel_rent | hotel_desc                  | book_id |
+----------+-------------------+-----------+------------+-----------------------------+---------+
| H06      | Grand Luxury Hotel | Luxury    |     260.00 | Indulgent luxury experience. |     600 |
+----------+-------------------+-----------+------------+-----------------------------+---------+
1 row in set (0.01 sec)
```

4. **Sub Query to get user with highest number of booking.**



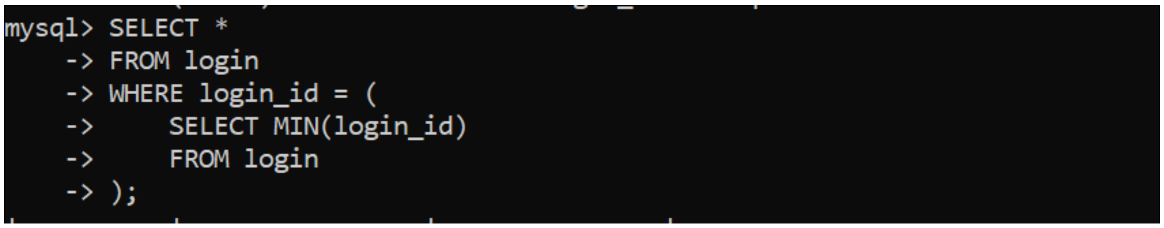
```
mysql> SELECT user_id
    -> FROM booking
    -> GROUP BY user_id
    -> HAVING COUNT(*) = (
    ->     SELECT MAX(booking_count)
    ->     FROM (
    ->         SELECT COUNT(*) AS booking_count
    ->         FROM booking
    ->         GROUP BY user_id
    ->     ) AS booking_counts
    -> );
```

Output:



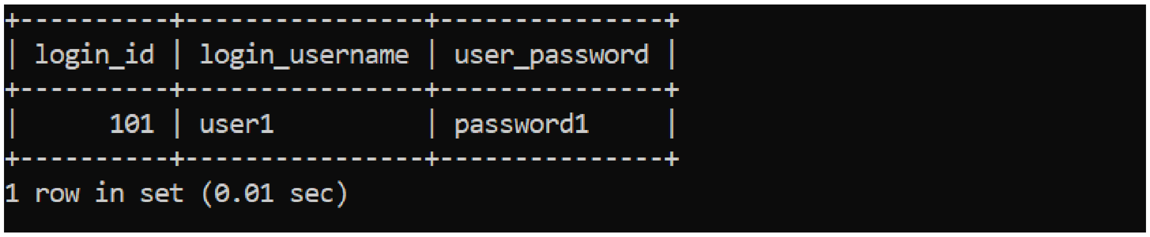
```
+---------+
| user_id |
+---------+
|       1 |
+---------+
1 row in set (0.01 sec)
```

5. Sub Query to get first user to login.



```
mysql> SELECT *
    -> FROM login
    -> WHERE login_id = (
    ->     SELECT MIN(login_id)
    ->     FROM login
    -> );
```

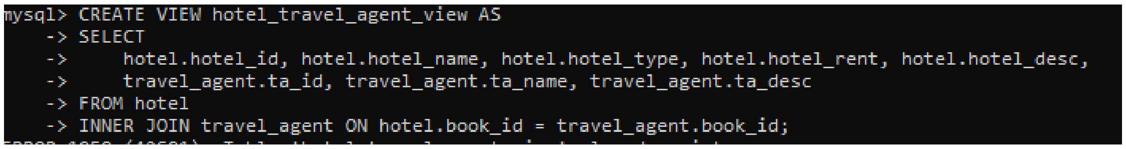
Output:



```
+----------+----------------+---------------+
| login_id | login_username | user_password |
+----------+----------------+---------------+
|      101 | user1          | password1     |
+----------+----------------+---------------+
1 row in set (0.01 sec)
```

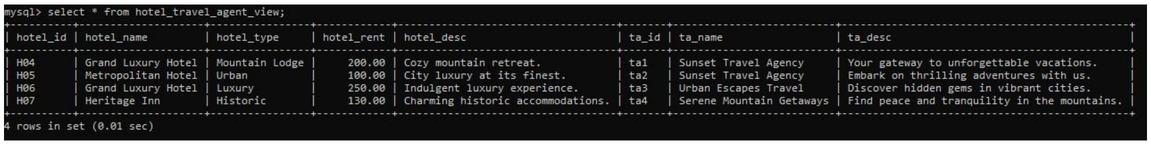
3.2 Join Operations

1. **Inner join for the hotel and travel_agent table.**



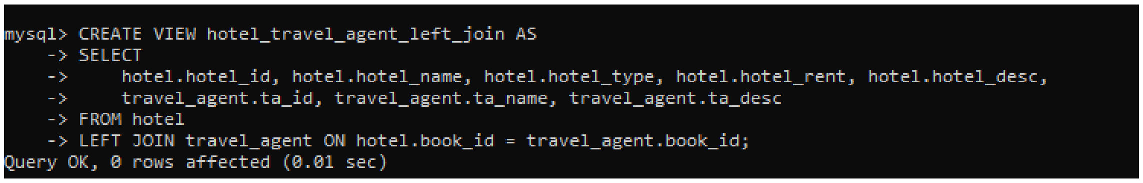
```
mysql> CREATE VIEW hotel_travel_agent_view AS
    -> SELECT
    ->     hotel.hotel_id, hotel.hotel_name, hotel.hotel_type, hotel.hotel_rent, hotel.hotel_desc,
    ->     travel_agent.ta_id, travel_agent.ta_name, travel_agent.ta_desc
    -> FROM hotel
    -> INNER JOIN travel_agent ON hotel.book_id = travel_agent.book_id;
```

Output:



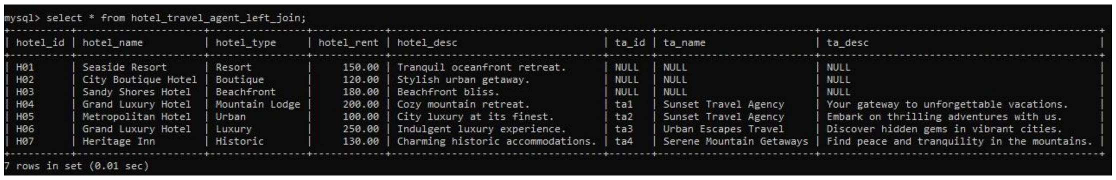
```
mysql> select * from hotel_travel_agent_view;
+----------+--------------------+----------------+------------+-----------------------------------+-------+--------------------------+----------------------------------------------+
| hotel_id | hotel_name         | hotel_type     | hotel_rent | hotel_desc                        | ta_id | ta_name                  | ta_desc                                      |
+----------+--------------------+----------------+------------+-----------------------------------+-------+--------------------------+----------------------------------------------+
| H04      | Grand Luxury Hotel | Mountain Lodge |     200.00 | Cozy mountain retreat.            | ta1   | Sunset Travel Agency     | Your gateway to unforgettable vacations.     |
| H05      | Metropolitan Hotel | Urban          |     100.00 | City luxury at its finest.        | ta2   | Sunset Travel Agency     | Embark on thrilling adventures with us.      |
| H06      | Grand Luxury Hotel | Luxury         |     250.00 | Indulgent luxury experience.      | ta3   | Urban Escapes Travel     | Discover hidden gems in vibrant cities.      |
| H07      | Heritage Inn       | Historic       |     130.00 | Charming historic accommodations. | ta4   | Serene Mountain Getaways | Find peace and tranquility in the mountains. |
+----------+--------------------+----------------+------------+-----------------------------------+-------+--------------------------+----------------------------------------------+
4 rows in set (0.01 sec)
```

2. **Inner join for the hotel and travel_agent table.**



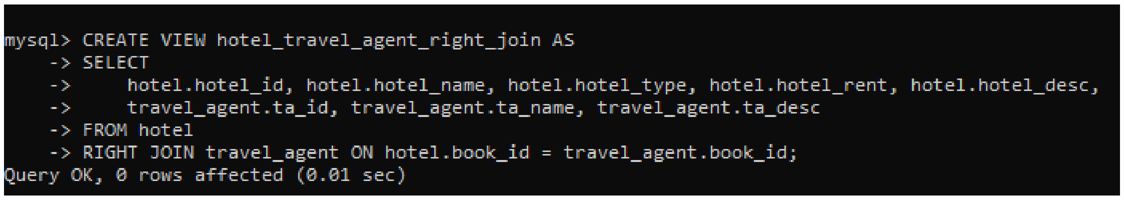
```
mysql> CREATE VIEW hotel_travel_agent_left_join AS
    -> SELECT
    ->     hotel.hotel_id, hotel.hotel_name, hotel.hotel_type, hotel.hotel_rent, hotel.hotel_desc,
    ->     travel_agent.ta_id, travel_agent.ta_name, travel_agent.ta_desc
    -> FROM hotel
    -> LEFT JOIN travel_agent ON hotel.book_id = travel_agent.book_id;
Query OK, 0 rows affected (0.01 sec)
```

Output:



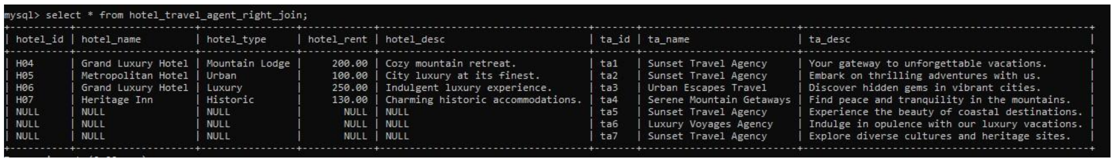
```
mysql> select * from hotel_travel_agent_left_join;
+----------+---------------------+----------------+------------+-----------------------------------+-------+--------------------------+----------------------------------------------+
| hotel_id | hotel_name          | hotel_type     | hotel_rent | hotel_desc                        | ta_id | ta_name                  | ta_desc                                      |
+----------+---------------------+----------------+------------+-----------------------------------+-------+--------------------------+----------------------------------------------+
| H01      | Seaside Resort      | Resort         |     150.00 | Tranquil oceanfront retreat.      | NULL  | NULL                     | NULL                                         |
| H02      | City Boutique Hotel | Boutique       |     120.00 | Stylish urban getaway.            | NULL  | NULL                     | NULL                                         |
| H03      | Sandy Shores Hotel  | Beachfront     |     180.00 | Beachfront bliss.                 | NULL  | NULL                     | NULL                                         |
| H04      | Grand Luxury Hotel  | Mountain Lodge |     200.00 | Cozy mountain retreat.            | ta1   | Sunset Travel Agency     | Your gateway to unforgettable vacations.     |
| H05      | Metropolitan Hotel  | Urban          |     100.00 | City luxury at its finest.        | ta2   | Sunset Travel Agency     | Embark on thrilling adventures with us.      |
| H06      | Grand Luxury Hotel  | Luxury         |     250.00 | Indulgent luxury experience.      | ta3   | Urban Escapes Travel     | Discover hidden gems in vibrant cities.      |
| H07      | Heritage Inn        | Historic       |     130.00 | Charming historic accommodations. | ta4   | Serene Mountain Getaways | Find peace and tranquility in the mountains. |
+----------+---------------------+----------------+------------+-----------------------------------+-------+--------------------------+----------------------------------------------+
7 rows in set (0.01 sec)
```

3. **Right Outer join for the hotel and travel_agent table.**



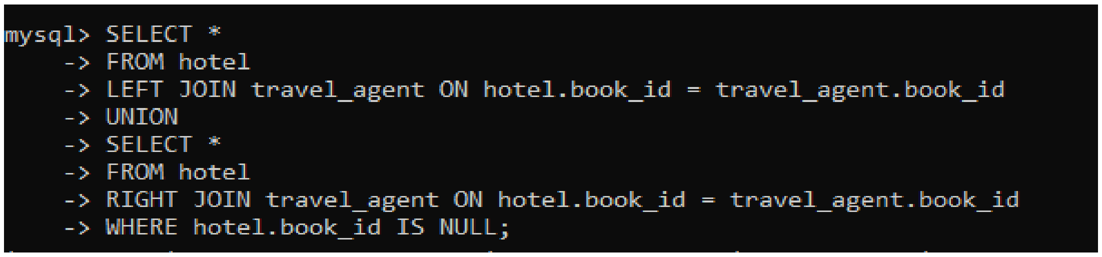
```
mysql> CREATE VIEW hotel_travel_agent_right_join AS
    -> SELECT
    ->     hotel.hotel_id, hotel.hotel_name, hotel.hotel_type, hotel.hotel_rent, hotel.hotel_desc,
    ->     travel_agent.ta_id, travel_agent.ta_name, travel_agent.ta_desc
    -> FROM hotel
    -> RIGHT JOIN travel_agent ON hotel.book_id = travel_agent.book_id;
Query OK, 0 rows affected (0.01 sec)
```

Output:



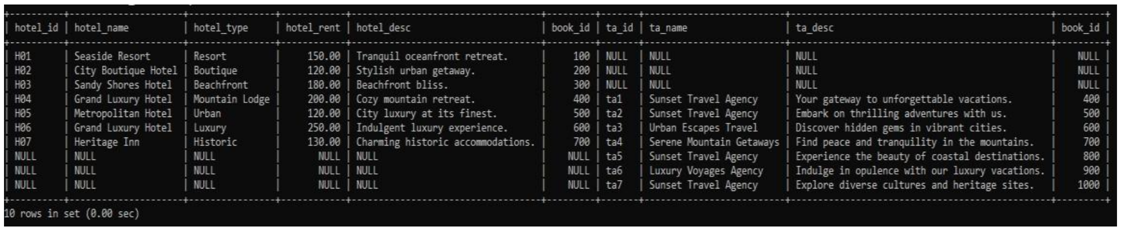
```
mysql> select * from hotel_travel_agent_right_join;
+----------+--------------------+----------------+------------+-----------------------------------+-------+--------------------------+------------------------------------------------+
| hotel_id | hotel_name         | hotel_type     | hotel_rent | hotel_desc                        | ta_id | ta_name                  | ta_desc                                        |
+----------+--------------------+----------------+------------+-----------------------------------+-------+--------------------------+------------------------------------------------+
| H04      | Grand Luxury Hotel | Mountain Lodge |     200.00 | Cozy mountain retreat.            | ta1   | Sunset Travel Agency     | Your gateway to unforgettable vacations.       |
| H05      | Metropolitan Hotel | Urban          |     100.00 | City luxury at its finest.        | ta2   | Sunset Travel Agency     | Embark on thrilling adventures with us.        |
| H06      | Grand Luxury Hotel | Luxury         |     250.00 | Indulgent luxury experience.      | ta3   | Urban Escapes Travel     | Discover hidden gems in vibrant cities.        |
| H07      | Heritage Inn       | Historic       |     130.00 | Charming historic accommodations. | ta4   | Serene Mountain Getaways | Find peace and tranquility in the mountains.   |
| NULL     | NULL               | NULL           |       NULL | NULL                              | ta5   | Sunset Travel Agency     | Experience the beauty of coastal destinations. |
| NULL     | NULL               | NULL           |       NULL | NULL                              | ta6   | Luxury Voyages Agency    | Indulge in opulence with our luxury vacations. |
| NULL     | NULL               | NULL           |       NULL | NULL                              | ta7   | Sunset Travel Agency     | Explore diverse cultures and heritage sites.   |
+----------+--------------------+----------------+------------+-----------------------------------+-------+--------------------------+------------------------------------------------+
```

4. **Full Outer join for the hotel and travel_agent table.**



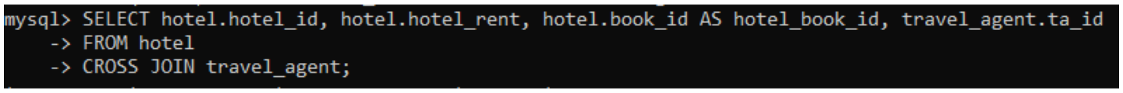
```
mysql> SELECT *
    -> FROM hotel
    -> LEFT JOIN travel_agent ON hotel.book_id = travel_agent.book_id
    -> UNION
    -> SELECT *
    -> FROM hotel
    -> RIGHT JOIN travel_agent ON hotel.book_id = travel_agent.book_id
    -> WHERE hotel.book_id IS NULL;
```

Output:



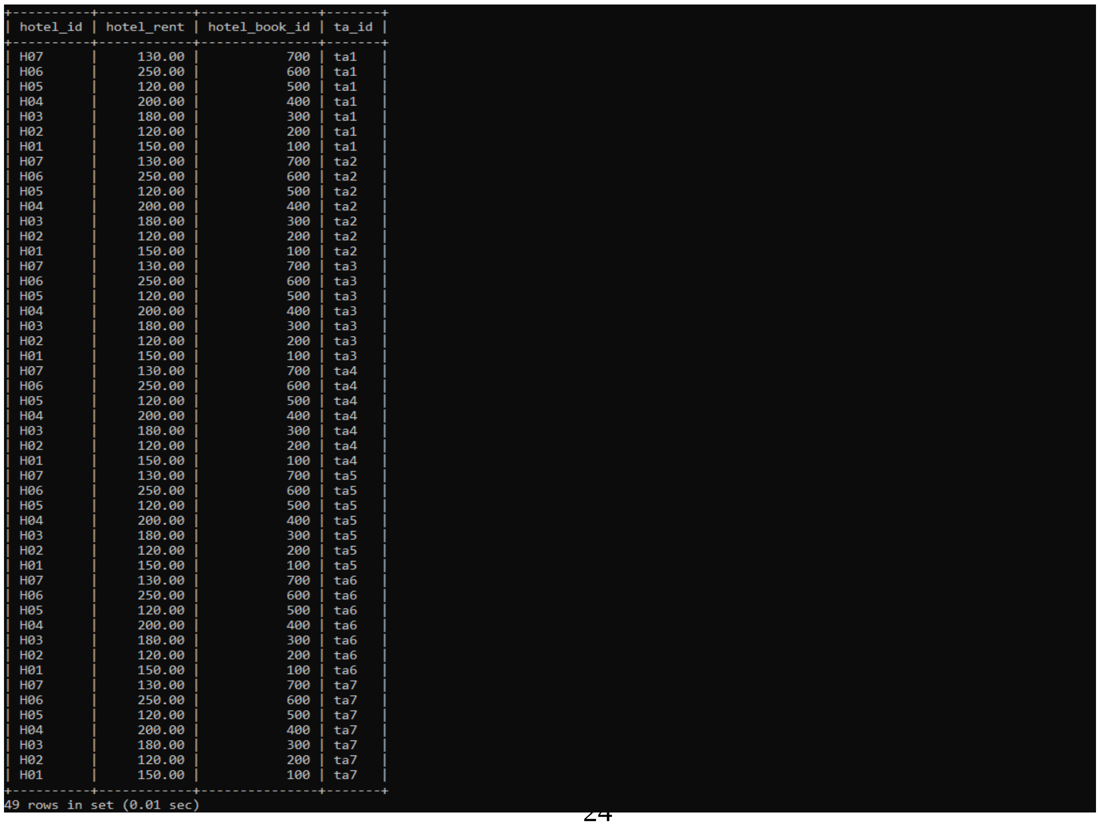
```
+----------+---------------------+----------------+------------+-----------------------------------+---------+-------+--------------------------+------------------------------------------------+---------+
| hotel_id | hotel_name          | hotel_type     | hotel_rent | hotel_desc                        | book_id | ta_id | ta_name                  | ta_desc                                        | book_id |
+----------+---------------------+----------------+------------+-----------------------------------+---------+-------+--------------------------+------------------------------------------------+---------+
| H01      | Seaside Resort      | Resort         |     150.00 | Tranquil oceanfront retreat.      |     100 | NULL  | NULL                     | NULL                                           |    NULL |
| H02      | City Boutique Hotel | Boutique       |     120.00 | Stylish urban getaway.            |     200 | NULL  | NULL                     | NULL                                           |    NULL |
| H03      | Sandy Shores Hotel  | Beachfront     |     180.00 | Beachfront bliss.                 |     300 | NULL  | NULL                     | NULL                                           |    NULL |
| H04      | Grand Luxury Hotel  | Mountain Lodge |     200.00 | Cozy mountain retreat.            |     400 | ta1   | Sunset Travel Agency     | Your gateway to unforgettable vacations.       |     400 |
| H05      | Metropolitan Hotel  | Urban          |     120.00 | City luxury at its finest.        |     500 | ta2   | Sunset Travel Agency     | Embark on thrilling adventures with us.        |     500 |
| H06      | Grand Luxury Hotel  | Luxury         |     250.00 | Indulgent luxury experience.      |     600 | ta3   | Urban Escapes Travel     | Discover hidden gems in vibrant cities.        |     600 |
| H07      | Heritage Inn        | Historic       |     130.00 | Charming historic accommodations. |     700 | ta4   | Serene Mountain Getaways | Find peace and tranquility in the mountains.   |     700 |
| NULL     | NULL                | NULL           |       NULL | NULL                              |    NULL | ta5   | Sunset Travel Agency     | Experience the beauty of coastal destinations. |     800 |
| NULL     | NULL                | NULL           |       NULL | NULL                              |    NULL | ta6   | Luxury Voyages Agency    | Indulge in opulence with our luxury vacations. |     900 |
| NULL     | NULL                | NULL           |       NULL | NULL                              |    NULL | ta7   | Sunset Travel Agency     | Explore diverse cultures and heritage sites.   |    1000 |
+----------+---------------------+----------------+------------+-----------------------------------+---------+-------+--------------------------+------------------------------------------------+---------+
10 rows in set (0.00 sec)
```

5. **Cross join for the hotel and travel_agent table.**



```
mysql> SELECT hotel.hotel_id, hotel.hotel_rent, hotel.book_id AS hotel_book_id, travel_agent.ta_id
    -> FROM hotel
    -> CROSS JOIN travel_agent;
```

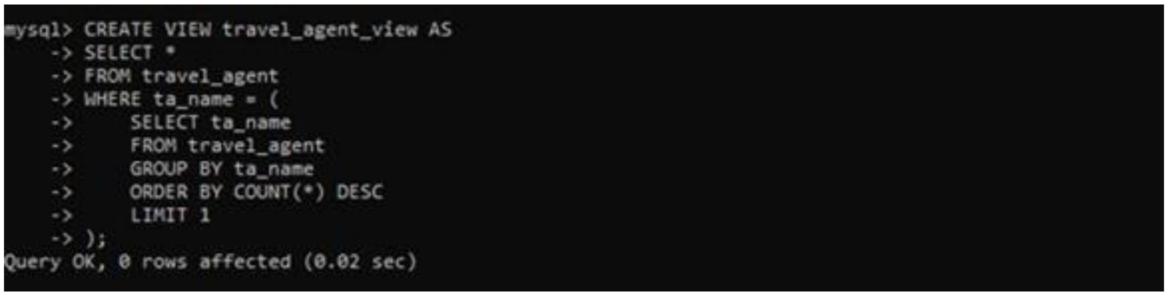
Output:



```
+----------+------------+---------------+-------+
| hotel_id | hotel_rent | hotel_book_id | ta_id |
+----------+------------+---------------+-------+
| H07      |     130.00 |           700 | ta1   |
| H06      |     250.00 |           600 | ta1   |
| H05      |     120.00 |           500 | ta1   |
| H04      |     200.00 |           400 | ta1   |
| H03      |     180.00 |           300 | ta1   |
| H02      |     120.00 |           200 | ta1   |
| H01      |     150.00 |           100 | ta1   |
| H07      |     130.00 |           700 | ta2   |
| H06      |     250.00 |           600 | ta2   |
| H05      |     120.00 |           500 | ta2   |
| H04      |     200.00 |           400 | ta2   |
| H03      |     180.00 |           300 | ta2   |
| H02      |     120.00 |           200 | ta2   |
| H01      |     150.00 |           100 | ta2   |
| H07      |     130.00 |           700 | ta3   |
| H06      |     250.00 |           600 | ta3   |
| H05      |     120.00 |           500 | ta3   |
| H04      |     200.00 |           400 | ta3   |
| H03      |     180.00 |           300 | ta3   |
| H02      |     120.00 |           200 | ta3   |
| H01      |     150.00 |           100 | ta3   |
| H07      |     130.00 |           700 | ta4   |
| H06      |     250.00 |           600 | ta4   |
| H05      |     120.00 |           500 | ta4   |
| H04      |     200.00 |           400 | ta4   |
| H03      |     180.00 |           300 | ta4   |
| H02      |     120.00 |           200 | ta4   |
| H01      |     150.00 |           100 | ta4   |
| H07      |     130.00 |           700 | ta5   |
| H06      |     250.00 |           600 | ta5   |
| H05      |     120.00 |           500 | ta5   |
| H04      |     200.00 |           400 | ta5   |
| H03      |     180.00 |           300 | ta5   |
| H02      |     120.00 |           200 | ta5   |
| H01      |     150.00 |           100 | ta5   |
| H07      |     130.00 |           700 | ta6   |
| H06      |     250.00 |           600 | ta6   |
| H05      |     120.00 |           500 | ta6   |
| H04      |     200.00 |           400 | ta6   |
| H03      |     180.00 |           300 | ta6   |
| H02      |     120.00 |           200 | ta6   |
| H01      |     150.00 |           100 | ta6   |
| H07      |     130.00 |           700 | ta7   |
| H06      |     250.00 |           600 | ta7   |
| H05      |     120.00 |           500 | ta7   |
| H04      |     200.00 |           400 | ta7   |
| H03      |     180.00 |           300 | ta7   |
| H02      |     120.00 |           200 | ta7   |
| H01      |     150.00 |           100 | ta7   |
+----------+------------+---------------+-------+
49 rows in set (0.01 sec)
```

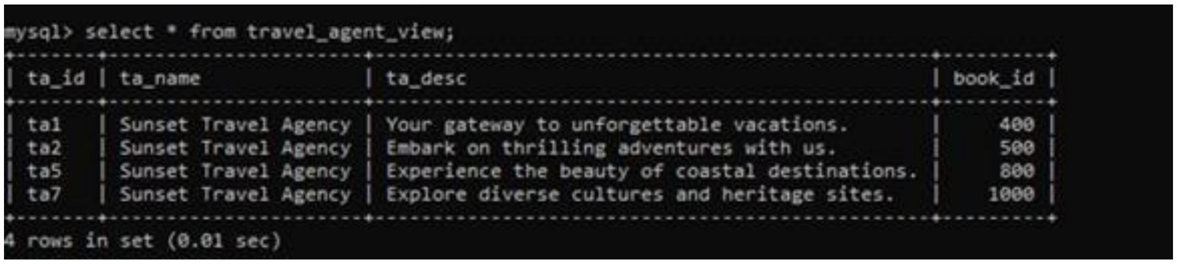
3.3 Views Operations

1. **View to list travel agent booked maximum time.**



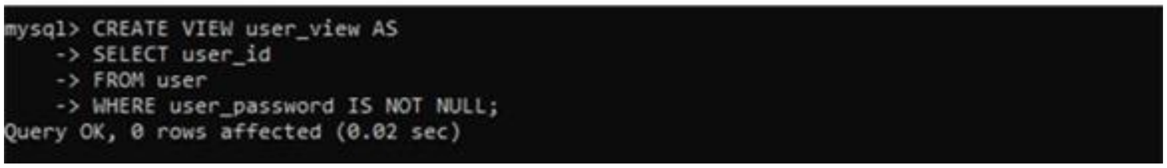
```
mysql> CREATE VIEW travel_agent_view AS
    -> SELECT *
    -> FROM travel_agent
    -> WHERE ta_name = (
    ->     SELECT ta_name
    ->     FROM travel_agent
    ->     GROUP BY ta_name
    ->     ORDER BY COUNT(*) DESC
    ->     LIMIT 1
    -> );
Query OK, 0 rows affected (0.02 sec)
```

Output:



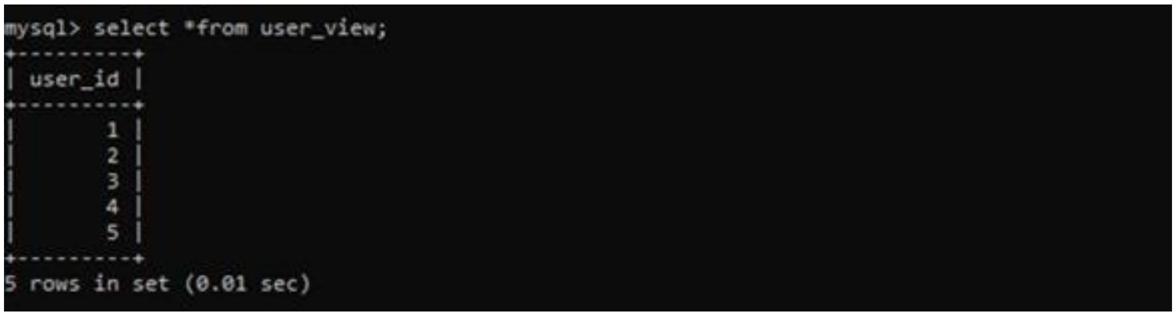
```
mysql> select * from travel_agent_view;
+-------+----------------------+------------------------------------------------+---------+
| ta_id | ta_name              | ta_desc                                        | book_id |
+-------+----------------------+------------------------------------------------+---------+
| ta1   | Sunset Travel Agency | Your gateway to unforgettable vacations.       |     400 |
| ta2   | Sunset Travel Agency | Embark on thrilling adventures with us.        |     500 |
| ta5   | Sunset Travel Agency | Experience the beauty of coastal destinations. |     800 |
| ta7   | Sunset Travel Agency | Explore diverse cultures and heritage sites.   |    1000 |
+-------+----------------------+------------------------------------------------+---------+
4 rows in set (0.01 sec)
```

2. **View to list users who have given passwords.**



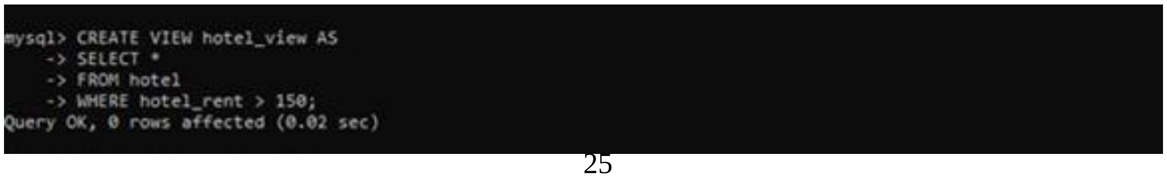
```
mysql> CREATE VIEW user_view AS
    -> SELECT user_id
    -> FROM user
    -> WHERE user_password IS NOT NULL;
Query OK, 0 rows affected (0.02 sec)
```

Output:



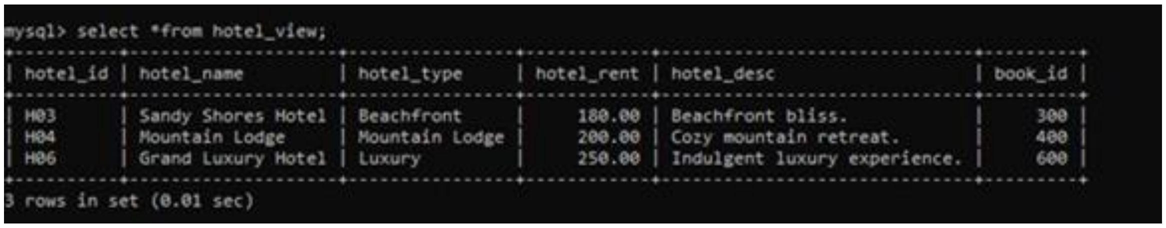
```
mysql> select *from user_view;
+---------+
| user_id |
+---------+
|       1 |
|       2 |
|       3 |
|       4 |
|       5 |
+---------+
5 rows in set (0.01 sec)
```

3. **View to list hotels with rent higher than 150.**



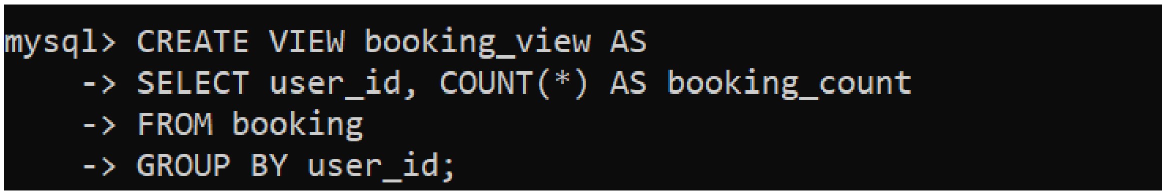
```
mysql> CREATE VIEW hotel_view AS
    -> SELECT *
    -> FROM hotel
    -> WHERE hotel_rent > 150;
Query OK, 0 rows affected (0.02 sec)
```

Output:



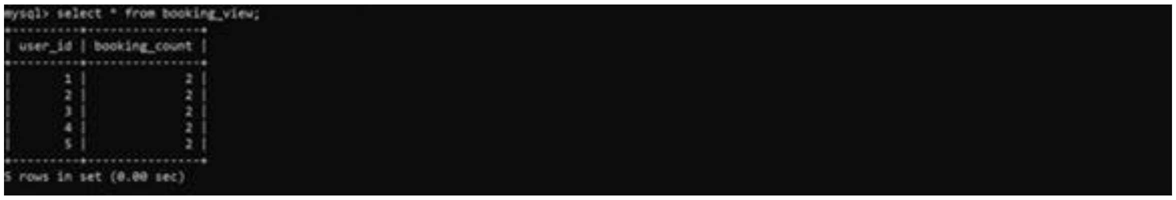
```
mysql> select *from hotel_view;
+----------+--------------------+----------------+-----------+-----------------------------+---------+
| hotel_id | hotel_name         | hotel_type     | hotel_rent | hotel_desc                 | book_id |
+----------+--------------------+----------------+-----------+-----------------------------+---------+
| H03      | Sandy Shores Hotel | Beachfront     |    180.00 | Beachfront bliss.           |     300 |
| H04      | Mountain Lodge     | Mountain Lodge |    200.00 | Cozy mountain retreat.      |     400 |
| H06      | Grand Luxury Hotel | Luxury         |    250.00 | Indulgent luxury experience. |     600 |
+----------+--------------------+----------------+-----------+-----------------------------+---------+
3 rows in set (0.01 sec)
```

4. **View to list of users and their number of bookings.**



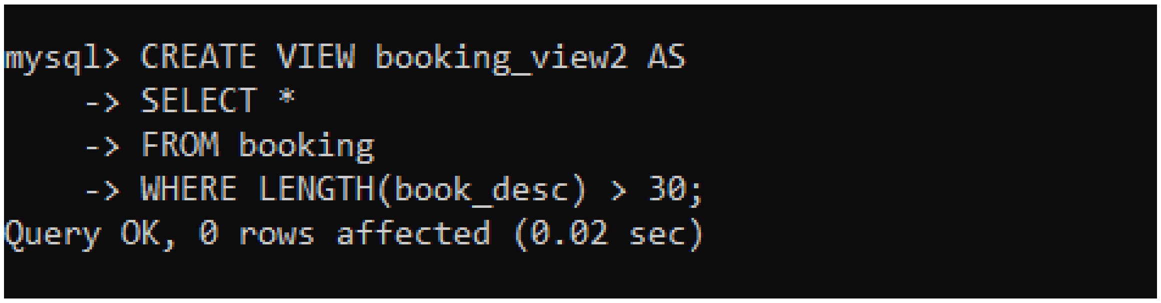
```
mysql> CREATE VIEW booking_view AS
    -> SELECT user_id, COUNT(*) AS booking_count
    -> FROM booking
    -> GROUP BY user_id;
```

Output:



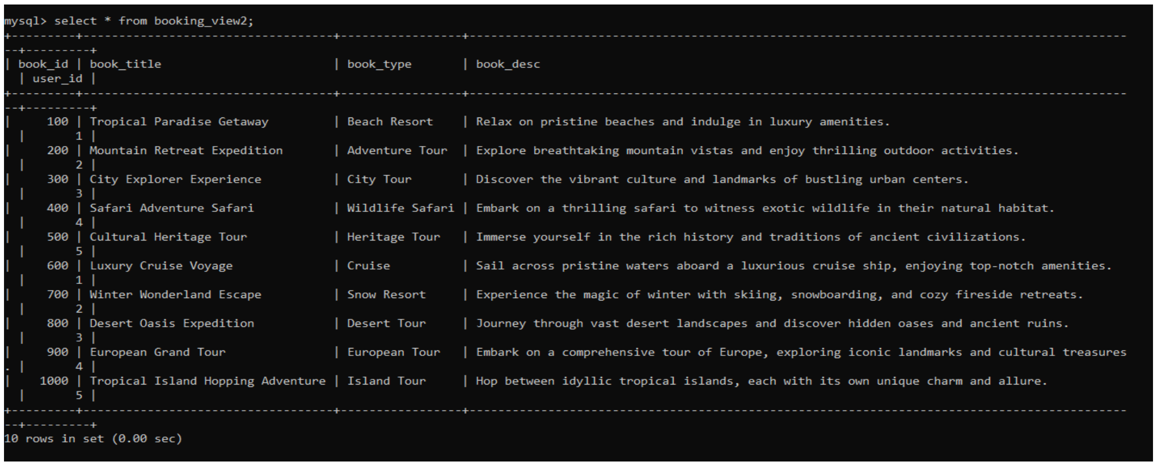
```
mysql> select * from booking_view;
+---------+---------------+
| user_id | booking_count |
+---------+---------------+
|       1 |             2 |
|       2 |             2 |
|       3 |             2 |
|       4 |             2 |
|       5 |             2 |
+---------+---------------+
5 rows in set (0.00 sec)
```

5. **View to list of booking desc with length greater than 30.**



```
mysql> CREATE VIEW booking_view2 AS
    -> SELECT *
    -> FROM booking
    -> WHERE LENGTH(book_desc) > 30;
Query OK, 0 rows affected (0.02 sec)
```

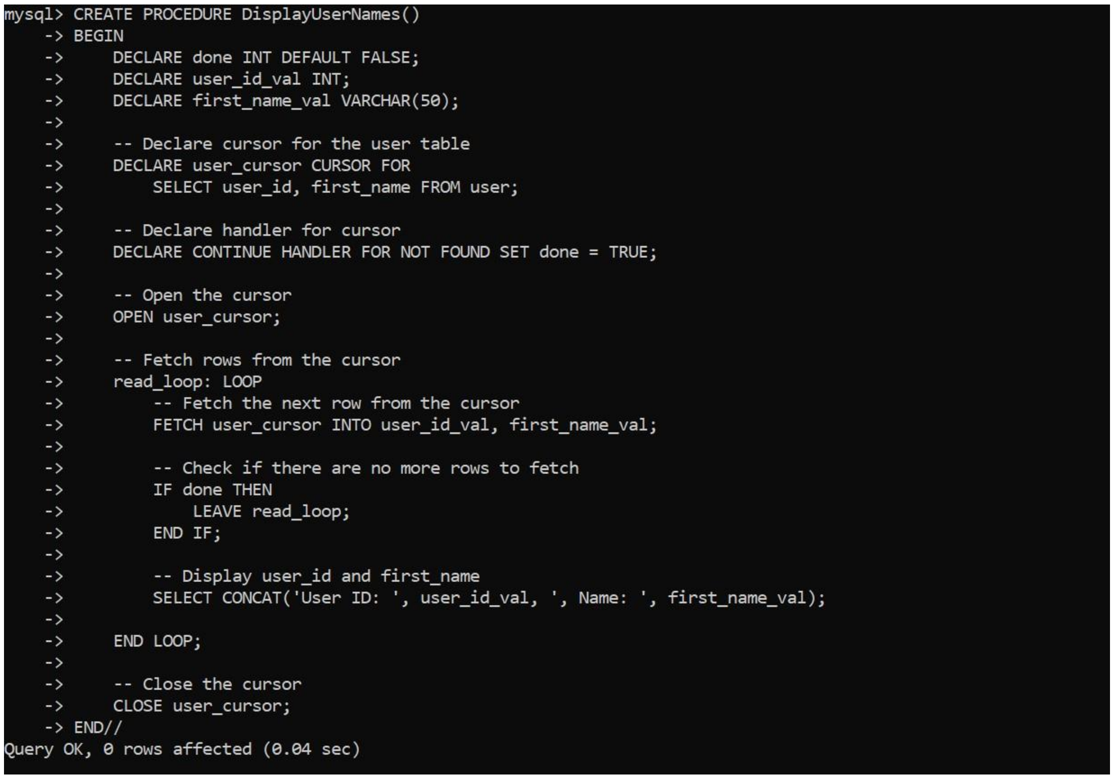
Output:



```
mysql> select * from booking_view2;
+---------+-----------------------------------+-----------------+-------------------------------------------------------------------------------------------
--+---------+
| book_id | book_title                        | book_type       | book_desc
  | user_id |
+---------+-----------------------------------+-----------------+-------------------------------------------------------------------------------------------
--+---------+
|     100 | Tropical Paradise Getaway         | Beach Resort    | Relax on pristine beaches and indulge in luxury amenities.
  |       1 |
|     200 | Mountain Retreat Expedition       | Adventure Tour  | Explore breathtaking mountain vistas and enjoy thrilling outdoor activities.
  |       2 |
|     300 | City Explorer Experience          | City Tour       | Discover the vibrant culture and landmarks of bustling urban centers.
  |       3 |
|     400 | Safari Adventure Safari           | Wildlife Safari | Embark on a thrilling safari to witness exotic wildlife in their natural habitat.
  |       4 |
|     500 | Cultural Heritage Tour            | Heritage Tour   | Immerse yourself in the rich history and traditions of ancient civilizations.
  |       5 |
|     600 | Luxury Cruise Voyage              | Cruise          | Sail across pristine waters aboard a luxurious cruise ship, enjoying top-notch amenities.
  |       1 |
|     700 | Winter Wonderland Escape          | Snow Resort     | Experience the magic of winter with skiing, snowboarding, and cozy fireside retreats.
  |       2 |
|     800 | Desert Oasis Expedition           | Desert Tour     | Journey through vast desert landscapes and discover hidden oases and ancient ruins.
  |       3 |
|     900 | European Grand Tour               | European Tour   | Embark on a comprehensive tour of Europe, exploring iconic landmarks and cultural treasures
. |       4 |
|    1000 | Tropical Island Hopping Adventure | Island Tour     | Hop between idyllic tropical islands, each with its own unique charm and allure.
  |       5 |
+---------+-----------------------------------+-----------------+-------------------------------------------------------------------------------------------
--+---------+
10 rows in set (0.00 sec)
```

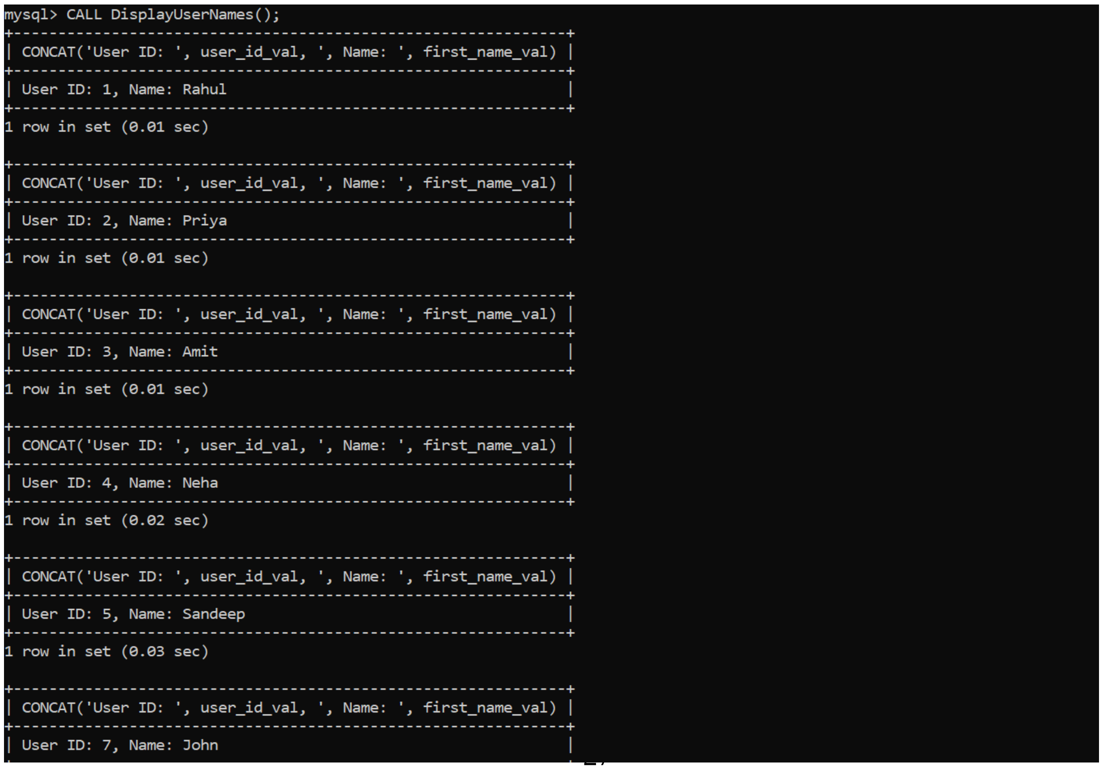
3.4 Cursors

1. Cursor to declare Usernames.



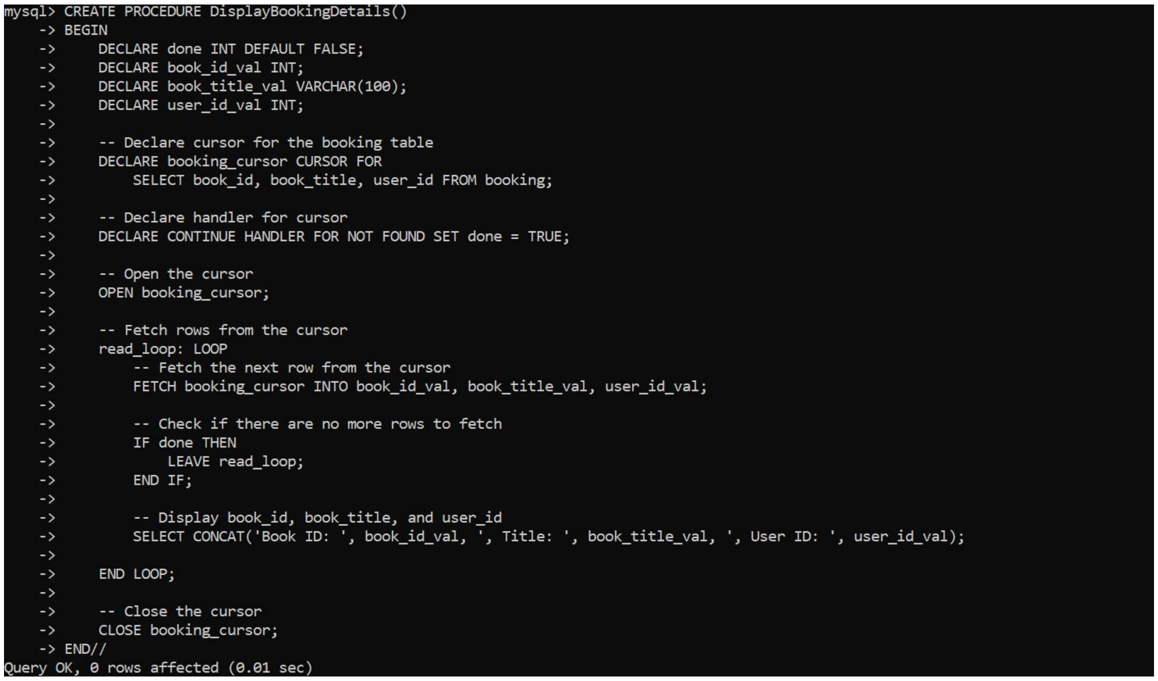
```
mysql> CREATE PROCEDURE DisplayUserNames()
    -> BEGIN
    ->     DECLARE done INT DEFAULT FALSE;
    ->     DECLARE user_id_val INT;
    ->     DECLARE first_name_val VARCHAR(50);
    ->
    ->     -- Declare cursor for the user table
    ->     DECLARE user_cursor CURSOR FOR
    ->         SELECT user_id, first_name FROM user;
    ->
    ->     -- Declare handler for cursor
    ->     DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = TRUE;
    ->
    ->     -- Open the cursor
    ->     OPEN user_cursor;
    ->
    ->     -- Fetch rows from the cursor
    ->     read_loop: LOOP
    ->         -- Fetch the next row from the cursor
    ->         FETCH user_cursor INTO user_id_val, first_name_val;
    ->
    ->         -- Check if there are no more rows to fetch
    ->         IF done THEN
    ->             LEAVE read_loop;
    ->         END IF;
    ->
    ->         -- Display user_id and first_name
    ->         SELECT CONCAT('User ID: ', user_id_val, ', Name: ', first_name_val);
    ->
    ->     END LOOP;
    ->
    ->     -- Close the cursor
    ->     CLOSE user_cursor;
    -> END//
Query OK, 0 rows affected (0.04 sec)
```

Output:



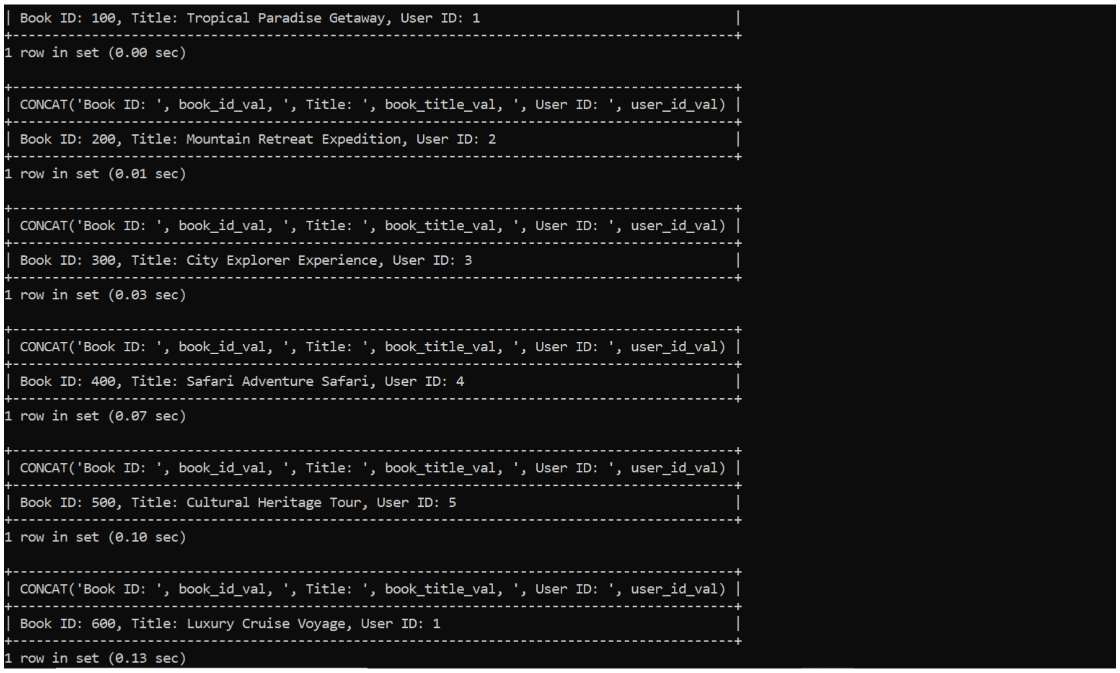
```
mysql> CALL DisplayUserNames();
+-----------------------------------------------------------+
| CONCAT('User ID: ', user_id_val, ', Name: ', first_name_val) |
+-----------------------------------------------------------+
| User ID: 1, Name: Rahul                                   |
+-----------------------------------------------------------+
1 row in set (0.01 sec)

+-----------------------------------------------------------+
| CONCAT('User ID: ', user_id_val, ', Name: ', first_name_val) |
+-----------------------------------------------------------+
| User ID: 2, Name: Priya                                   |
+-----------------------------------------------------------+
1 row in set (0.01 sec)

+-----------------------------------------------------------+
| CONCAT('User ID: ', user_id_val, ', Name: ', first_name_val) |
+-----------------------------------------------------------+
| User ID: 3, Name: Amit                                    |
+-----------------------------------------------------------+
1 row in set (0.01 sec)

+-----------------------------------------------------------+
| CONCAT('User ID: ', user_id_val, ', Name: ', first_name_val) |
+-----------------------------------------------------------+
| User ID: 4, Name: Neha                                    |
+-----------------------------------------------------------+
1 row in set (0.02 sec)

+-----------------------------------------------------------+
| CONCAT('User ID: ', user_id_val, ', Name: ', first_name_val) |
+-----------------------------------------------------------+
| User ID: 5, Name: Sandeep                                 |
+-----------------------------------------------------------+
1 row in set (0.03 sec)

+-----------------------------------------------------------+
| CONCAT('User ID: ', user_id_val, ', Name: ', first_name_val) |
+-----------------------------------------------------------+
| User ID: 7, Name: John                                    |
```

2. Cursor to declare booking details.

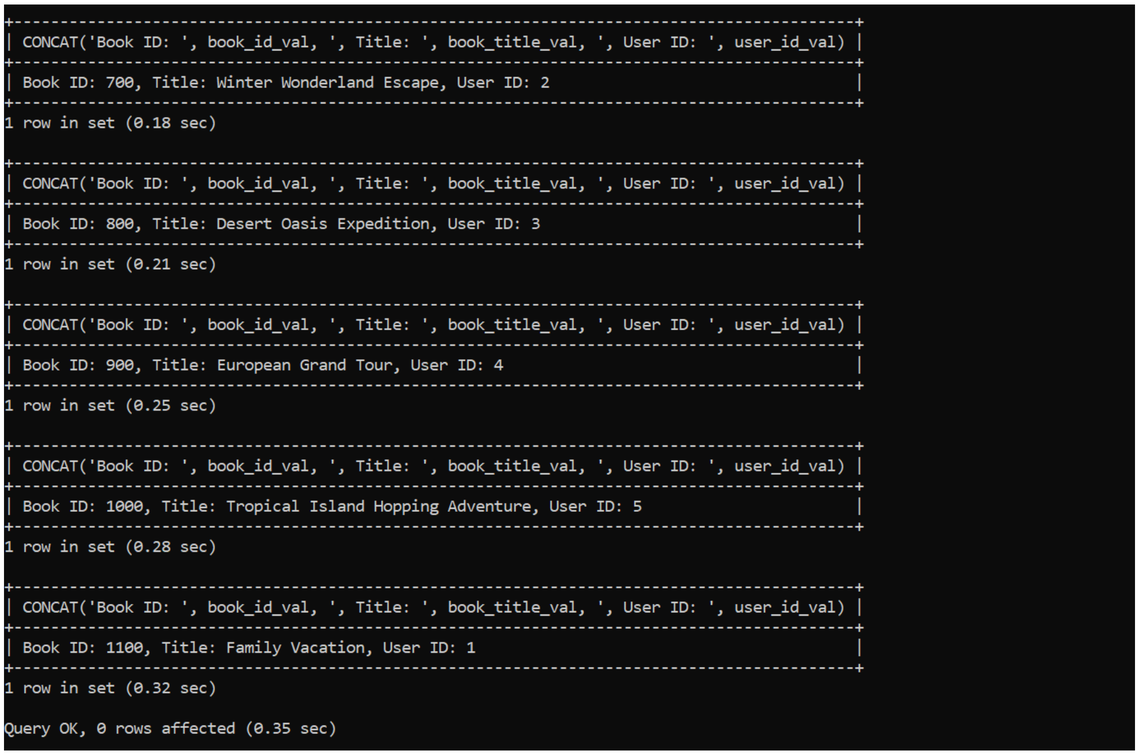


```
mysql> CREATE PROCEDURE DisplayBookingDetails()
    -> BEGIN
    ->     DECLARE done INT DEFAULT FALSE;
    ->     DECLARE book_id_val INT;
    ->     DECLARE book_title_val VARCHAR(100);
    ->     DECLARE user_id_val INT;
    ->
    ->     -- Declare cursor for the booking table
    ->     DECLARE booking_cursor CURSOR FOR
    ->         SELECT book_id, book_title, user_id FROM booking;
    ->
    ->     -- Declare handler for cursor
    ->     DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = TRUE;
    ->
    ->     -- Open the cursor
    ->     OPEN booking_cursor;
    ->
    ->     -- Fetch rows from the cursor
    ->     read_loop: LOOP
    ->         -- Fetch the next row from the cursor
    ->         FETCH booking_cursor INTO book_id_val, book_title_val, user_id_val;
    ->
    ->         -- Check if there are no more rows to fetch
    ->         IF done THEN
    ->             LEAVE read_loop;
    ->         END IF;
    ->
    ->         -- Display book_id, book_title, and user_id
    ->         SELECT CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val);
    ->
    ->     END LOOP;
    ->
    ->     -- Close the cursor
    ->     CLOSE booking_cursor;
    -> END//
Query OK, 0 rows affected (0.01 sec)
```

Output:

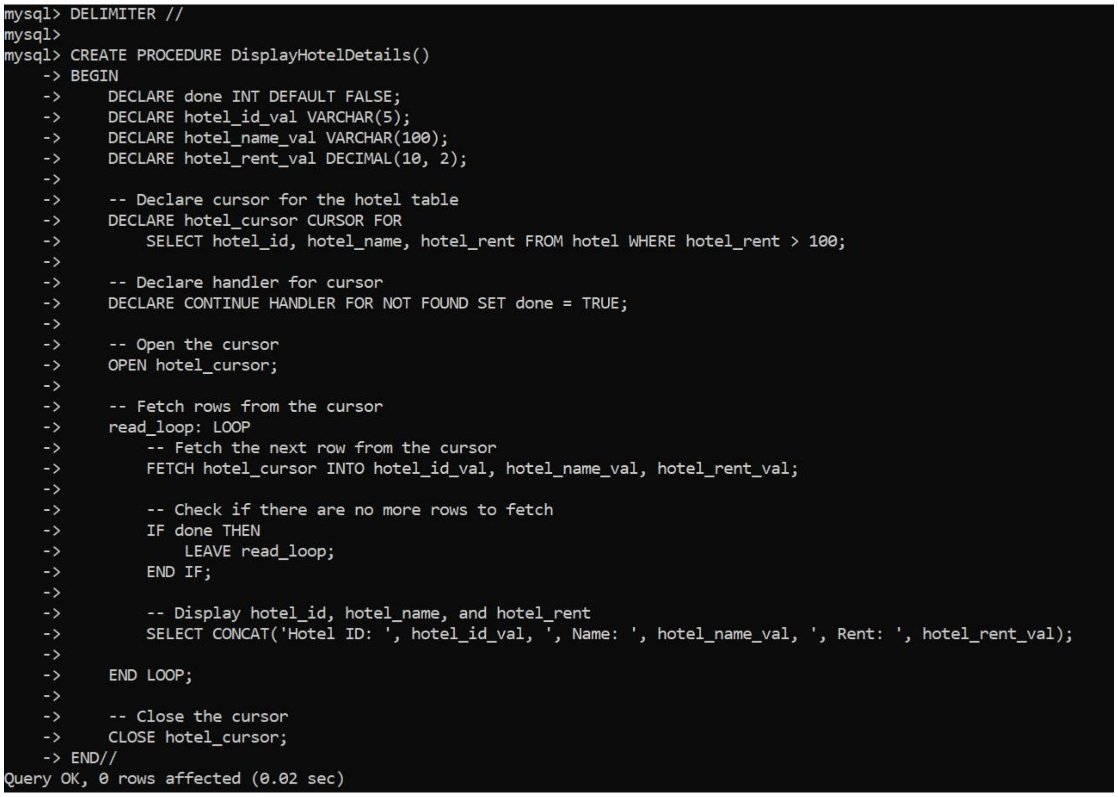


```
| Book ID: 100, Title: Tropical Paradise Getaway, User ID: 1                                   |
+----------------------------------------------------------------------------------------------+
1 row in set (0.00 sec)

+----------------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+----------------------------------------------------------------------------------------------+
| Book ID: 200, Title: Mountain Retreat Expedition, User ID: 2                                 |
+----------------------------------------------------------------------------------------------+
1 row in set (0.01 sec)

+----------------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+----------------------------------------------------------------------------------------------+
| Book ID: 300, Title: City Explorer Experience, User ID: 3                                    |
+----------------------------------------------------------------------------------------------+
1 row in set (0.03 sec)

+----------------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+----------------------------------------------------------------------------------------------+
| Book ID: 400, Title: Safari Adventure Safari, User ID: 4                                     |
+----------------------------------------------------------------------------------------------+
1 row in set (0.07 sec)

+----------------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+----------------------------------------------------------------------------------------------+
| Book ID: 500, Title: Cultural Heritage Tour, User ID: 5                                      |
+----------------------------------------------------------------------------------------------+
1 row in set (0.10 sec)

+----------------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+----------------------------------------------------------------------------------------------+
| Book ID: 600, Title: Luxury Cruise Voyage, User ID: 1                                        |
+----------------------------------------------------------------------------------------------+
1 row in set (0.13 sec)
```



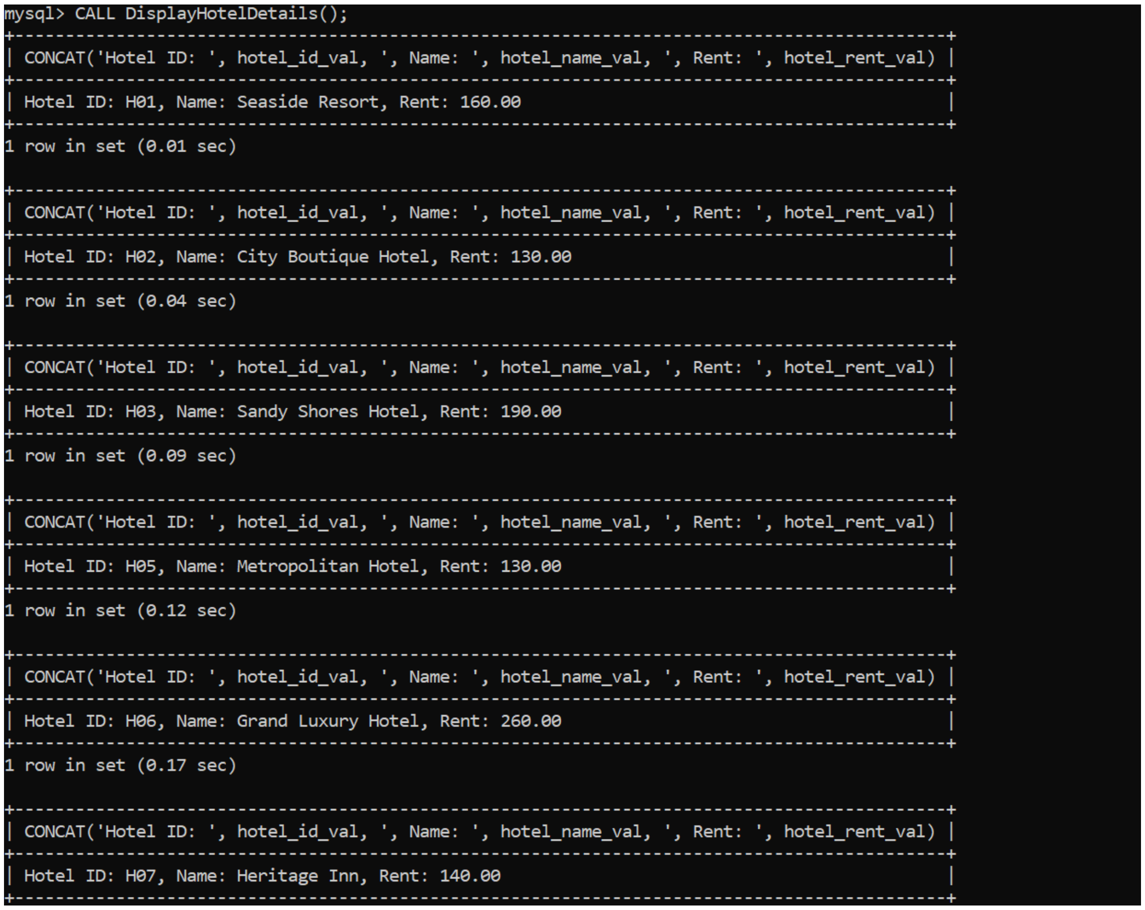
```
+-------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+-------------------------------------------------------------------------------------+
| Book ID: 700, Title: Winter Wonderland Escape, User ID: 2                           |
+-------------------------------------------------------------------------------------+
1 row in set (0.18 sec)

+-------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+-------------------------------------------------------------------------------------+
| Book ID: 800, Title: Desert Oasis Expedition, User ID: 3                            |
+-------------------------------------------------------------------------------------+
1 row in set (0.21 sec)

+-------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+-------------------------------------------------------------------------------------+
| Book ID: 900, Title: European Grand Tour, User ID: 4                                |
+-------------------------------------------------------------------------------------+
1 row in set (0.25 sec)

+-------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+-------------------------------------------------------------------------------------+
| Book ID: 1000, Title: Tropical Island Hopping Adventure, User ID: 5                 |
+-------------------------------------------------------------------------------------+
1 row in set (0.28 sec)

+-------------------------------------------------------------------------------------+
| CONCAT('Book ID: ', book_id_val, ', Title: ', book_title_val, ', User ID: ', user_id_val) |
+-------------------------------------------------------------------------------------+
| Book ID: 1100, Title: Family Vacation, User ID: 1                                   |
+-------------------------------------------------------------------------------------+
1 row in set (0.32 sec)

Query OK, 0 rows affected (0.35 sec)
```

3. Cursor to declare hotel details.



```
mysql> DELIMITER //
mysql>
mysql> CREATE PROCEDURE DisplayHotelDetails()
    -> BEGIN
    ->     DECLARE done INT DEFAULT FALSE;
    ->     DECLARE hotel_id_val VARCHAR(5);
    ->     DECLARE hotel_name_val VARCHAR(100);
    ->     DECLARE hotel_rent_val DECIMAL(10, 2);
    ->
    ->     -- Declare cursor for the hotel table
    ->     DECLARE hotel_cursor CURSOR FOR
    ->         SELECT hotel_id, hotel_name, hotel_rent FROM hotel WHERE hotel_rent > 100;
    ->
    ->     -- Declare handler for cursor
    ->     DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = TRUE;
    ->
    ->     -- Open the cursor
    ->     OPEN hotel_cursor;
    ->
    ->     -- Fetch rows from the cursor
    ->     read_loop: LOOP
    ->         -- Fetch the next row from the cursor
    ->         FETCH hotel_cursor INTO hotel_id_val, hotel_name_val, hotel_rent_val;
    ->
    ->         -- Check if there are no more rows to fetch
    ->         IF done THEN
    ->             LEAVE read_loop;
    ->         END IF;
    ->
    ->         -- Display hotel_id, hotel_name, and hotel_rent
    ->         SELECT CONCAT('Hotel ID: ', hotel_id_val, ', Name: ', hotel_name_val, ', Rent: ', hotel_rent_val);
    ->
    ->     END LOOP;
    ->
    ->     -- Close the cursor
    ->     CLOSE hotel_cursor;
    -> END//
Query OK, 0 rows affected (0.02 sec)
```

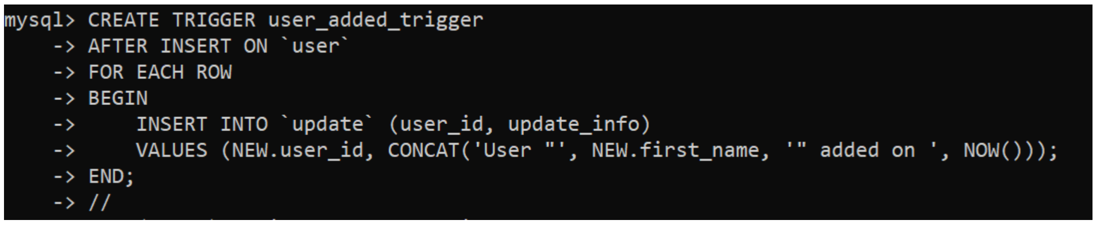
Output:



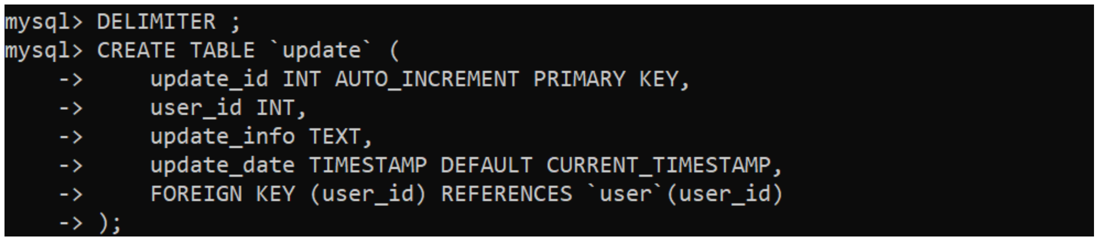
```
mysql> CALL DisplayHotelDetails();
+------------------------------------------------------------------------------------------+
| CONCAT('Hotel ID: ', hotel_id_val, ', Name: ', hotel_name_val, ', Rent: ', hotel_rent_val) |
+------------------------------------------------------------------------------------------+
| Hotel ID: H01, Name: Seaside Resort, Rent: 160.00                                        |
+------------------------------------------------------------------------------------------+
1 row in set (0.01 sec)

+------------------------------------------------------------------------------------------+
| CONCAT('Hotel ID: ', hotel_id_val, ', Name: ', hotel_name_val, ', Rent: ', hotel_rent_val) |
+------------------------------------------------------------------------------------------+
| Hotel ID: H02, Name: City Boutique Hotel, Rent: 130.00                                   |
+------------------------------------------------------------------------------------------+
1 row in set (0.04 sec)

+------------------------------------------------------------------------------------------+
| CONCAT('Hotel ID: ', hotel_id_val, ', Name: ', hotel_name_val, ', Rent: ', hotel_rent_val) |
+------------------------------------------------------------------------------------------+
| Hotel ID: H03, Name: Sandy Shores Hotel, Rent: 190.00                                    |
+------------------------------------------------------------------------------------------+
1 row in set (0.09 sec)

+------------------------------------------------------------------------------------------+
| CONCAT('Hotel ID: ', hotel_id_val, ', Name: ', hotel_name_val, ', Rent: ', hotel_rent_val) |
+------------------------------------------------------------------------------------------+
| Hotel ID: H05, Name: Metropolitan Hotel, Rent: 130.00                                    |
+------------------------------------------------------------------------------------------+
1 row in set (0.12 sec)

+------------------------------------------------------------------------------------------+
| CONCAT('Hotel ID: ', hotel_id_val, ', Name: ', hotel_name_val, ', Rent: ', hotel_rent_val) |
+------------------------------------------------------------------------------------------+
| Hotel ID: H06, Name: Grand Luxury Hotel, Rent: 260.00                                    |
+------------------------------------------------------------------------------------------+
1 row in set (0.17 sec)

+------------------------------------------------------------------------------------------+
| CONCAT('Hotel ID: ', hotel_id_val, ', Name: ', hotel_name_val, ', Rent: ', hotel_rent_val) |
+------------------------------------------------------------------------------------------+
| Hotel ID: H07, Name: Heritage Inn, Rent: 140.00                                          |
+------------------------------------------------------------------------------------------+
```

3.5 Triggers

1. **Trigger to know updated user tuples.**

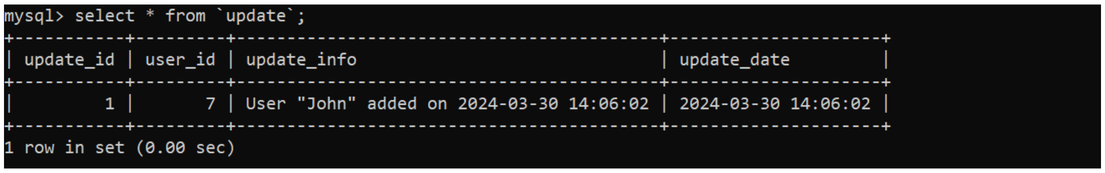


```
mysql> CREATE TRIGGER user_added_trigger
    -> AFTER INSERT ON `user`
    -> FOR EACH ROW
    -> BEGIN
    ->     INSERT INTO `update` (user_id, update_info)
    ->     VALUES (NEW.user_id, CONCAT('User "', NEW.first_name, '" added on ', NOW()));
    -> END;
    -> //
```



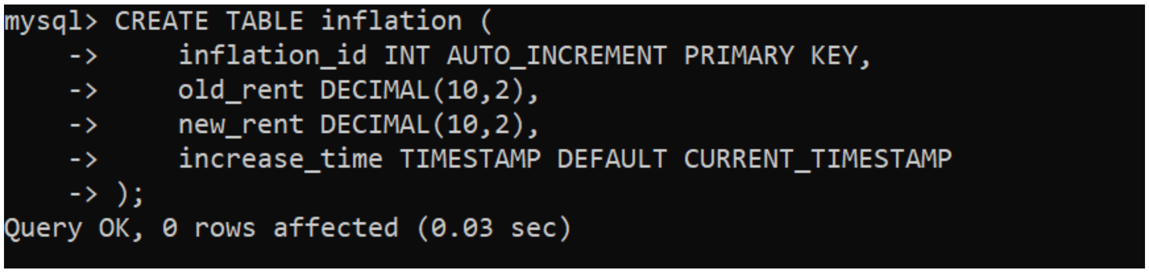
```
mysql> DELIMITER ;
mysql> CREATE TABLE `update` (
    ->     update_id INT AUTO_INCREMENT PRIMARY KEY,
    ->     user_id INT,
    ->     update_info TEXT,
    ->     update_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    ->     FOREIGN KEY (user_id) REFERENCES `user`(user_id)
    -> );
```

Output:

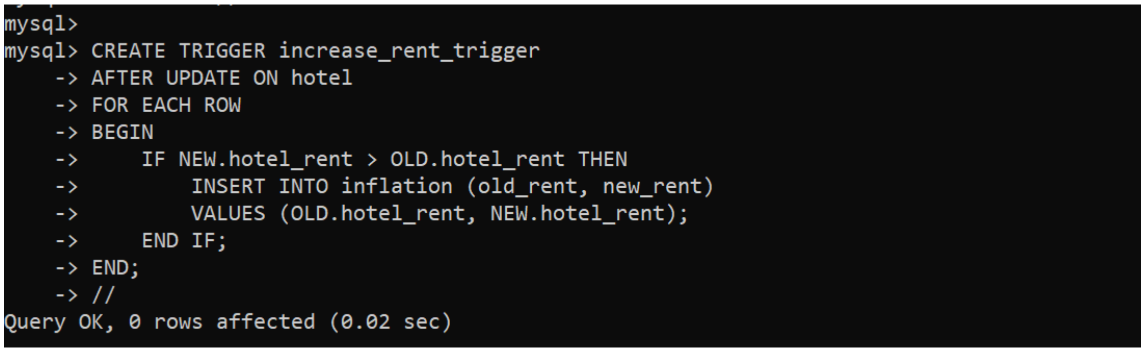


```
mysql> select * from `update`;
+-----------+---------+-----------------------------------------+---------------------+
| update_id | user_id | update_info                             | update_date         |
+-----------+---------+-----------------------------------------+---------------------+
|         1 |       7 | User "John" added on 2024-03-30 14:06:02 | 2024-03-30 14:06:02 |
+-----------+---------+-----------------------------------------+---------------------+
1 row in set (0.00 sec)
```

2. **Trigger to alert increase in hotel rent.**

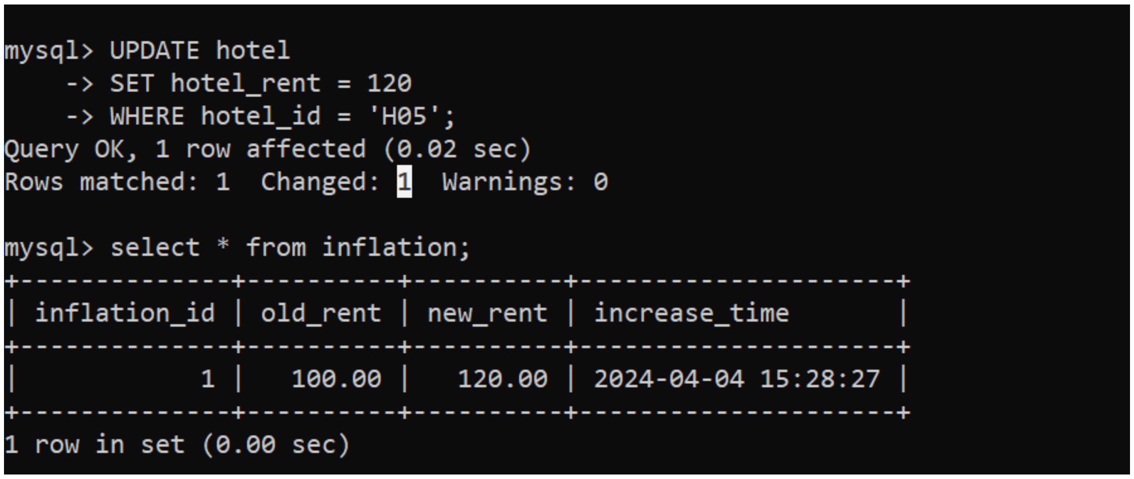


```
mysql> CREATE TABLE inflation (
    ->     inflation_id INT AUTO_INCREMENT PRIMARY KEY,
    ->     old_rent DECIMAL(10,2),
    ->     new_rent DECIMAL(10,2),
    ->     increase_time TIMESTAMP DEFAULT CURRENT_TIMESTAMP
    -> );
Query OK, 0 rows affected (0.03 sec)
```



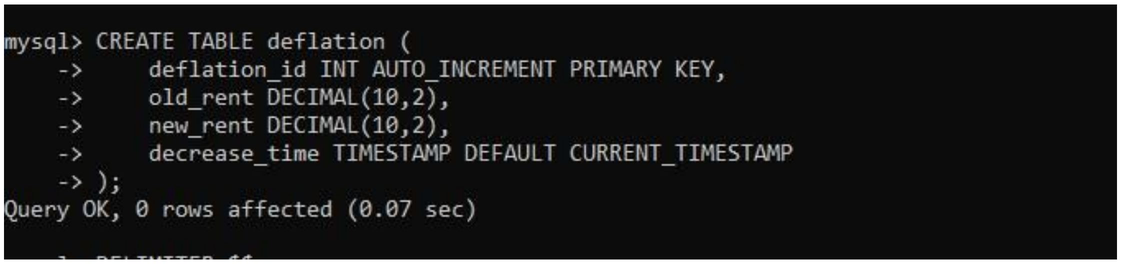
```
mysql>
mysql> CREATE TRIGGER increase_rent_trigger
    -> AFTER UPDATE ON hotel
    -> FOR EACH ROW
    -> BEGIN
    ->     IF NEW.hotel_rent > OLD.hotel_rent THEN
    ->         INSERT INTO inflation (old_rent, new_rent)
    ->         VALUES (OLD.hotel_rent, NEW.hotel_rent);
    ->     END IF;
    -> END;
    -> //
Query OK, 0 rows affected (0.02 sec)
```

Output:

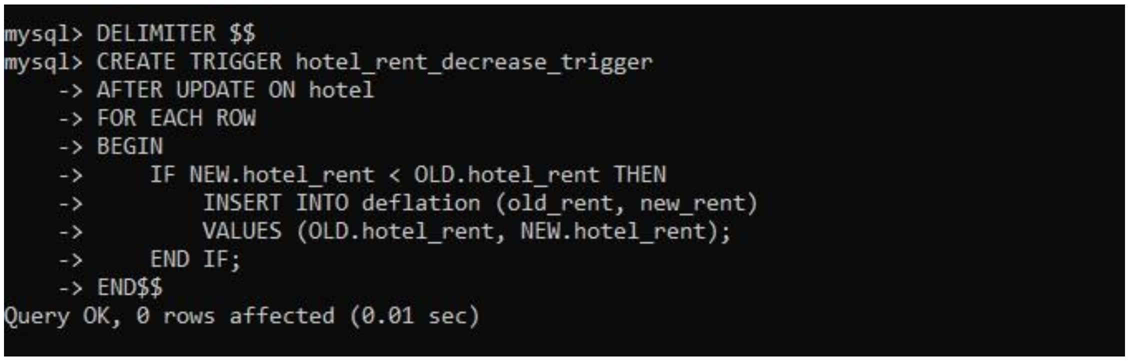


```
mysql> UPDATE hotel
    -> SET hotel_rent = 120
    -> WHERE hotel_id = 'H05';
Query OK, 1 row affected (0.02 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from inflation;
+--------------+----------+----------+---------------------+
| inflation_id | old_rent | new_rent | increase_time       |
+--------------+----------+----------+---------------------+
|            1 |   100.00 |   120.00 | 2024-04-04 15:28:27 |
+--------------+----------+----------+---------------------+
1 row in set (0.00 sec)
```

3. **Trigger to alert decrease in hotel rent.**

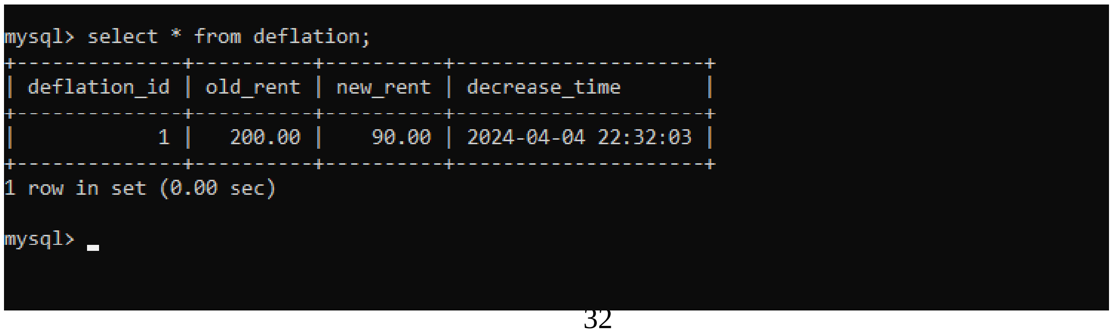


```
mysql> CREATE TABLE deflation (
    ->     deflation_id INT AUTO_INCREMENT PRIMARY KEY,
    ->     old_rent DECIMAL(10,2),
    ->     new_rent DECIMAL(10,2),
    ->     decrease_time TIMESTAMP DEFAULT CURRENT_TIMESTAMP
    -> );
Query OK, 0 rows affected (0.07 sec)
```



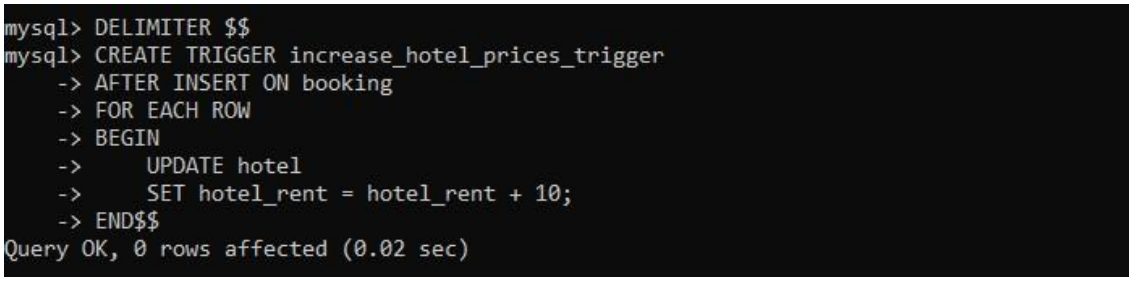
```
mysql> DELIMITER $$
mysql> CREATE TRIGGER hotel_rent_decrease_trigger
    -> AFTER UPDATE ON hotel
    -> FOR EACH ROW
    -> BEGIN
    ->     IF NEW.hotel_rent < OLD.hotel_rent THEN
    ->         INSERT INTO deflation (old_rent, new_rent)
    ->         VALUES (OLD.hotel_rent, NEW.hotel_rent);
    ->     END IF;
    -> END$$
Query OK, 0 rows affected (0.01 sec)
```

Output:

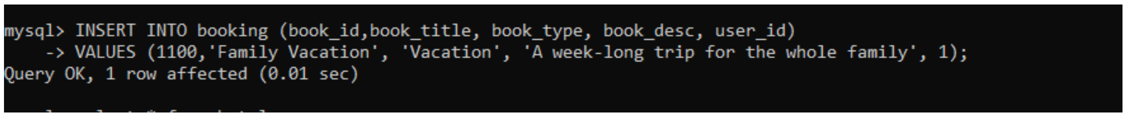


```
mysql> select * from deflation;
+--------------+----------+----------+---------------------+
| deflation_id | old_rent | new_rent | decrease_time       |
+--------------+----------+----------+---------------------+
|            1 |   200.00 |    90.00 | 2024-04-04 22:32:03 |
+--------------+----------+----------+---------------------+
1 row in set (0.00 sec)

mysql> 
```

4. **Trigger to increase hotel price on every booking.**

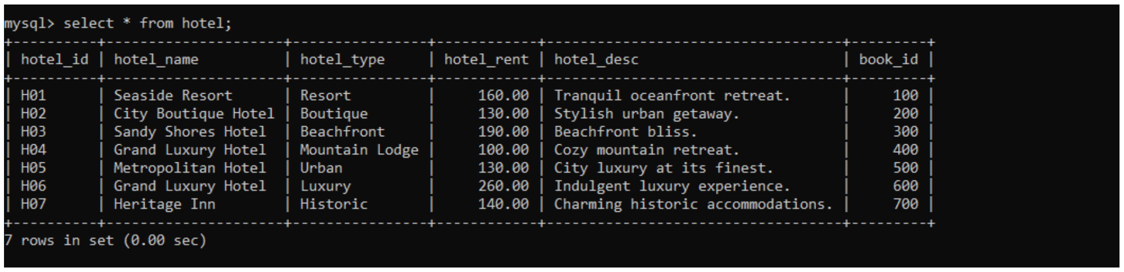


```
mysql> DELIMITER $$
mysql> CREATE TRIGGER increase_hotel_prices_trigger
    -> AFTER INSERT ON booking
    -> FOR EACH ROW
    -> BEGIN
    ->     UPDATE hotel
    ->     SET hotel_rent = hotel_rent + 10;
    -> END$$
Query OK, 0 rows affected (0.02 sec)
```



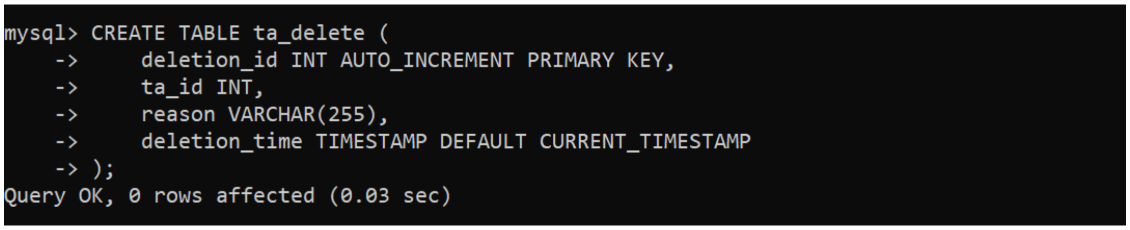
```
mysql> INSERT INTO booking (book_id,book_title, book_type, book_desc, user_id)
    -> VALUES (1100,'Family Vacation', 'Vacation', 'A week-long trip for the whole family', 1);
Query OK, 1 row affected (0.01 sec)
```

<u>Output:</u>

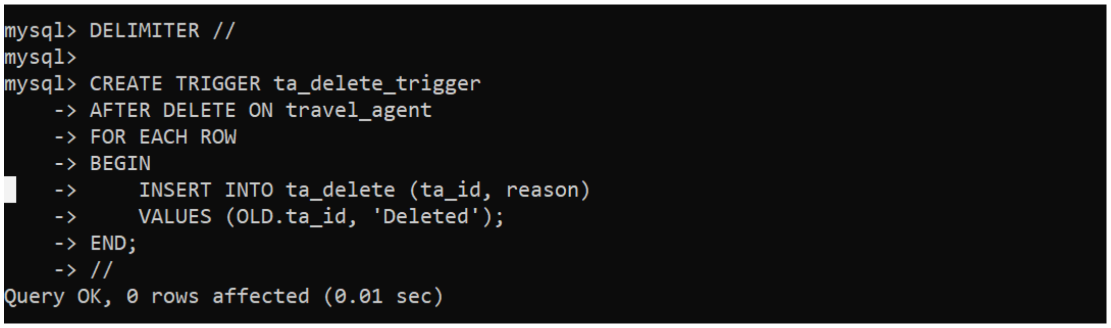


```
mysql> select * from hotel;
+----------+--------------------+---------------+------------+---------------------------------+---------+
| hotel_id | hotel_name         | hotel_type    | hotel_rent | hotel_desc                      | book_id |
+----------+--------------------+---------------+------------+---------------------------------+---------+
| H01      | Seaside Resort     | Resort        |     160.00 | Tranquil oceanfront retreat.    |     100 |
| H02      | City Boutique Hotel| Boutique      |     130.00 | Stylish urban getaway.          |     200 |
| H03      | Sandy Shores Hotel | Beachfront    |     190.00 | Beachfront bliss.               |     300 |
| H04      | Grand Luxury Hotel | Mountain Lodge|     100.00 | Cozy mountain retreat.          |     400 |
| H05      | Metropolitan Hotel | Urban         |     130.00 | City luxury at its finest.      |     500 |
| H06      | Grand Luxury Hotel | Luxury        |     260.00 | Indulgent luxury experience.    |     600 |
| H07      | Heritage Inn       | Historic      |     140.00 | Charming historic accommodations.|    700 |
+----------+--------------------+---------------+------------+---------------------------------+---------+
7 rows in set (0.00 sec)
```

5. **Trigger to alert when a travel agent tuple is deleted.**



```
mysql> CREATE TABLE ta_delete (
    ->     deletion_id INT AUTO_INCREMENT PRIMARY KEY,
    ->     ta_id INT,
    ->     reason VARCHAR(255),
    ->     deletion_time TIMESTAMP DEFAULT CURRENT_TIMESTAMP
    -> );
Query OK, 0 rows affected (0.03 sec)
```



```
mysql> DELIMITER //
mysql>
mysql> CREATE TRIGGER ta_delete_trigger
    -> AFTER DELETE ON travel_agent
    -> FOR EACH ROW
    -> BEGIN
    ->     INSERT INTO ta_delete (ta_id, reason)
    ->     VALUES (OLD.ta_id, 'Deleted');
    -> END;
    -> //
Query OK, 0 rows affected (0.01 sec)
```

Chapter-4

Analyzing the pitfalls, identifying the dependencies, and applying normalizations

5. Analyzing the Pitfalls, Identifying the Dependencies and Applying Normalizations

Pitfalls:

- Redundancy: In my database tables, I've strived to minimize redundancy by avoiding storing the same data in multiple places. However, there's still a risk of redundancy if data is duplicated unintentionally across different tables. Even without explicit dependencies, redundant data can lead to inconsistencies and inefficiencies if not managed properly.

- Inefficiency: While I've attempted to design my tables efficiently, inefficiencies can still arise if the schema lacks proper normalization or if data retrieval mechanisms are not optimized. Without explicit dependencies, it's essential to ensure that storage and retrieval processes are streamlined to maintain performance.

- Complexity: Despite the absence of explicit dependencies, complexity can creep into the schema if it's not carefully designed. Complexity can make the database harder to understand and maintain, increasing the likelihood of errors and hindering future development efforts. Simplifying the schema through normalization can help mitigate these complexities and improve overall manageability.

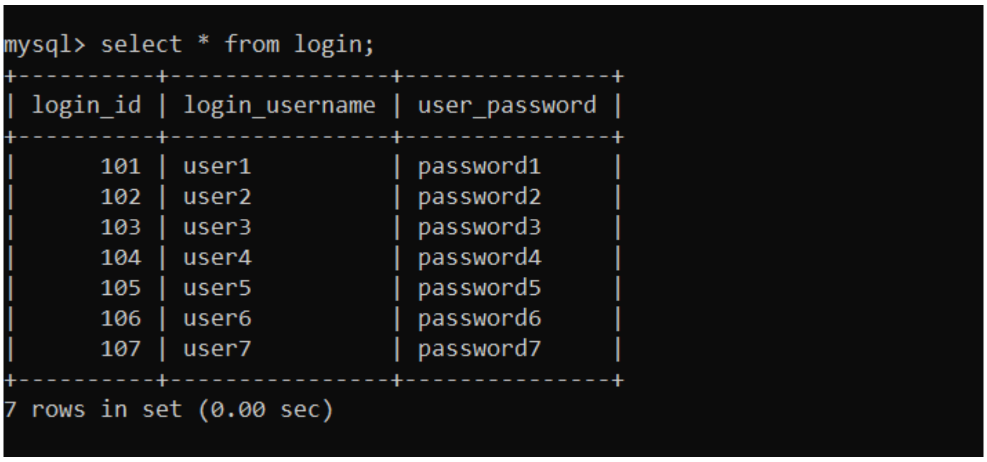
Dependencies:

No dependencies were identified in the database schema. Each table appears to be independent of each other without any partial or transitivity dependencies.

Normalization:

Since no dependencies were identified and the database schema does not exhibit any issues related to redundancy, inefficiency, or complexity, normalization beyond 1NF may not be necessary. However, ensuring that the database design adheres to the principles of 1NF, such as atomicity and uniqueness of values, is essential.

4.1 Login Table:



```
mysql> select * from login;
+----------+----------------+---------------+
| login_id | login_username | user_password |
+----------+----------------+---------------+
|      101 | user1          | password1     |
|      102 | user2          | password2     |
|      103 | user3          | password3     |
|      104 | user4          | password4     |
|      105 | user5          | password5     |
|      106 | user6          | password6     |
|      107 | user7          | password7     |
+----------+----------------+---------------+
7 rows in set (0.00 sec)
```

Pitfalls:

a) Redundancy: The login_username and user_password columns store repeated information for each user, leading to redundancy.

b) Inconsistency: Storing login credentials directly in the login table can lead to inefficiency, especially if multiple tables require access to user credentials.

c) Inefficiency: Having login credentials in a separate table adds complexity to the database schema, especially if additional tables require access to user credentials.

d) Complexity: Storing login credentials directly in the login table can lead to inefficiency, especially if multiple tables require access to user credentials.

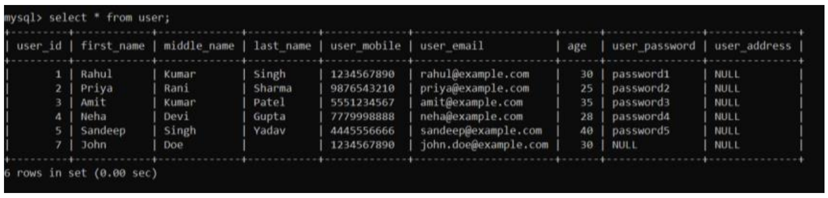
Dependencies:

The login table does not exhibit partial or transitive dependencies as it consists of atomic attributes.

Normalization:

No specific normalization changes are required for dependency reasons

4.2 User Table:



```
mysql> select * from user;
+---------+------------+-------------+-----------+-------------+-----------------------+-----+---------------+--------------+
| user_id | first_name | middle_name | last_name | user_mobile | user_email            | age | user_password | user_address |
+---------+------------+-------------+-----------+-------------+-----------------------+-----+---------------+--------------+
|       1 | Rahul      | Kumar       | Singh     | 1234567890  | rahul@example.com     |  30 | password1     | NULL         |
|       2 | Priya      | Rani        | Sharma    | 9876543210  | priya@example.com     |  25 | password2     | NULL         |
|       3 | Amit       | Kumar       | Patel     | 5551234567  | amit@example.com      |  35 | password3     | NULL         |
|       4 | Neha       | Devi        | Gupta     | 7779998888  | neha@example.com      |  28 | password4     | NULL         |
|       5 | Sandeep    | Singh       | Yadav     | 4445556666  | sandeep@example.com   |  40 | password5     | NULL         |
|       7 | John       | Doe         |           | 1234567890  | john.doe@example.com  |  30 | NULL          | NULL         |
+---------+------------+-------------+-----------+-------------+-----------------------+-----+---------------+--------------+
6 rows in set (0.00 sec)
```

Pitfalls:

4.2.1 Redundancy: The user_mobile column contains repeated data for users who have multiple mobile numbers, leading to redundancy.

4.2.2 Inconsistency: Storing multiple mobile numbers in a single column can lead to inefficiency in querying and managing the data.

4.2.3 Inefficiency: Users with multiple mobile numbers might have different formats or lengths, leading to data inconsistencies.

4.2.4 Complexity: Managing multiple mobile numbers within a single column adds complexity to the database schema.

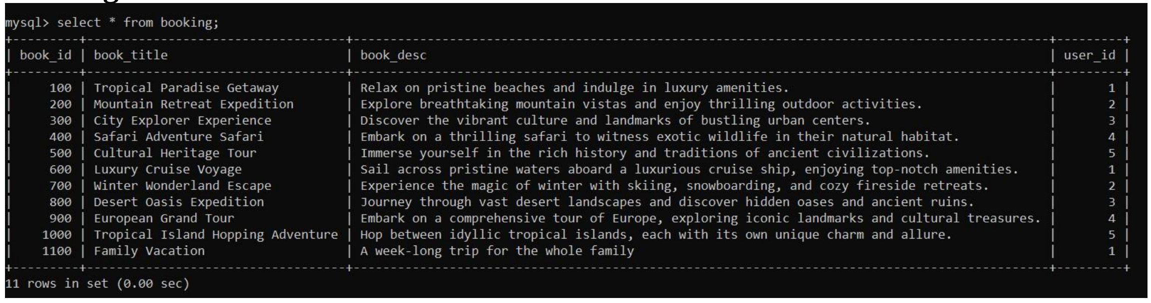
Dependencies:

There are no partial or transitive dependencies present in the Customer table.

Normalization:

No specific normalization changes are required for dependency reasons

4.3 Booking Table:



```
mysql> select * from booking;
+---------+-----------------------------------+----------------------------------------------------------------------------------------------+---------+
| book_id | book_title                        | book_desc                                                                                    | user_id |
+---------+-----------------------------------+----------------------------------------------------------------------------------------------+---------+
|     100 | Tropical Paradise Getaway         | Relax on pristine beaches and indulge in luxury amenities.                                   |       1 |
|     200 | Mountain Retreat Expedition       | Explore breathtaking mountain vistas and enjoy thrilling outdoor activities.                 |       2 |
|     300 | City Explorer Experience          | Discover the vibrant culture and landmarks of bustling urban centers.                        |       3 |
|     400 | Safari Adventure Safari           | Embark on a thrilling safari to witness exotic wildlife in their natural habitat.            |       4 |
|     500 | Cultural Heritage Tour            | Immerse yourself in the rich history and traditions of ancient civilizations.                |       5 |
|     600 | Luxury Cruise Voyage              | Sail across pristine waters aboard a luxurious cruise ship, enjoying top-notch amenities.    |       1 |
|     700 | Winter Wonderland Escape          | Experience the magic of winter with skiing, snowboarding, and cozy fireside retreats.        |       2 |
|     800 | Desert Oasis Expedition           | Journey through vast desert landscapes and discover hidden oases and ancient ruins.          |       3 |
|     900 | European Grand Tour               | Embark on a comprehensive tour of Europe, exploring iconic landmarks and cultural treasures. |       4 |
|    1000 | Tropical Island Hopping Adventure | Hop between idyllic tropical islands, each with its own unique charm and allure.             |       5 |
|    1100 | Family Vacation                   | A week-long trip for the whole family                                                        |       1 |
+---------+-----------------------------------+----------------------------------------------------------------------------------------------+---------+
11 rows in set (0.00 sec)
```

Pitfalls:

4.3.1 Redundancy: The book_title and book_desc columns contain repeated data for each booking, leading to redundancy.

4.3.2 Inconsistency: Storing detailed book descriptions directly in the booking table can lead to inefficiency, especially if the descriptions are lengthy.

4.3.3 Inefficiency: Different bookings might have varying lengths or formats for their titles and descriptions, leading to data inconsistencies.

4.3.4 Complexity: Managing detailed book descriptions within the booking table adds complexity to the database schema.

Dependencies:

There are no apparent partial or transitive dependencies in this table.

To address these pitfalls and normalize the booking table, we can apply the following steps:

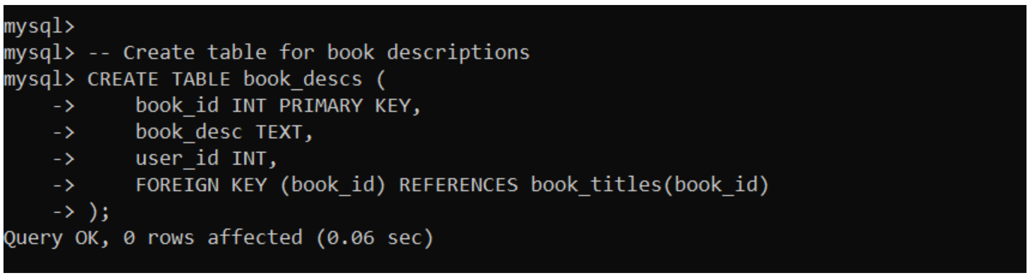
1. Separate the book_title and book_desc columns into a separate table to eliminate redundancy and manage detailed descriptions efficiently.

2. Ensure each attribute in the table is atomic.

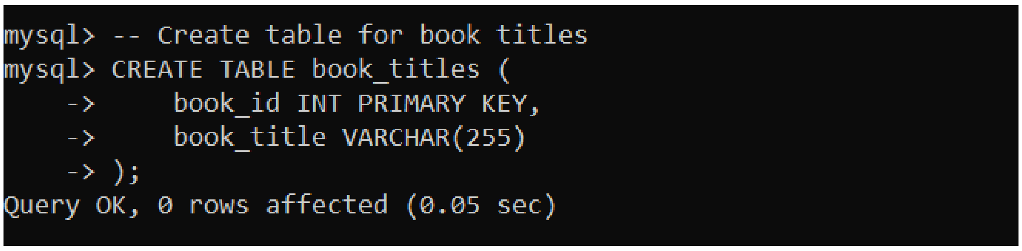
3. Assign primary and foreign keys where necessary.

Normalization:(2NF)

In this setup, book_titles contains only the book_id and book_title, while book_descs contains book_id, book_desc, and user_id. This separation adheres to 2NF by removing any partial dependencies.

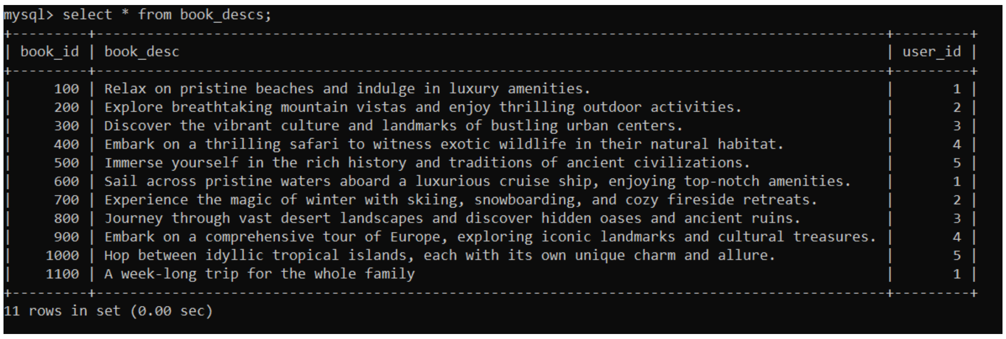


```
mysql>
mysql> -- Create table for book descriptions
mysql> CREATE TABLE book_descs (
    ->     book_id INT PRIMARY KEY,
    ->     book_desc TEXT,
    ->     user_id INT,
    ->     FOREIGN KEY (book_id) REFERENCES book_titles(book_id)
    -> );
Query OK, 0 rows affected (0.06 sec)
```

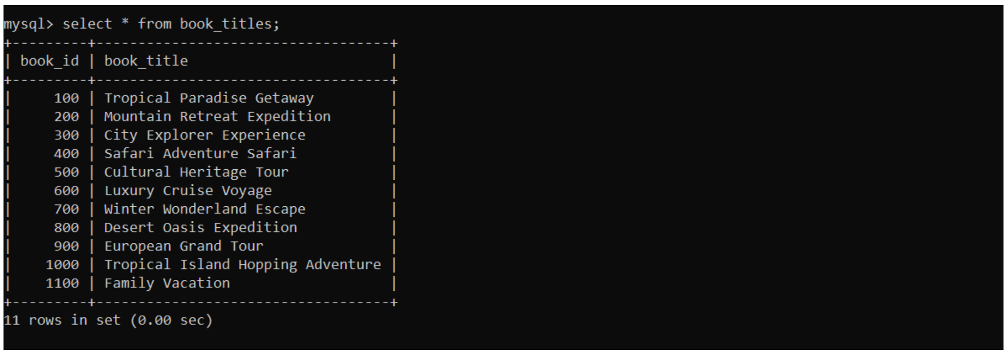


```
mysql> -- Create table for book titles
mysql> CREATE TABLE book_titles (
    ->     book_id INT PRIMARY KEY,
    ->     book_title VARCHAR(255)
    -> );
Query OK, 0 rows affected (0.05 sec)
```

<u>OUTPUT:</u>

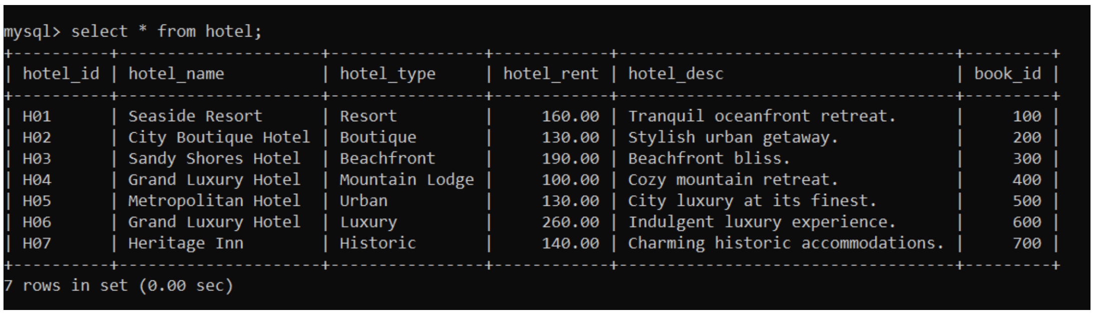


```
mysql> select * from book_descs;
+---------+----------------------------------------------------------------------------------------------+---------+
| book_id | book_desc                                                                                    | user_id |
+---------+----------------------------------------------------------------------------------------------+---------+
|     100 | Relax on pristine beaches and indulge in luxury amenities.                                   |       1 |
|     200 | Explore breathtaking mountain vistas and enjoy thrilling outdoor activities.                 |       2 |
|     300 | Discover the vibrant culture and landmarks of bustling urban centers.                        |       3 |
|     400 | Embark on a thrilling safari to witness exotic wildlife in their natural habitat.            |       4 |
|     500 | Immerse yourself in the rich history and traditions of ancient civilizations.                |       5 |
|     600 | Sail across pristine waters aboard a luxurious cruise ship, enjoying top-notch amenities.    |       1 |
|     700 | Experience the magic of winter with skiing, snowboarding, and cozy fireside retreats.        |       2 |
|     800 | Journey through vast desert landscapes and discover hidden oases and ancient ruins.          |       3 |
|     900 | Embark on a comprehensive tour of Europe, exploring iconic landmarks and cultural treasures. |       4 |
|    1000 | Hop between idyllic tropical islands, each with its own unique charm and allure.             |       5 |
|    1100 | A week-long trip for the whole family                                                        |       1 |
+---------+----------------------------------------------------------------------------------------------+---------+
11 rows in set (0.00 sec)
```



```
mysql> select * from book_titles;
+---------+--------------------------------+
| book_id | book_title                     |
+---------+--------------------------------+
|     100 | Tropical Paradise Getaway      |
|     200 | Mountain Retreat Expedition    |
|     300 | City Explorer Experience       |
|     400 | Safari Adventure Safari        |
|     500 | Cultural Heritage Tour         |
|     600 | Luxury Cruise Voyage           |
|     700 | Winter Wonderland Escape       |
|     800 | Desert Oasis Expedition        |
|     900 | European Grand Tour            |
|    1000 | Tropical Island Hopping Adventure |
|    1100 | Family Vacation                |
+---------+--------------------------------+
11 rows in set (0.00 sec)
```

4.4 Hotel Table:



```
mysql> select * from hotel;
+----------+---------------------+---------------+------------+----------------------------------+---------+
| hotel_id | hotel_name          | hotel_type    | hotel_rent | hotel_desc                       | book_id |
+----------+---------------------+---------------+------------+----------------------------------+---------+
| H01      | Seaside Resort      | Resort        |     160.00 | Tranquil oceanfront retreat.     |     100 |
| H02      | City Boutique Hotel | Boutique      |     130.00 | Stylish urban getaway.           |     200 |
| H03      | Sandy Shores Hotel  | Beachfront    |     190.00 | Beachfront bliss.                |     300 |
| H04      | Grand Luxury Hotel  | Mountain Lodge |    100.00 | Cozy mountain retreat.           |     400 |
| H05      | Metropolitan Hotel  | Urban         |     130.00 | City luxury at its finest.       |     500 |
| H06      | Grand Luxury Hotel  | Luxury        |     260.00 | Indulgent luxury experience.     |     600 |
| H07      | Heritage Inn        | Historic      |     140.00 | Charming historic accommodations. |    700 |
+----------+---------------------+---------------+------------+----------------------------------+---------+
7 rows in set (0.00 sec)
```

Pitfalls:

4.4.1 Redundancy: The hotel table may suffer from redundancy as storing the same data in multiple places can lead to inconsistencies and inefficiencies.

4.4.2 Inconsistency: If the same hotel information is stored in multiple rows due to different booking IDs, it can lead to data inconsistencies.

4.4.3 Inefficiency: Storing text descriptions directly in the table (hotel_desc) can lead to increased storage requirements and slower query performance.

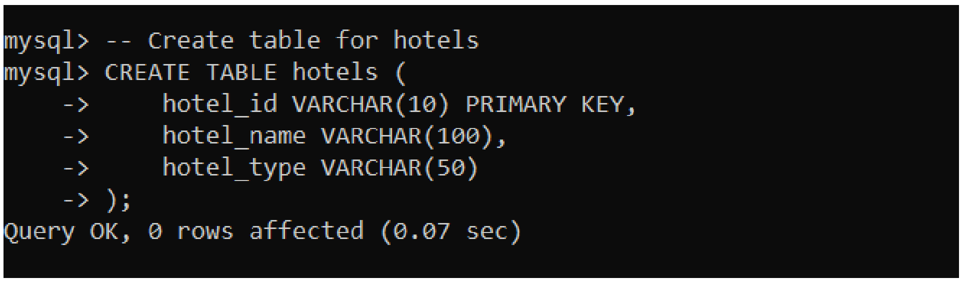
4.4.4 Complexity: Depending on how the book_id relates to the hotel booking, there might be complexity introduced by maintaining this relationship within the same table.

Dependencies:

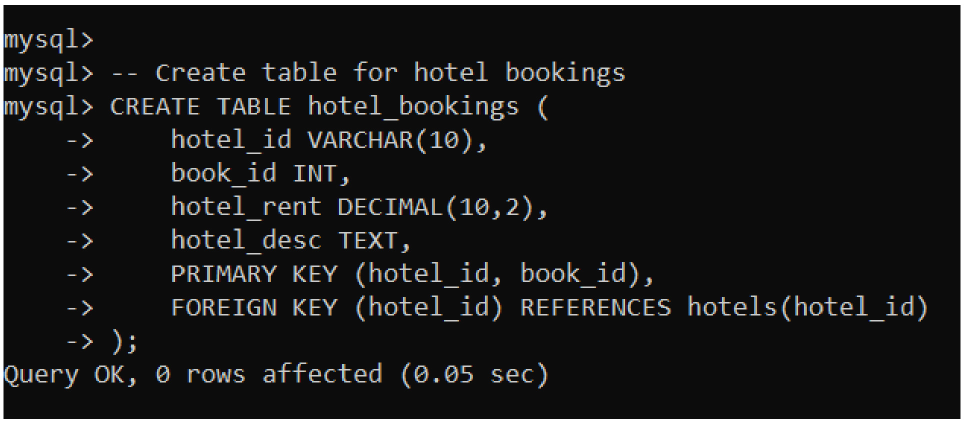
It appears that there's a partial dependency on book_id. The book_id seems to relate to bookings made for hotels, implying that a hotel can have multiple bookings associated with it. However, the hotel_desc column is dependent only on hotel_id, not on book_id. This partial dependency could lead to data anomalies if not addressed properly during normalization.

Normalization:

To achieve 2NF, we need to ensure that there are no partial dependencies. In the hotel table, we observe a potential partial dependency of hotel_desc on hotel_id rather than on the entire primary key. To address this, we'll create two tables:

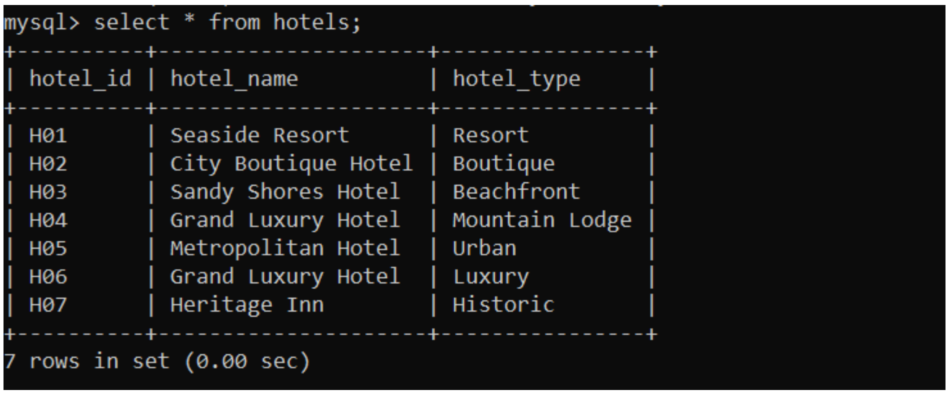


```
mysql> -- Create table for hotels
mysql> CREATE TABLE hotels (
    ->     hotel_id VARCHAR(10) PRIMARY KEY,
    ->     hotel_name VARCHAR(100),
    ->     hotel_type VARCHAR(50)
    -> );
Query OK, 0 rows affected (0.07 sec)
```

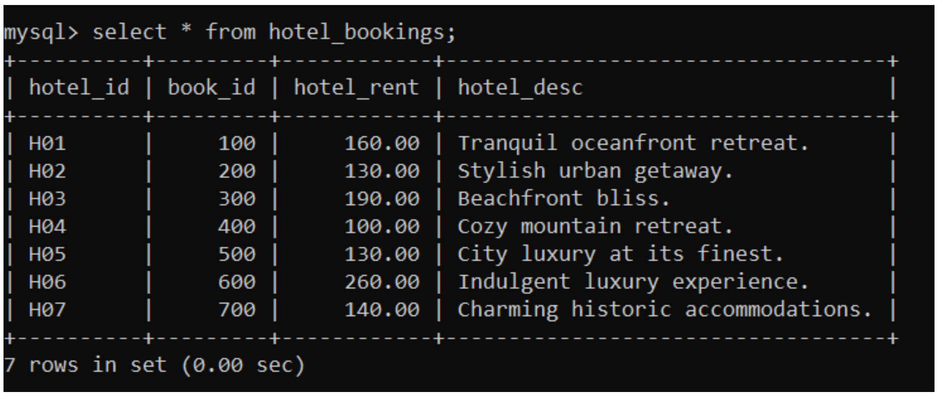


```
mysql>
mysql> -- Create table for hotel bookings
mysql> CREATE TABLE hotel_bookings (
    ->     hotel_id VARCHAR(10),
    ->     book_id INT,
    ->     hotel_rent DECIMAL(10,2),
    ->     hotel_desc TEXT,
    ->     PRIMARY KEY (hotel_id, book_id),
    ->     FOREIGN KEY (hotel_id) REFERENCES hotels(hotel_id)
    -> );
Query OK, 0 rows affected (0.05 sec)
```

OUTPUT:

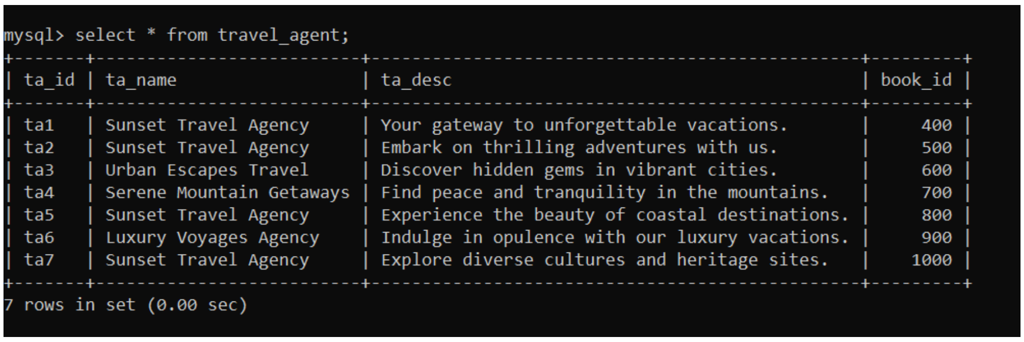


```
mysql> select * from hotels;
+----------+---------------------+----------------+
| hotel_id | hotel_name          | hotel_type     |
+----------+---------------------+----------------+
| H01      | Seaside Resort      | Resort         |
| H02      | City Boutique Hotel | Boutique       |
| H03      | Sandy Shores Hotel  | Beachfront     |
| H04      | Grand Luxury Hotel  | Mountain Lodge |
| H05      | Metropolitan Hotel  | Urban          |
| H06      | Grand Luxury Hotel  | Luxury         |
| H07      | Heritage Inn        | Historic       |
+----------+---------------------+----------------+
7 rows in set (0.00 sec)
```



```
mysql> select * from hotel_bookings;
+----------+---------+------------+-----------------------------------+
| hotel_id | book_id | hotel_rent | hotel_desc                        |
+----------+---------+------------+-----------------------------------+
| H01      |     100 |     160.00 | Tranquil oceanfront retreat.      |
| H02      |     200 |     130.00 | Stylish urban getaway.            |
| H03      |     300 |     190.00 | Beachfront bliss.                 |
| H04      |     400 |     100.00 | Cozy mountain retreat.            |
| H05      |     500 |     130.00 | City luxury at its finest.        |
| H06      |     600 |     260.00 | Indulgent luxury experience.      |
| H07      |     700 |     140.00 | Charming historic accommodations. |
+----------+---------+------------+-----------------------------------+
7 rows in set (0.00 sec)
```

4.5 Travel Agent Table:



```
mysql> select * from travel_agent;
+-------+-------------------------+---------------------------------------------+---------+
| ta_id | ta_name                 | ta_desc                                     | book_id |
+-------+-------------------------+---------------------------------------------+---------+
| ta1   | Sunset Travel Agency    | Your gateway to unforgettable vacations.    |     400 |
| ta2   | Sunset Travel Agency    | Embark on thrilling adventures with us.     |     500 |
| ta3   | Urban Escapes Travel    | Discover hidden gems in vibrant cities.     |     600 |
| ta4   | Serene Mountain Getaways | Find peace and tranquility in the mountains. |     700 |
| ta5   | Sunset Travel Agency    | Experience the beauty of coastal destinations. |     800 |
| ta6   | Luxury Voyages Agency   | Indulge in opulence with our luxury vacations. |     900 |
| ta7   | Sunset Travel Agency    | Explore diverse cultures and heritage sites. |    1000 |
+-------+-------------------------+---------------------------------------------+---------+
7 rows in set (0.00 sec)
```

Pitfalls:

4.5.1 Redundancy: The ta_name appears to repeat for multiple rows, indicating redundancy.

4.5.2 Inconsistency: If the same travel agency information is stored for different bookings, it may lead to inconsistencies.

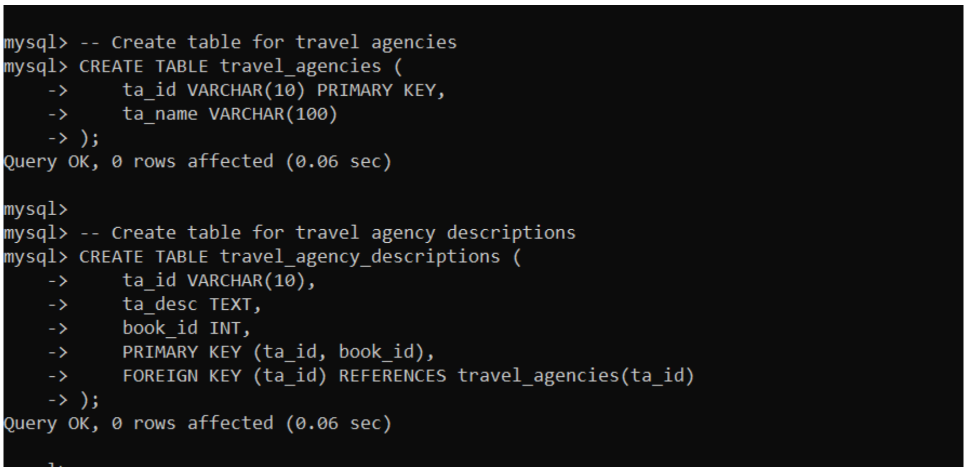
4.5.3 Inefficiency: Storing descriptive text directly in the table (ta_desc) can lead to increased storage requirements and slower query performance.

4.5.4 Complexity: Depending on how book_id relates to travel agencies, there might be complexity introduced by maintaining this relationship within the same table.

Dependencies:

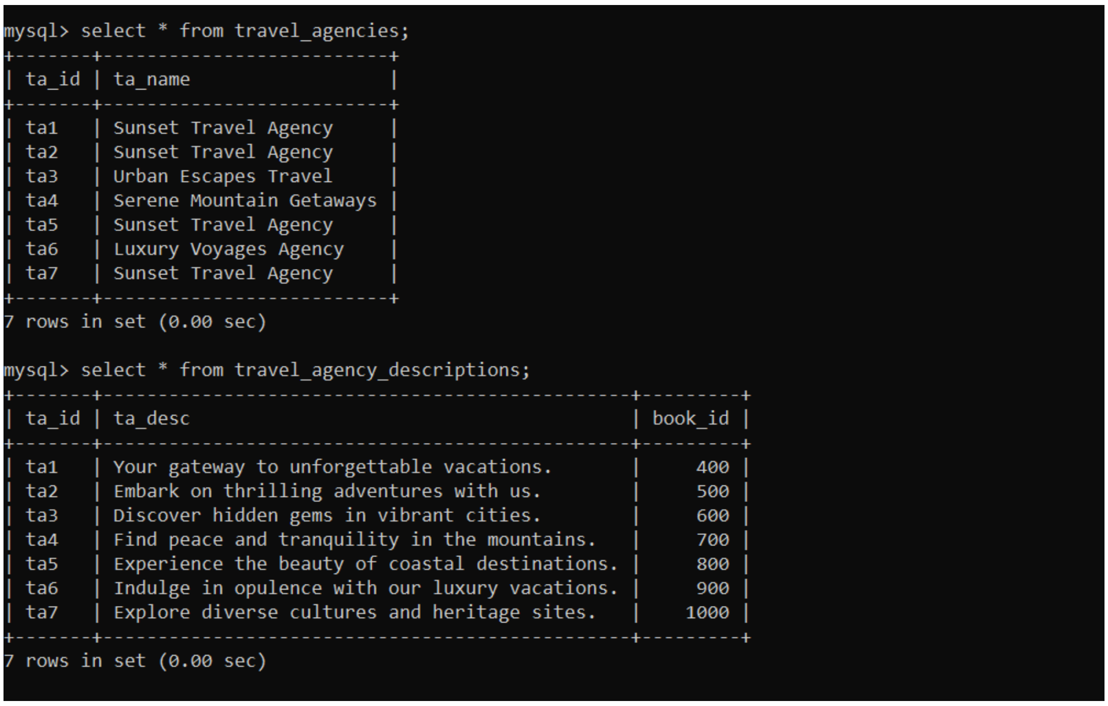
It seems there's a potential partial dependency on ta_name and ta_desc on book_id. This suggests that a travel agency's name and description are associated with a booking. However, without knowing the full context of the data, we can't definitively identify dependencies.

Normalization:



```
mysql> -- Create table for travel agencies
mysql> CREATE TABLE travel_agencies (
    ->     ta_id VARCHAR(10) PRIMARY KEY,
    ->     ta_name VARCHAR(100)
    -> );
Query OK, 0 rows affected (0.06 sec)

mysql>
mysql> -- Create table for travel agency descriptions
mysql> CREATE TABLE travel_agency_descriptions (
    ->     ta_id VARCHAR(10),
    ->     ta_desc TEXT,
    ->     book_id INT,
    ->     PRIMARY KEY (ta_id, book_id),
    ->     FOREIGN KEY (ta_id) REFERENCES travel_agencies(ta_id)
    -> );
Query OK, 0 rows affected (0.06 sec)
```

OUTPUT:



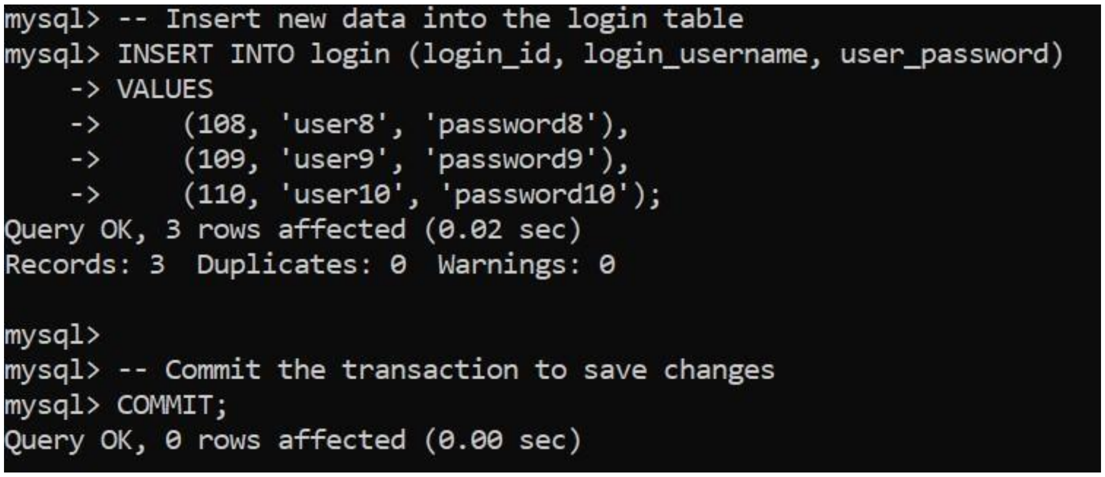
```
mysql> select * from travel_agencies;
+-------+-------------------------+
| ta_id | ta_name                 |
+-------+-------------------------+
| ta1   | Sunset Travel Agency    |
| ta2   | Sunset Travel Agency    |
| ta3   | Urban Escapes Travel    |
| ta4   | Serene Mountain Getaways |
| ta5   | Sunset Travel Agency    |
| ta6   | Luxury Voyages Agency   |
| ta7   | Sunset Travel Agency    |
+-------+-------------------------+
7 rows in set (0.00 sec)

mysql> select * from travel_agency_descriptions;
+-------+----------------------------------------------+---------+
| ta_id | ta_desc                                      | book_id |
+-------+----------------------------------------------+---------+
| ta1   | Your gateway to unforgettable vacations.     |     400 |
| ta2   | Embark on thrilling adventures with us.      |     500 |
| ta3   | Discover hidden gems in vibrant cities.      |     600 |
| ta4   | Find peace and tranquility in the mountains. |     700 |
| ta5   | Experience the beauty of coastal destinations. |     800 |
| ta6   | Indulge in opulence with our luxury vacations. |     900 |
| ta7   | Explore diverse cultures and heritage sites. |    1000 |
+-------+----------------------------------------------+---------+
7 rows in set (0.00 sec)
```

Chapter-5

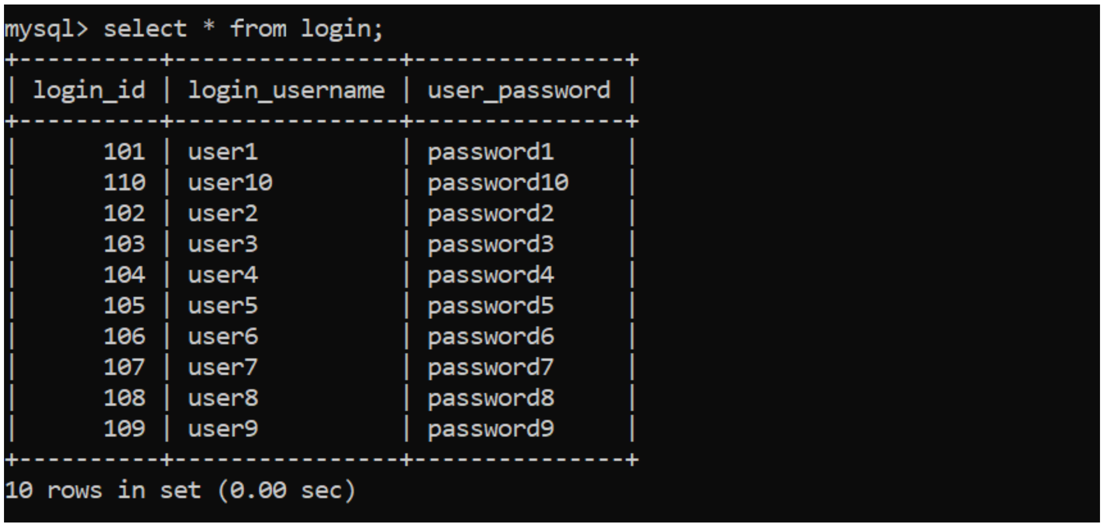
Implementation of concurrency control and recovery mechanisms

COMMIT

1) **Begin a transaction and insert data into the login table:**

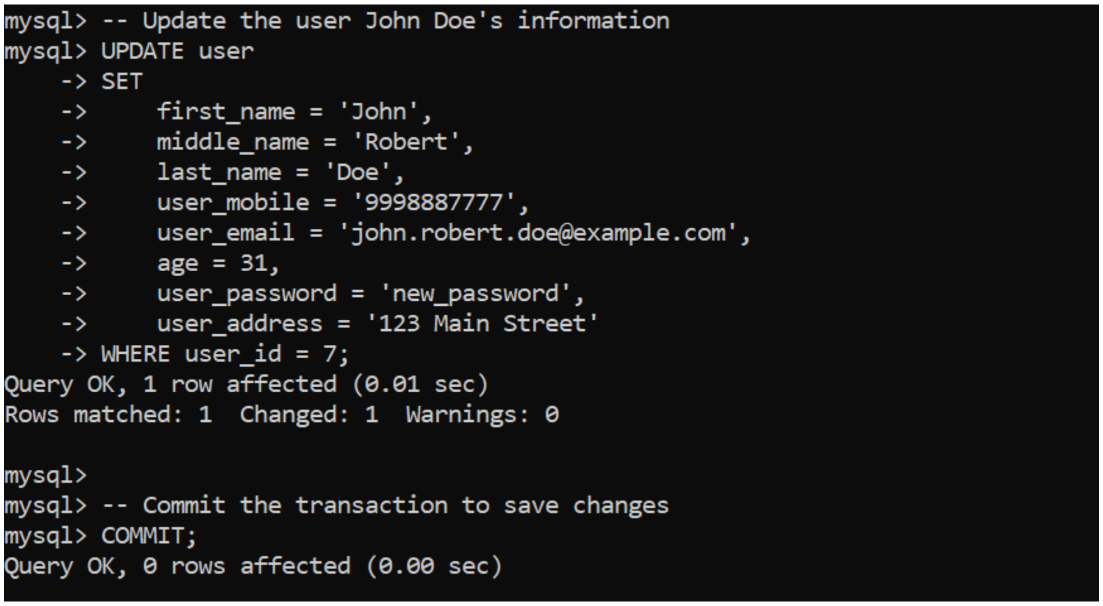


```
mysql> -- Insert new data into the login table
mysql> INSERT INTO login (login_id, login_username, user_password)
    -> VALUES
    ->     (108, 'user8', 'password8'),
    ->     (109, 'user9', 'password9'),
    ->     (110, 'user10', 'password10');
Query OK, 3 rows affected (0.02 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
```

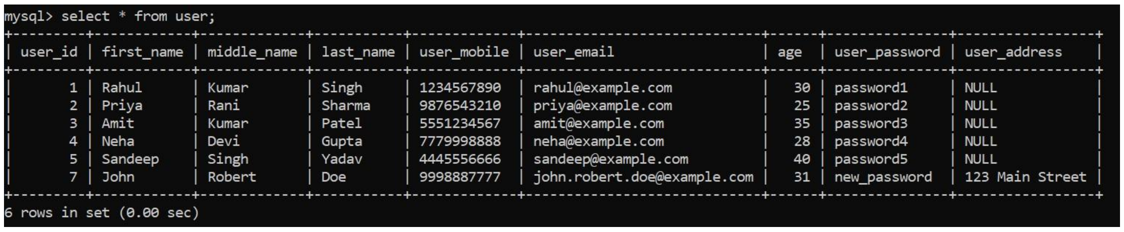


```
mysql> select * from login;
+----------+----------------+---------------+
| login_id | login_username | user_password |
+----------+----------------+---------------+
|      101 | user1          | password1     |
|      110 | user10         | password10    |
|      102 | user2          | password2     |
|      103 | user3          | password3     |
|      104 | user4          | password4     |
|      105 | user5          | password5     |
|      106 | user6          | password6     |
|      107 | user7          | password7     |
|      108 | user8          | password8     |
|      109 | user9          | password9     |
+----------+----------------+---------------+
10 rows in set (0.00 sec)
```

2) Begin a transaction and update data in the user table:

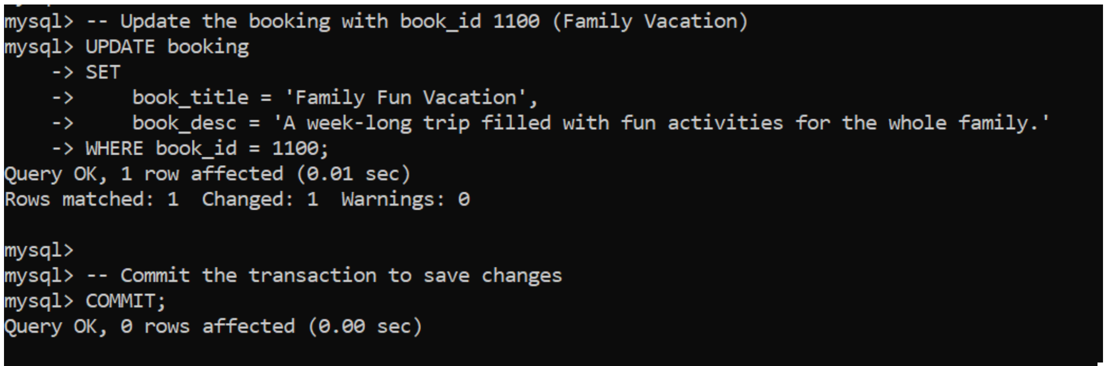


```
mysql> -- Update the user John Doe's information
mysql> UPDATE user
    -> SET
    ->     first_name = 'John',
    ->     middle_name = 'Robert',
    ->     last_name = 'Doe',
    ->     user_mobile = '9998887777',
    ->     user_email = 'john.robert.doe@example.com',
    ->     age = 31,
    ->     user_password = 'new_password',
    ->     user_address = '123 Main Street'
    -> WHERE user_id = 7;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
```

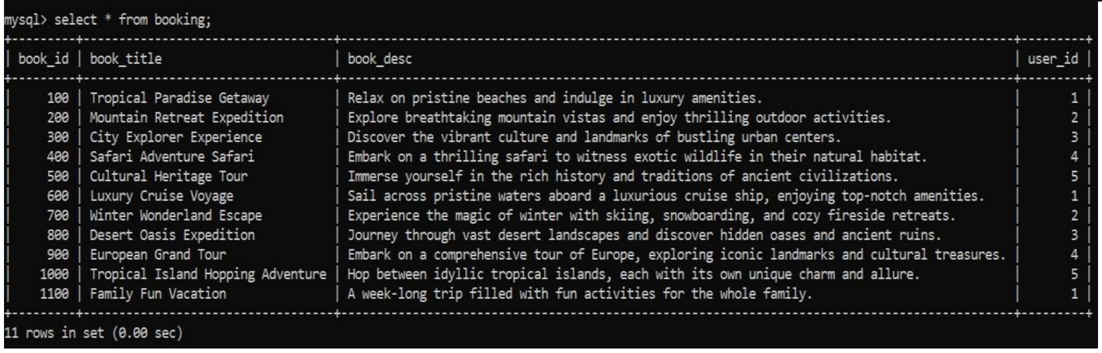


```
mysql> select * from user;
+---------+------------+-------------+-----------+-------------+-----------------------------+------+---------------+-----------------+
| user_id | first_name | middle_name | last_name | user_mobile | user_email                  | age  | user_password | user_address    |
+---------+------------+-------------+-----------+-------------+-----------------------------+------+---------------+-----------------+
|       1 | Rahul      | Kumar       | Singh     | 1234567890  | rahul@example.com           |   30 | password1     | NULL            |
|       2 | Priya      | Rani        | Sharma    | 9876543210  | priya@example.com           |   25 | password2     | NULL            |
|       3 | Amit       | Kumar       | Patel     | 5551234567  | amit@example.com            |   35 | password3     | NULL            |
|       4 | Neha       | Devi        | Gupta     | 7779998888  | neha@example.com            |   28 | password4     | NULL            |
|       5 | Sandeep    | Singh       | Yadav     | 4445556666  | sandeep@example.com         |   40 | password5     | NULL            |
|       7 | John       | Robert      | Doe       | 9998887777  | john.robert.doe@example.com |   31 | new_password  | 123 Main Street |
+---------+------------+-------------+-----------+-------------+-----------------------------+------+---------------+-----------------+
6 rows in set (0.00 sec)
```

3) Begin a transaction and update data in the booking table:

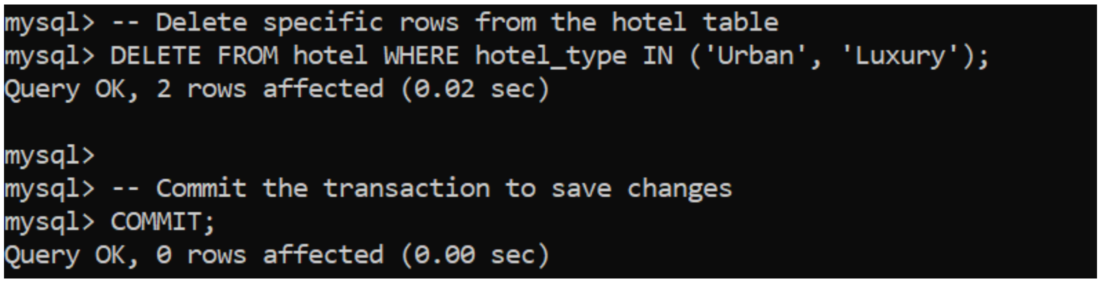


```
mysql> -- Update the booking with book_id 1100 (Family Vacation)
mysql> UPDATE booking
    -> SET
    ->     book_title = 'Family Fun Vacation',
    ->     book_desc = 'A week-long trip filled with fun activities for the whole family.'
    -> WHERE book_id = 1100;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
```

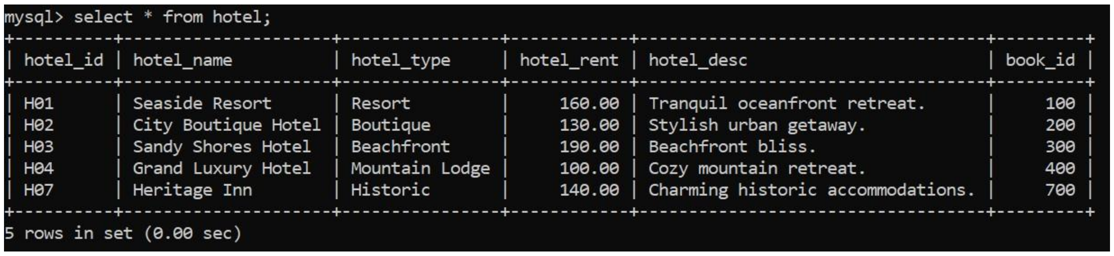


```
mysql> select * from booking;
+---------+--------------------------------+-------------------------------------------------------------------------------------+---------+
| book_id | book_title                     | book_desc                                                                           | user_id |
+---------+--------------------------------+-------------------------------------------------------------------------------------+---------+
|     100 | Tropical Paradise Getaway      | Relax on pristine beaches and indulge in luxury amenities.                          |       1 |
|     200 | Mountain Retreat Expedition    | Explore breathtaking mountain vistas and enjoy thrilling outdoor activities.        |       2 |
|     300 | City Explorer Experience       | Discover the vibrant culture and landmarks of bustling urban centers.               |       3 |
|     400 | Safari Adventure Safari        | Embark on a thrilling safari to witness exotic wildlife in their natural habitat.   |       4 |
|     500 | Cultural Heritage Tour         | Immerse yourself in the rich history and traditions of ancient civilizations.       |       5 |
|     600 | Luxury Cruise Voyage           | Sail across pristine waters aboard a luxurious cruise ship, enjoying top-notch amenities. |       1 |
|     700 | Winter Wonderland Escape       | Experience the magic of winter with skiing, snowboarding, and cozy fireside retreats. |       2 |
|     800 | Desert Oasis Expedition        | Journey through vast desert landscapes and discover hidden oases and ancient ruins. |       3 |
|     900 | European Grand Tour            | Embark on a comprehensive tour of Europe, exploring iconic landmarks and cultural treasures. |       4 |
|    1000 | Tropical Island Hopping Adventure | Hop between idyllic tropical islands, each with its own unique charm and allure. |       5 |
|    1100 | Family Fun Vacation            | A week-long trip filled with fun activities for the whole family.                   |       1 |
+---------+--------------------------------+-------------------------------------------------------------------------------------+---------+
11 rows in set (0.00 sec)
```

4) **Commit after deleting data from hotel table:**

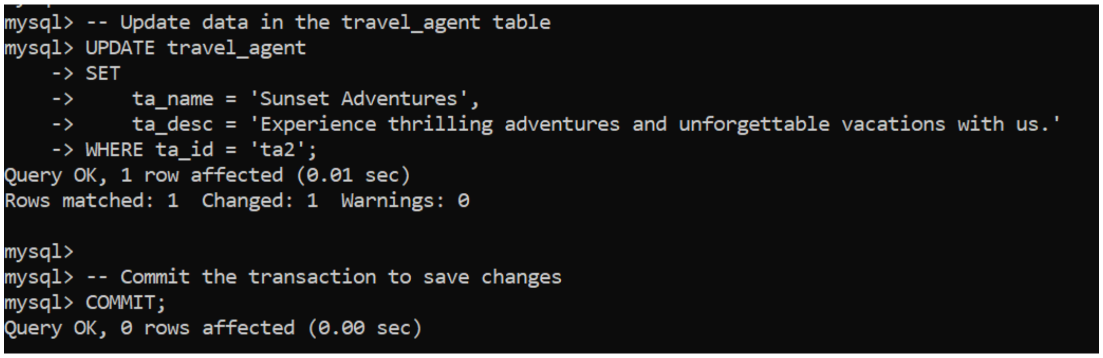


```
mysql> -- Delete specific rows from the hotel table
mysql> DELETE FROM hotel WHERE hotel_type IN ('Urban', 'Luxury');
Query OK, 2 rows affected (0.02 sec)

mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
```

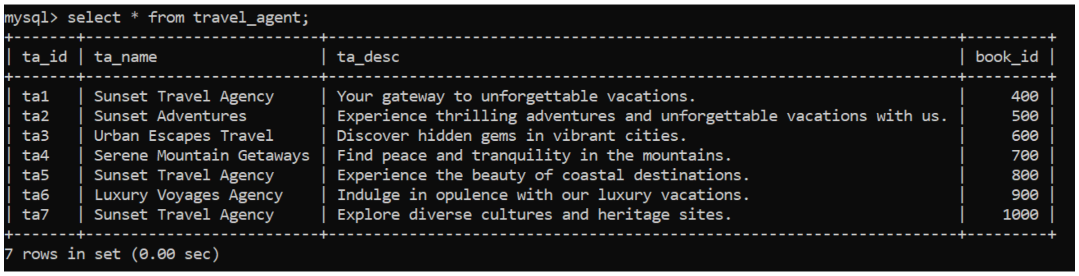


```
mysql> select * from hotel;
+----------+---------------------+---------------+------------+----------------------------------+---------+
| hotel_id | hotel_name          | hotel_type    | hotel_rent | hotel_desc                       | book_id |
+----------+---------------------+---------------+------------+----------------------------------+---------+
| H01      | Seaside Resort      | Resort        |     160.00 | Tranquil oceanfront retreat.     |     100 |
| H02      | City Boutique Hotel | Boutique      |     130.00 | Stylish urban getaway.           |     200 |
| H03      | Sandy Shores Hotel  | Beachfront    |     190.00 | Beachfront bliss.                |     300 |
| H04      | Grand Luxury Hotel  | Mountain Lodge|     100.00 | Cozy mountain retreat.           |     400 |
| H07      | Heritage Inn        | Historic      |     140.00 | Charming historic accommodations.|     700 |
+----------+---------------------+---------------+------------+----------------------------------+---------+
5 rows in set (0.00 sec)
```

5) **Commit after updating data in travel_agent table:**



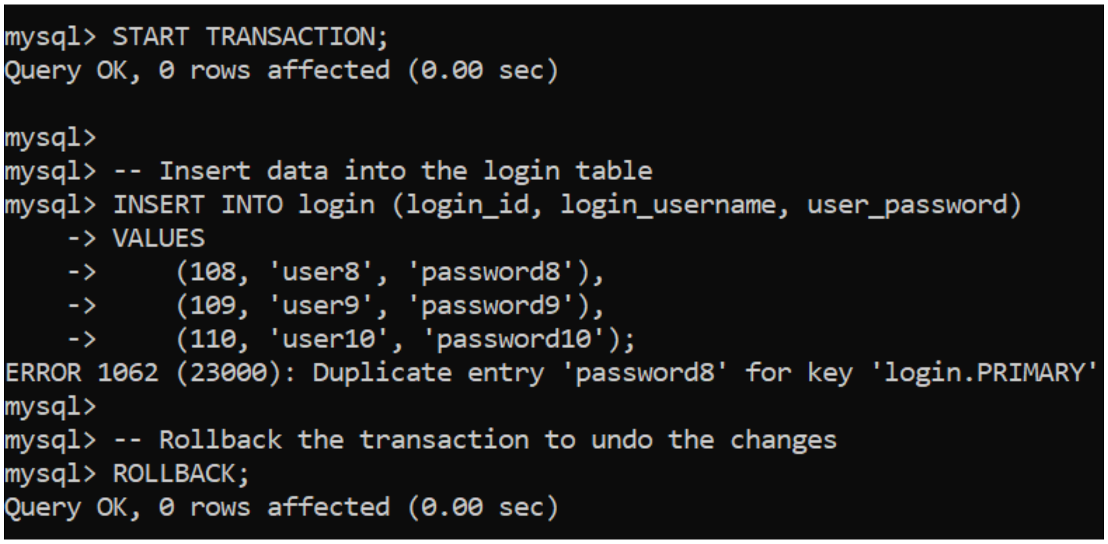
```
mysql> -- Update data in the travel_agent table
mysql> UPDATE travel_agent
    -> SET
    ->     ta_name = 'Sunset Adventures',
    ->     ta_desc = 'Experience thrilling adventures and unforgettable vacations with us.'
    -> WHERE ta_id = 'ta2';
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
```



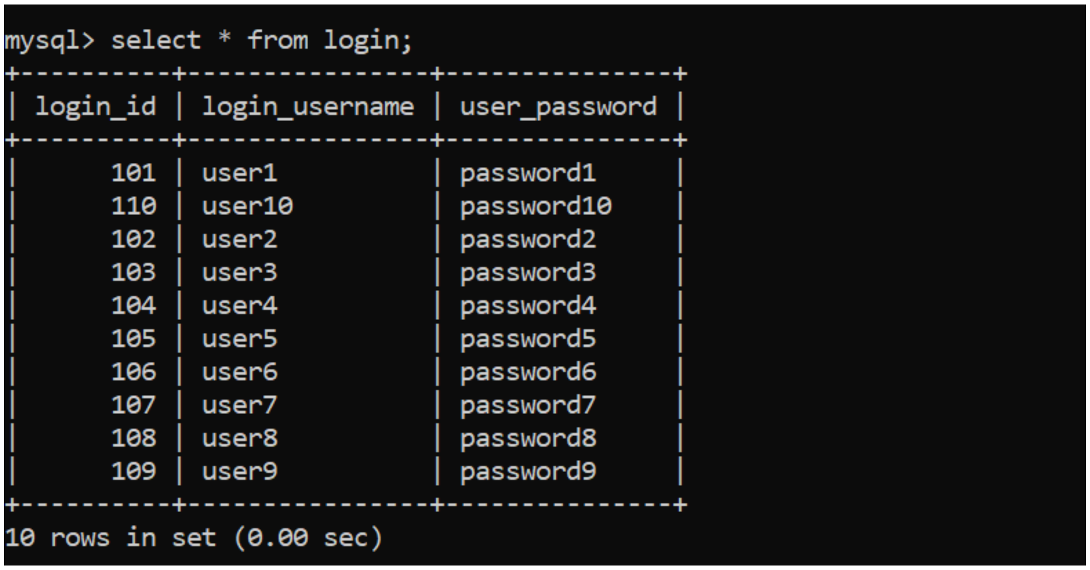
```
mysql> select * from travel_agent;
+-------+-------------------------+---------------------------------------------------------------------+---------+
| ta_id | ta_name                 | ta_desc                                                             | book_id |
+-------+-------------------------+---------------------------------------------------------------------+---------+
| ta1   | Sunset Travel Agency    | Your gateway to unforgettable vacations.                            |     400 |
| ta2   | Sunset Adventures       | Experience thrilling adventures and unforgettable vacations with us. |     500 |
| ta3   | Urban Escapes Travel    | Discover hidden gems in vibrant cities.                             |     600 |
| ta4   | Serene Mountain Getaways| Find peace and tranquility in the mountains.                        |     700 |
| ta5   | Sunset Travel Agency    | Experience the beauty of coastal destinations.                      |     800 |
| ta6   | Luxury Voyages Agency   | Indulge in opulence with our luxury vacations.                      |     900 |
| ta7   | Sunset Travel Agency    | Explore diverse cultures and heritage sites.                        |    1000 |
+-------+-------------------------+---------------------------------------------------------------------+---------+
7 rows in set (0.00 sec)
```

ROLLBACK:

1) Begin a transaction rollback after inserting data into the login table:

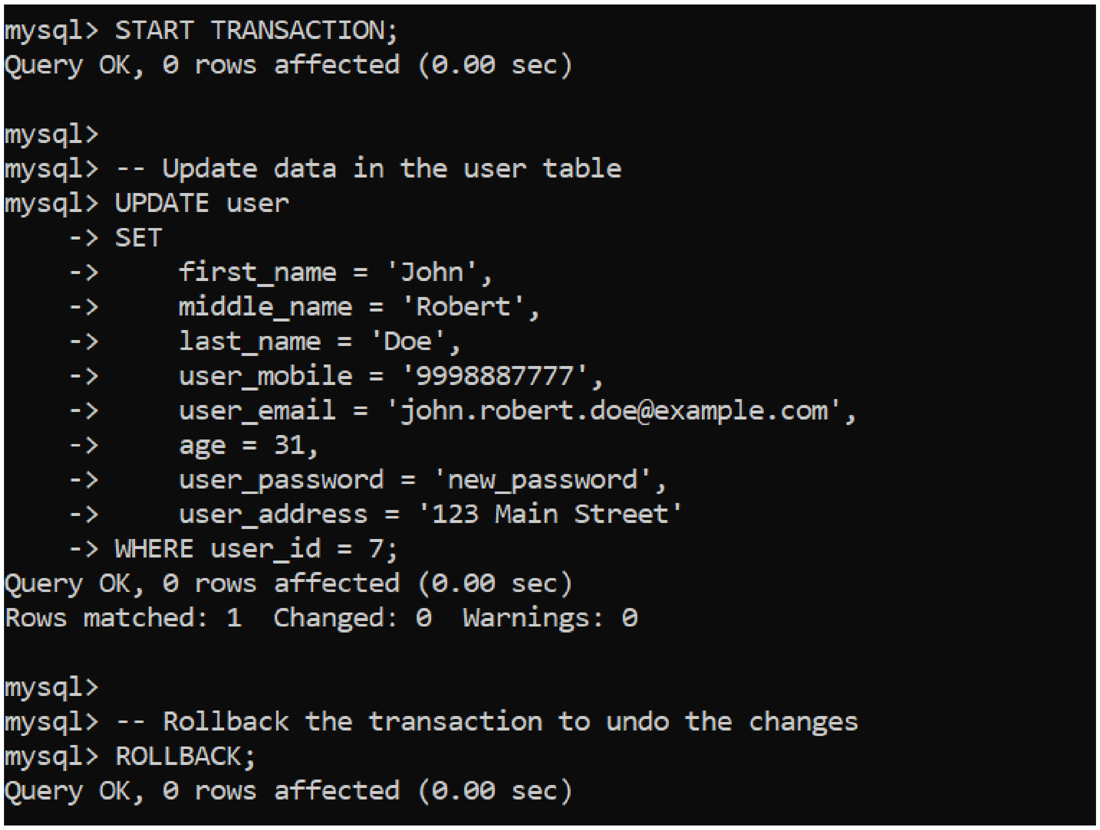


```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Insert data into the login table
mysql> INSERT INTO login (login_id, login_username, user_password)
    -> VALUES
    ->     (108, 'user8', 'password8'),
    ->     (109, 'user9', 'password9'),
    ->     (110, 'user10', 'password10');
ERROR 1062 (23000): Duplicate entry 'password8' for key 'login.PRIMARY'
mysql>
mysql> -- Rollback the transaction to undo the changes
mysql> ROLLBACK;
Query OK, 0 rows affected (0.00 sec)
```

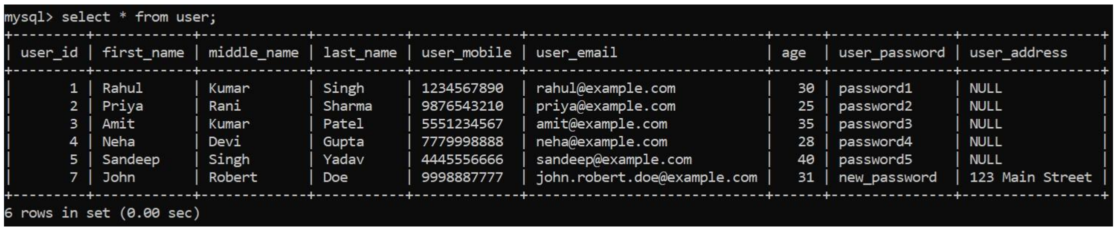


```
mysql> select * from login;
+----------+----------------+---------------+
| login_id | login_username | user_password |
+----------+----------------+---------------+
|      101 | user1          | password1     |
|      110 | user10         | password10    |
|      102 | user2          | password2     |
|      103 | user3          | password3     |
|      104 | user4          | password4     |
|      105 | user5          | password5     |
|      106 | user6          | password6     |
|      107 | user7          | password7     |
|      108 | user8          | password8     |
|      109 | user9          | password9     |
+----------+----------------+---------------+
10 rows in set (0.00 sec)
```

2) Begin a transaction and Rollback after updating data in the user table:

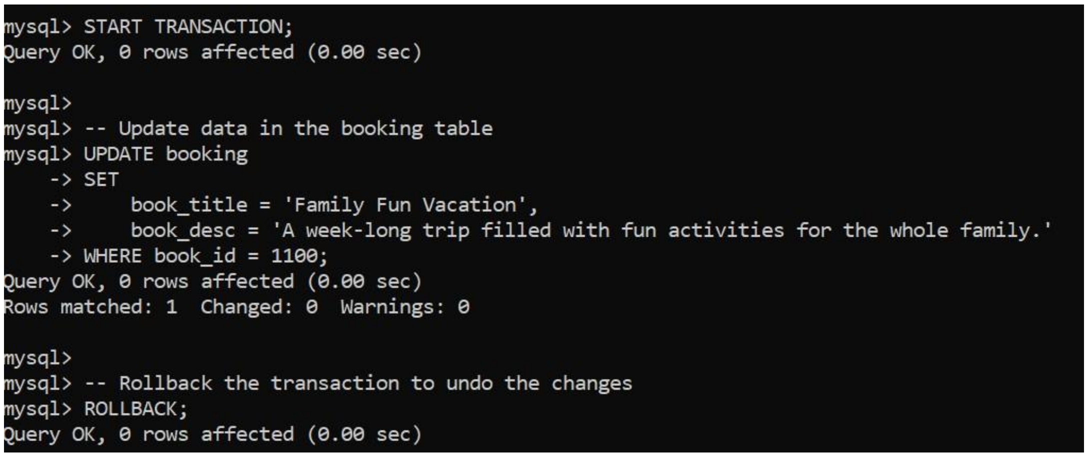


```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Update data in the user table
mysql> UPDATE user
    -> SET
    ->     first_name = 'John',
    ->     middle_name = 'Robert',
    ->     last_name = 'Doe',
    ->     user_mobile = '9998887777',
    ->     user_email = 'john.robert.doe@example.com',
    ->     age = 31,
    ->     user_password = 'new_password',
    ->     user_address = '123 Main Street'
    -> WHERE user_id = 7;
Query OK, 0 rows affected (0.00 sec)
Rows matched: 1  Changed: 0  Warnings: 0

mysql>
mysql> -- Rollback the transaction to undo the changes
mysql> ROLLBACK;
Query OK, 0 rows affected (0.00 sec)
```

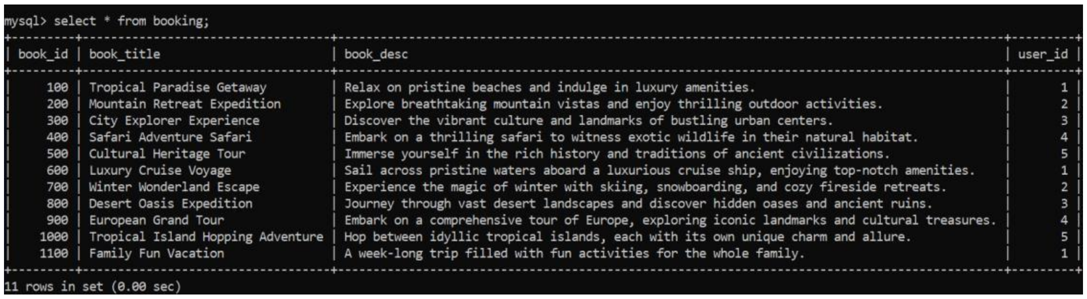


```
mysql> select * from user;
+---------+------------+-------------+-----------+-------------+-----------------------------+------+---------------+-----------------+
| user_id | first_name | middle_name | last_name | user_mobile | user_email                  | age  | user_password | user_address    |
+---------+------------+-------------+-----------+-------------+-----------------------------+------+---------------+-----------------+
|       1 | Rahul      | Kumar       | Singh     | 1234567890  | rahul@example.com           |   30 | password1     | NULL            |
|       2 | Priya      | Rani        | Sharma    | 9876543210  | priya@example.com           |   25 | password2     | NULL            |
|       3 | Amit       | Kumar       | Patel     | 5551234567  | amit@example.com            |   35 | password3     | NULL            |
|       4 | Neha       | Devi        | Gupta     | 7779998888  | neha@example.com            |   28 | password4     | NULL            |
|       5 | Sandeep    | Singh       | Yadav     | 4445556666  | sandeep@example.com         |   40 | password5     | NULL            |
|       7 | John       | Robert      | Doe       | 9998887777  | john.robert.doe@example.com |   31 | new_password  | 123 Main Street |
+---------+------------+-------------+-----------+-------------+-----------------------------+------+---------------+-----------------+
6 rows in set (0.00 sec)
```

3) Rollback after updating data in the booking table:

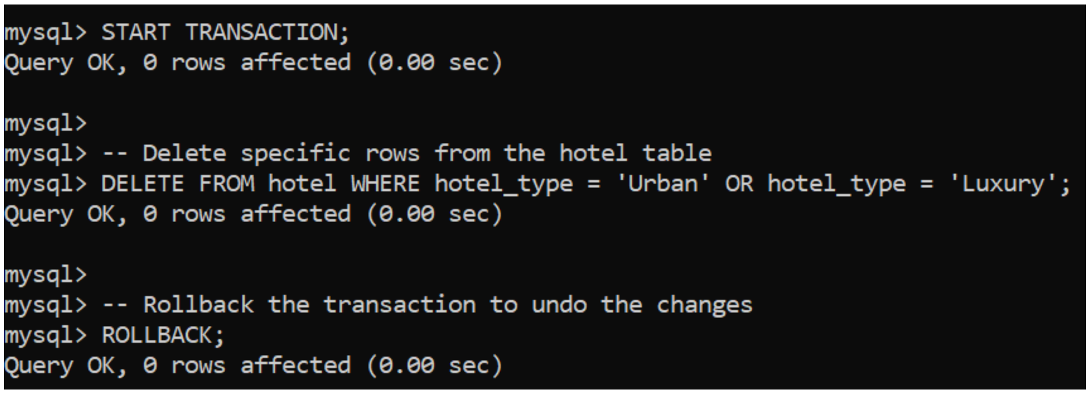


```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Update data in the booking table
mysql> UPDATE booking
    -> SET
    ->     book_title = 'Family Fun Vacation',
    ->     book_desc = 'A week-long trip filled with fun activities for the whole family.'
    -> WHERE book_id = 1100;
Query OK, 0 rows affected (0.00 sec)
Rows matched: 1  Changed: 0  Warnings: 0

mysql>
mysql> -- Rollback the transaction to undo the changes
mysql> ROLLBACK;
Query OK, 0 rows affected (0.00 sec)
```

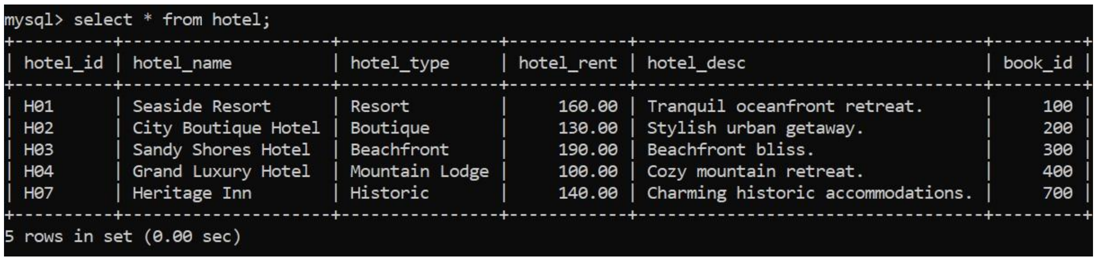


```
mysql> select * from booking;
+---------+-----------------------------------+----------------------------------------------------------------------------------------------+---------+
| book_id | book_title                        | book_desc                                                                                    | user_id |
+---------+-----------------------------------+----------------------------------------------------------------------------------------------+---------+
|     100 | Tropical Paradise Getaway         | Relax on pristine beaches and indulge in luxury amenities.                                   |       1 |
|     200 | Mountain Retreat Expedition       | Explore breathtaking mountain vistas and enjoy thrilling outdoor activities.                 |       2 |
|     300 | City Explorer Experience          | Discover the vibrant culture and landmarks of bustling urban centers.                        |       3 |
|     400 | Safari Adventure Safari           | Embark on a thrilling safari to witness exotic wildlife in their natural habitat.            |       4 |
|     500 | Cultural Heritage Tour            | Immerse yourself in the rich history and traditions of ancient civilizations.                |       5 |
|     600 | Luxury Cruise Voyage              | Sail across pristine waters aboard a luxurious cruise ship, enjoying top-notch amenities.    |       1 |
|     700 | Winter Wonderland Escape          | Experience the magic of winter with skiing, snowboarding, and cozy fireside retreats.        |       2 |
|     800 | Desert Oasis Expedition           | Journey through vast desert landscapes and discover hidden oases and ancient ruins.          |       3 |
|     900 | European Grand Tour               | Embark on a comprehensive tour of Europe, exploring iconic landmarks and cultural treasures. |       4 |
|    1000 | Tropical Island Hopping Adventure | Hop between idyllic tropical islands, each with its own unique charm and allure.             |       5 |
|    1100 | Family Fun Vacation               | A week-long trip filled with fun activities for the whole family.                            |       1 |
+---------+-----------------------------------+----------------------------------------------------------------------------------------------+---------+
11 rows in set (0.00 sec)
```

4) Rollback after deleting data into the hotel table:

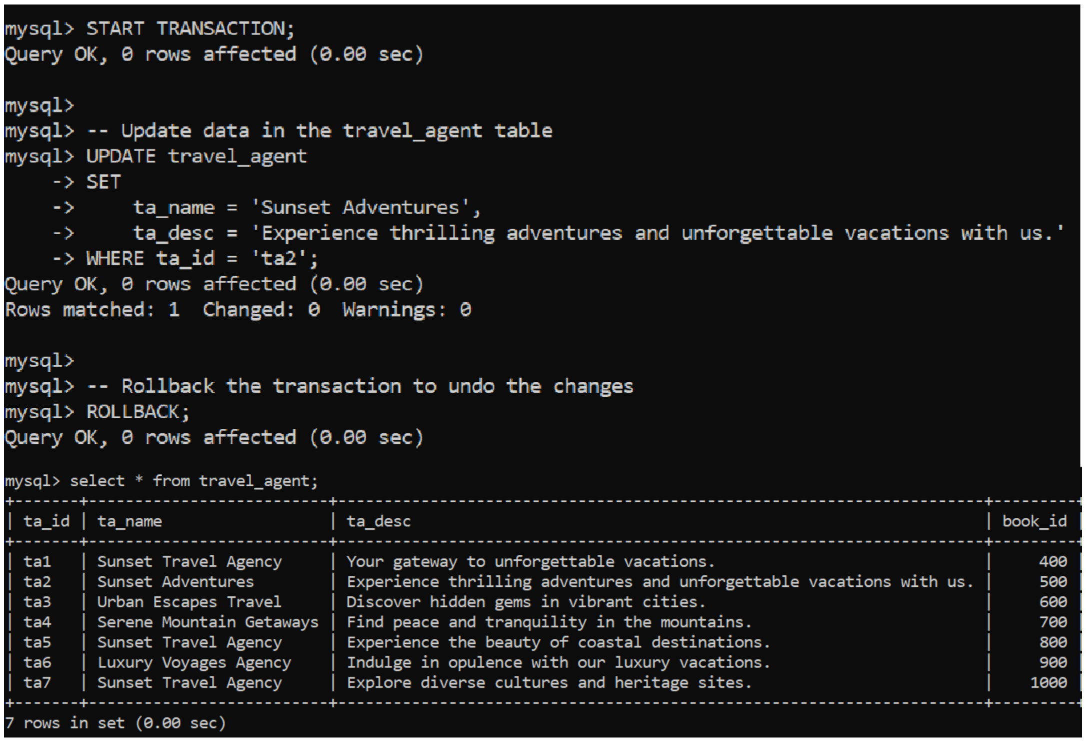


```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Delete specific rows from the hotel table
mysql> DELETE FROM hotel WHERE hotel_type = 'Urban' OR hotel_type = 'Luxury';
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Rollback the transaction to undo the changes
mysql> ROLLBACK;
Query OK, 0 rows affected (0.00 sec)
```



```
mysql> select * from hotel;
+----------+---------------------+----------------+------------+-----------------------------------+---------+
| hotel_id | hotel_name          | hotel_type     | hotel_rent | hotel_desc                        | book_id |
+----------+---------------------+----------------+------------+-----------------------------------+---------+
| H01      | Seaside Resort      | Resort         |     160.00 | Tranquil oceanfront retreat.      |     100 |
| H02      | City Boutique Hotel | Boutique       |     130.00 | Stylish urban getaway.            |     200 |
| H03      | Sandy Shores Hotel  | Beachfront     |     190.00 | Beachfront bliss.                 |     300 |
| H04      | Grand Luxury Hotel  | Mountain Lodge |     100.00 | Cozy mountain retreat.            |     400 |
| H07      | Heritage Inn        | Historic       |     140.00 | Charming historic accommodations. |     700 |
+----------+---------------------+----------------+------------+-----------------------------------+---------+
5 rows in set (0.00 sec)
```

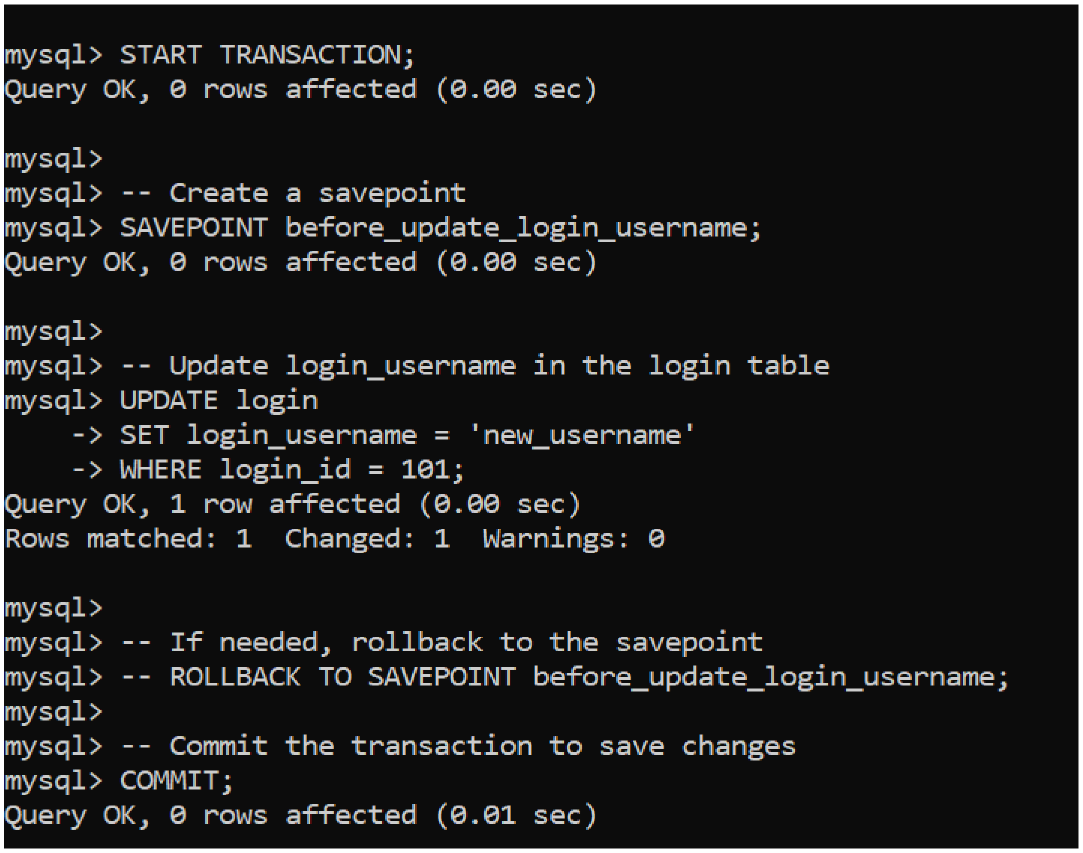
5) Rollback after updating data in travel_agent table:



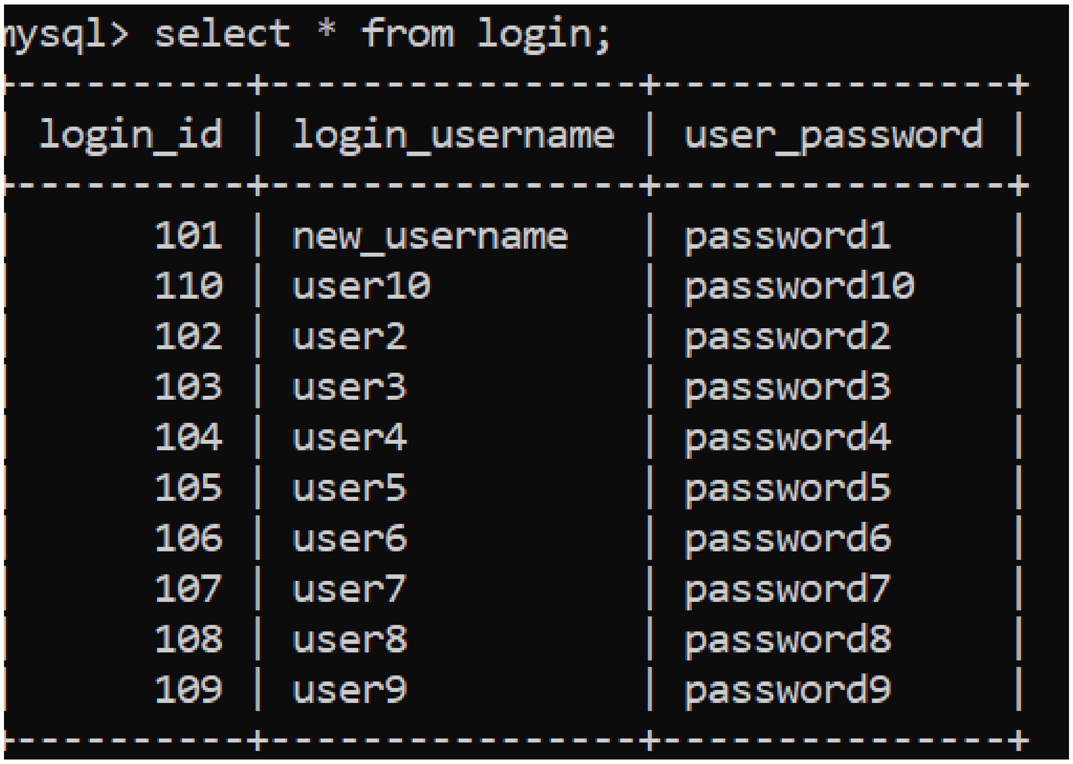
```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Update data in the travel_agent table
mysql> UPDATE travel_agent
    -> SET
    ->     ta_name = 'Sunset Adventures',
    ->     ta_desc = 'Experience thrilling adventures and unforgettable vacations with us.'
    -> WHERE ta_id = 'ta2';
Query OK, 0 rows affected (0.00 sec)
Rows matched: 1  Changed: 0  Warnings: 0

mysql>
mysql> -- Rollback the transaction to undo the changes
mysql> ROLLBACK;
Query OK, 0 rows affected (0.00 sec)

mysql> select * from travel_agent;
+-------+--------------------------+----------------------------------------------------------------------+---------+
| ta_id | ta_name                  | ta_desc                                                              | book_id |
+-------+--------------------------+----------------------------------------------------------------------+---------+
| ta1   | Sunset Travel Agency     | Your gateway to unforgettable vacations.                             |     400 |
| ta2   | Sunset Adventures        | Experience thrilling adventures and unforgettable vacations with us. |     500 |
| ta3   | Urban Escapes Travel     | Discover hidden gems in vibrant cities.                              |     600 |
| ta4   | Serene Mountain Getaways | Find peace and tranquility in the mountains.                         |     700 |
| ta5   | Sunset Travel Agency     | Experience the beauty of coastal destinations.                       |     800 |
| ta6   | Luxury Voyages Agency    | Indulge in opulence with our luxury vacations.                       |     900 |
| ta7   | Sunset Travel Agency     | Explore diverse cultures and heritage sites.                         |    1000 |
+-------+--------------------------+----------------------------------------------------------------------+---------+
7 rows in set (0.00 sec)
```

SAVEPOINT:

1)Create a SAVEPOINT before updating login login_username:

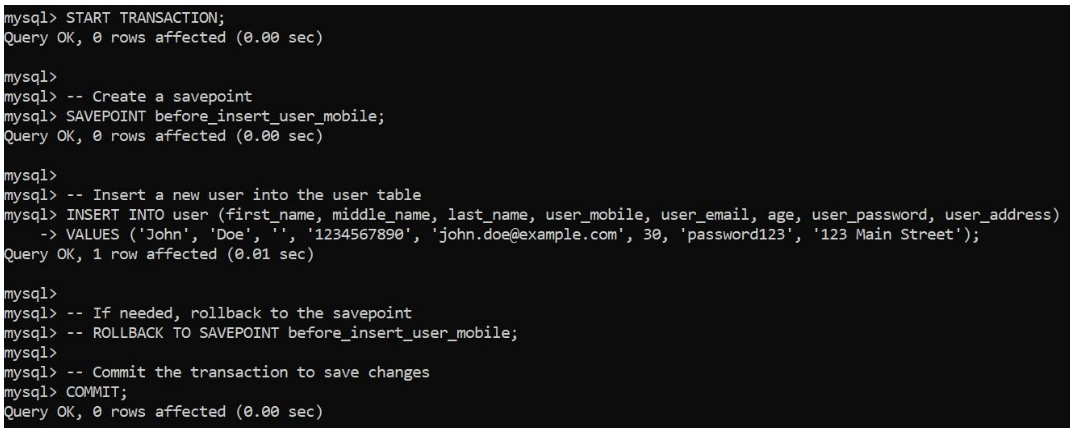


```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Create a savepoint
mysql> SAVEPOINT before_update_login_username;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Update login_username in the login table
mysql> UPDATE login
    -> SET login_username = 'new_username'
    -> WHERE login_id = 101;
Query OK, 1 row affected (0.00 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql>
mysql> -- If needed, rollback to the savepoint
mysql> -- ROLLBACK TO SAVEPOINT before_update_login_username;
mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.01 sec)
```

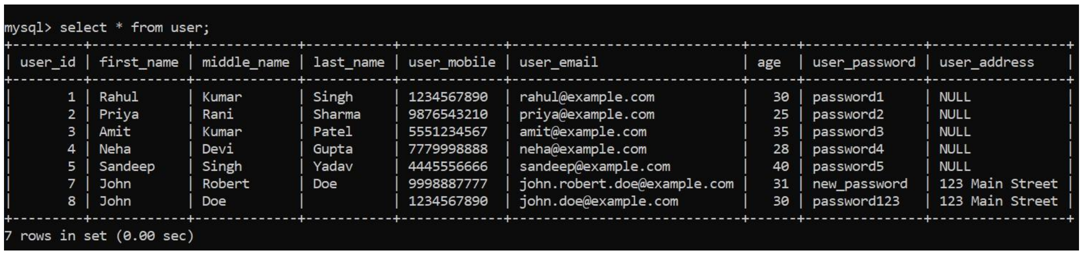


```
mysql> select * from login;
+----------+----------------+---------------+
| login_id | login_username | user_password |
+----------+----------------+---------------+
|      101 | new_username   | password1     |
|      110 | user10         | password10    |
|      102 | user2          | password2     |
|      103 | user3          | password3     |
|      104 | user4          | password4     |
|      105 | user5          | password5     |
|      106 | user6          | password6     |
|      107 | user7          | password7     |
|      108 | user8          | password8     |
|      109 | user9          | password9     |
+----------+----------------+---------------+
```

2. Create a SAVEPOINT before inserting a user user_mobile:

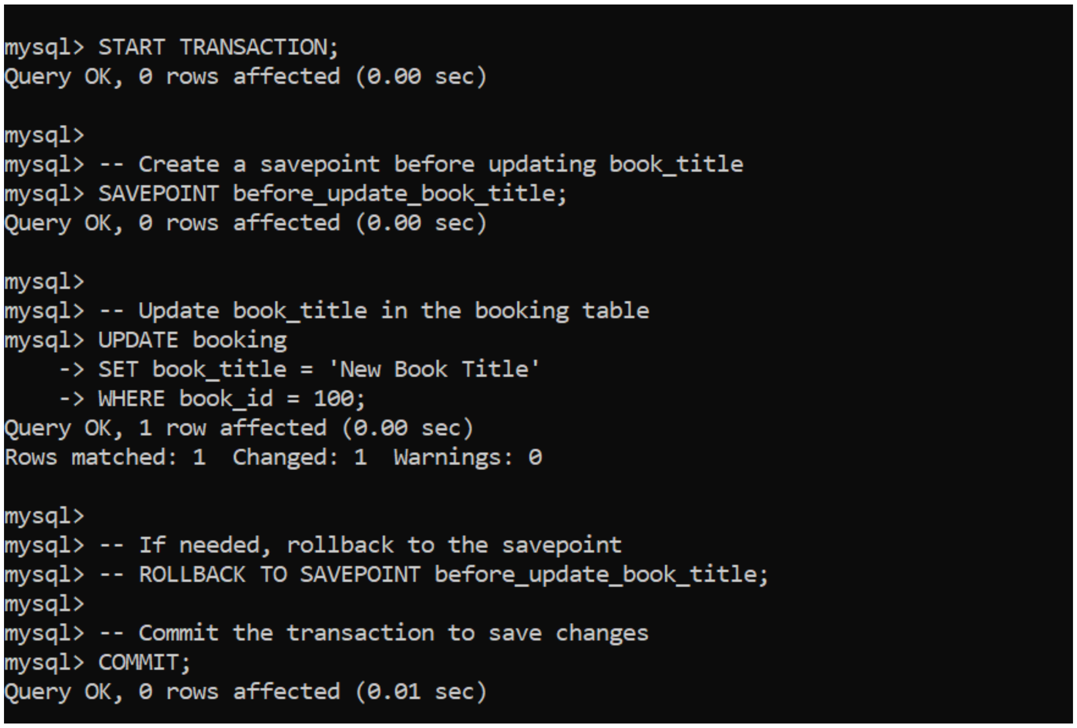


```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Create a savepoint
mysql> SAVEPOINT before_insert_user_mobile;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Insert a new user into the user table
mysql> INSERT INTO user (first_name, middle_name, last_name, user_mobile, user_email, age, user_password, user_address)
    -> VALUES ('John', 'Doe', '', '1234567890', 'john.doe@example.com', 30, 'password123', '123 Main Street');
Query OK, 1 row affected (0.01 sec)

mysql>
mysql> -- If needed, rollback to the savepoint
mysql> -- ROLLBACK TO SAVEPOINT before_insert_user_mobile;
mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
```

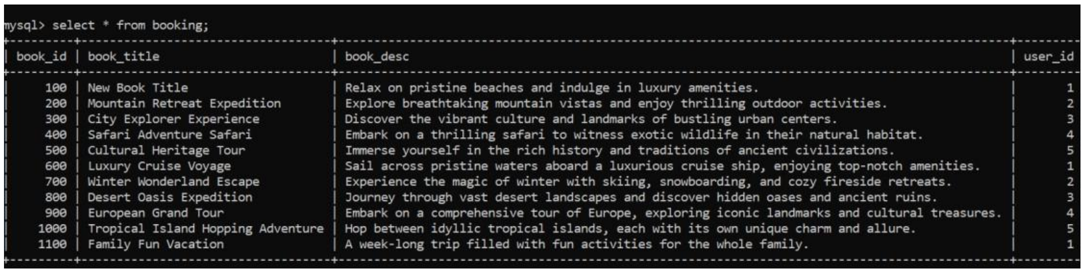


```
mysql> select * from user;
+---------+------------+-------------+-----------+-------------+------------------------------+------+---------------+-----------------+
| user_id | first_name | middle_name | last_name | user_mobile | user_email                   | age  | user_password | user_address    |
+---------+------------+-------------+-----------+-------------+------------------------------+------+---------------+-----------------+
|       1 | Rahul      | Kumar       | Singh     | 1234567890  | rahul@example.com            |   30 | password1     | NULL            |
|       2 | Priya      | Rani        | Sharma    | 9876543210  | priya@example.com            |   25 | password2     | NULL            |
|       3 | Amit       | Kumar       | Patel     | 5551234567  | amit@example.com             |   35 | password3     | NULL            |
|       4 | Neha       | Devi        | Gupta     | 7779998888  | neha@example.com             |   28 | password4     | NULL            |
|       5 | Sandeep    | Singh       | Yadav     | 4445556666  | sandeep@example.com          |   40 | password5     | NULL            |
|       7 | John       | Robert      | Doe       | 9998887777  | john.robert.doe@example.com  |   31 | new_password  | 123 Main Street |
|       8 | John       | Doe         |           | 1234567890  | john.doe@example.com         |   30 | password123   | 123 Main Street |
+---------+------------+-------------+-----------+-------------+------------------------------+------+---------------+-----------------+
7 rows in set (0.00 sec)
```

3. Create a SAVEPOINT before book_title:

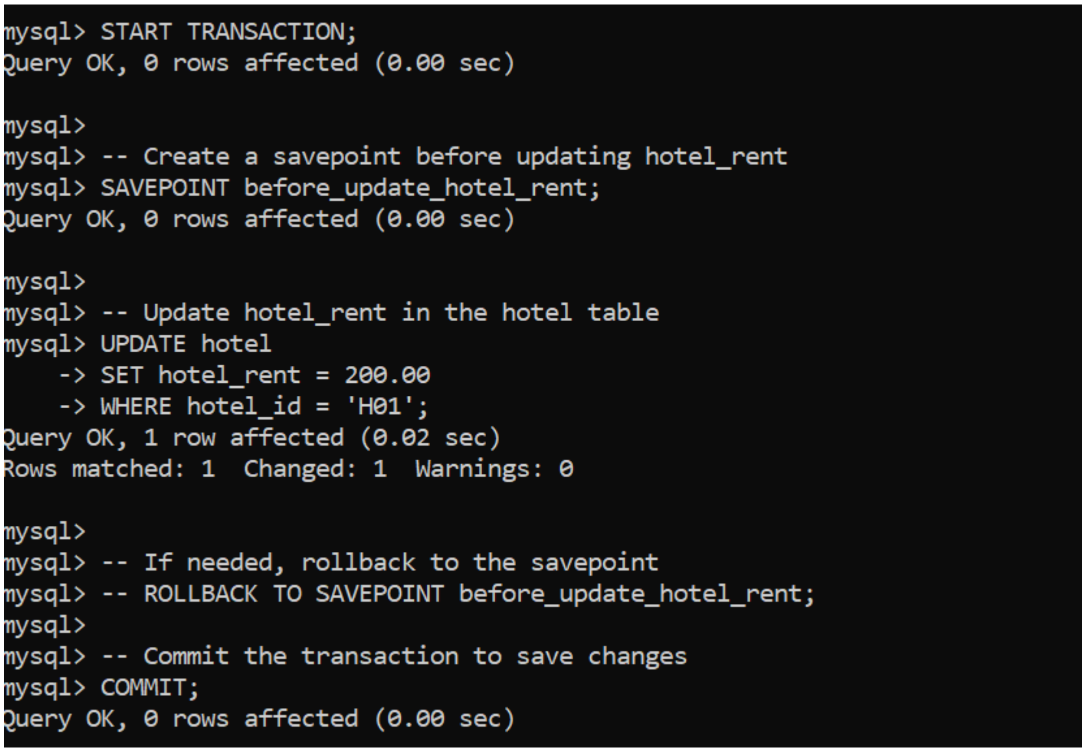


```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Create a savepoint before updating book_title
mysql> SAVEPOINT before_update_book_title;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Update book_title in the booking table
mysql> UPDATE booking
    -> SET book_title = 'New Book Title'
    -> WHERE book_id = 100;
Query OK, 1 row affected (0.00 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql>
mysql> -- If needed, rollback to the savepoint
mysql> -- ROLLBACK TO SAVEPOINT before_update_book_title;
mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.01 sec)
```

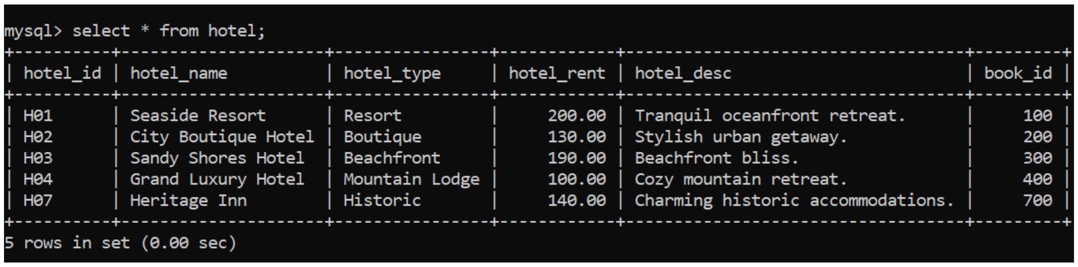


```
mysql> select * from booking;
+---------+-----------------------------------+-----------------------------------------------------------------------------------------+--------
| book_id | book_title                        | book_desc                                                                               | user_id
+---------+-----------------------------------+-----------------------------------------------------------------------------------------+--------
|     100 | New Book Title                    | Relax on pristine beaches and indulge in luxury amenities.                              |       1
|     200 | Mountain Retreat Expedition       | Explore breathtaking mountain vistas and enjoy thrilling outdoor activities.            |       2
|     300 | City Explorer Experience          | Discover the vibrant culture and landmarks of bustling urban centers.                   |       3
|     400 | Safari Adventure Safari           | Embark on a thrilling safari to witness exotic wildlife in their natural habitat.       |       4
|     500 | Cultural Heritage Tour            | Immerse yourself in the rich history and traditions of ancient civilizations.           |       5
|     600 | Luxury Cruise Voyage              | Sail across pristine waters aboard a luxurious cruise ship, enjoying top-notch amenities. |       1
|     700 | Winter Wonderland Escape          | Experience the magic of winter with skiing, snowboarding, and cozy fireside retreats.   |       2
|     800 | Desert Oasis Expedition           | Journey through vast desert landscapes and discover hidden oases and ancient ruins.     |       3
|     900 | European Grand Tour               | Embark on a comprehensive tour of Europe, exploring iconic landmarks and cultural treasures. |       4
|    1000 | Tropical Island Hopping Adventure | Hop between idyllic tropical islands, each with its own unique charm and allure.        |       5
|    1100 | Family Fun Vacation               | A week-long trip filled with fun activities for the whole family.                       |       1
+---------+-----------------------------------+-----------------------------------------------------------------------------------------+--------
```

4.Create a SAVEPOINT before updating hotel_rent:

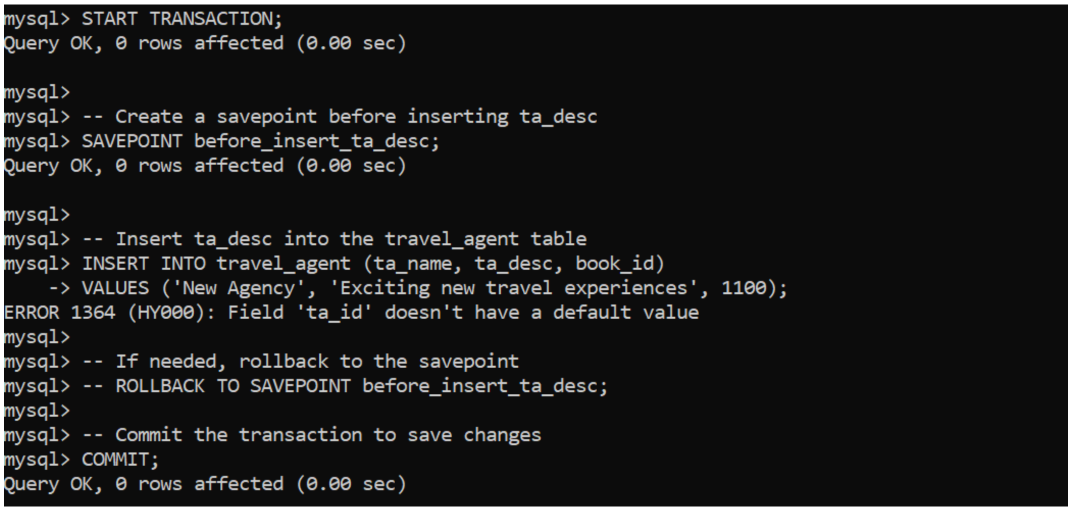


```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Create a savepoint before updating hotel_rent
mysql> SAVEPOINT before_update_hotel_rent;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Update hotel_rent in the hotel table
mysql> UPDATE hotel
    -> SET hotel_rent = 200.00
    -> WHERE hotel_id = 'H01';
Query OK, 1 row affected (0.02 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql>
mysql> -- If needed, rollback to the savepoint
mysql> -- ROLLBACK TO SAVEPOINT before_update_hotel_rent;
mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
```

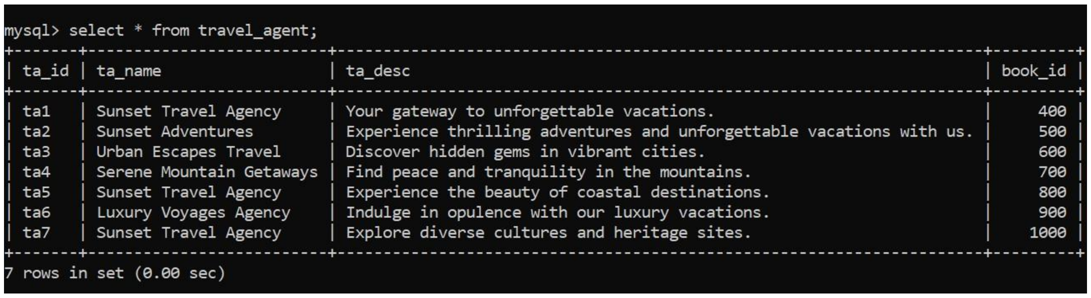


```
mysql> select * from hotel;
+----------+--------------------+---------------+------------+----------------------------------+---------+
| hotel_id | hotel_name         | hotel_type    | hotel_rent | hotel_desc                       | book_id |
+----------+--------------------+---------------+------------+----------------------------------+---------+
| H01      | Seaside Resort     | Resort        |     200.00 | Tranquil oceanfront retreat.     |     100 |
| H02      | City Boutique Hotel| Boutique      |     130.00 | Stylish urban getaway.           |     200 |
| H03      | Sandy Shores Hotel | Beachfront    |     190.00 | Beachfront bliss.                |     300 |
| H04      | Grand Luxury Hotel | Mountain Lodge|     100.00 | Cozy mountain retreat.           |     400 |
| H07      | Heritage Inn       | Historic      |     140.00 | Charming historic accommodations.|     700 |
+----------+--------------------+---------------+------------+----------------------------------+---------+
5 rows in set (0.00 sec)
```

5.Create a SAVEPOINT before inserting ta_desc:



```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Create a savepoint before inserting ta_desc
mysql> SAVEPOINT before_insert_ta_desc;
Query OK, 0 rows affected (0.00 sec)

mysql>
mysql> -- Insert ta_desc into the travel_agent table
mysql> INSERT INTO travel_agent (ta_name, ta_desc, book_id)
    -> VALUES ('New Agency', 'Exciting new travel experiences', 1100);
ERROR 1364 (HY000): Field 'ta_id' doesn't have a default value
mysql>
mysql> -- If needed, rollback to the savepoint
mysql> -- ROLLBACK TO SAVEPOINT before_insert_ta_desc;
mysql>
mysql> -- Commit the transaction to save changes
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
```



```
mysql> select * from travel_agent;
+-------+-------------------------+----------------------------------------------------------------+---------+
| ta_id | ta_name                 | ta_desc                                                        | book_id |
+-------+-------------------------+----------------------------------------------------------------+---------+
| ta1   | Sunset Travel Agency    | Your gateway to unforgettable vacations.                       |     400 |
| ta2   | Sunset Adventures       | Experience thrilling adventures and unforgettable vacations with us. |     500 |
| ta3   | Urban Escapes Travel    | Discover hidden gems in vibrant cities.                        |     600 |
| ta4   | Serene Mountain Getaways | Find peace and tranquility in the mountains.                  |     700 |
| ta5   | Sunset Travel Agency    | Experience the beauty of coastal destinations.                 |     800 |
| ta6   | Luxury Voyages Agency   | Indulge in opulence with our luxury vacations.                 |     900 |
| ta7   | Sunset Travel Agency    | Explore diverse cultures and heritage sites.                   |    1000 |
+-------+-------------------------+----------------------------------------------------------------+---------+
7 rows in set (0.00 sec)
```

Atomicity, Consistency, Isolation, Durability (ACID PROPERTIES)

1. Atomicity:

All provided SQL transactions start with `START TRANSACTION` and end with either `COMMIT` or `ROLLBACK`. This ensures that either all the operations within the transaction are completed successfully (committed) or none of them are (rolled back). For example:
  - When updating `book_title`, `hotel_rent`, or `ta_desc`, each operation is part of a transaction and will be either fully completed or fully rolled back.
  - If any error occurs during the execution of an operation, the transaction can be rolled back to the savepoint, ensuring that the database remains in a consistent state.

2. Consistency:
The operations maintain the consistency of the database by following predefined constraints and rules. For example:
  - The update operations (`book_title` and `hotel_rent`) ensure that the updated data remains valid according to the schema and any business rules.
  - The insert operation (`ta_desc`) ensures that new data adheres to the constraints defined for the `travel_agent` table.

3. Isolation:
Each transaction operates independently of other transactions. Transactions are executed in isolation, meaning that the intermediate states of transactions are not visible to other transactions until they are committed. For example:
  - The savepoints provide a mechanism for breaking transactions into smaller parts, allowing for finer control over transaction boundaries and rollback points without affecting other transactions.

4. Durability:

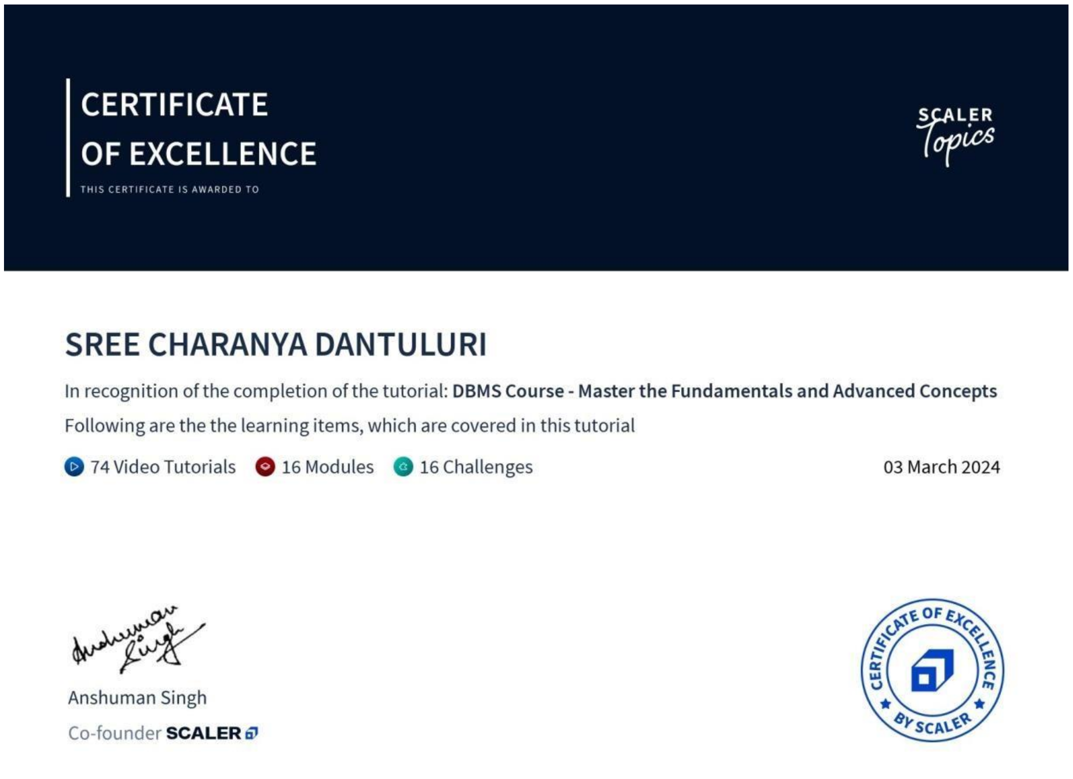
Once a transaction is committed, its changes are permanently saved in the database, even in the event of system failure. For example:

- After a successful `COMMIT`, any changes made to the database (such as updates to `book_title` and `hotel_rent` or insertions into `travel_agent`) are durably persisted.
- If a transaction is rolled back due to an error or explicit rollback command, changes are not persisted, ensuring that the database remains in a consistent state.

Overall, the provided data operations demonstrate adherence to the ACID properties, ensuring reliability, consistency, and integrity of the database transactions.

Chapter-8

Attach the Real Time project certificate / Online course certificate



CERTIFICATE
OF EXCELLENCE
THIS CERTIFICATE IS AWARDED TO

SCALER Topics

SREE CHARANYA DANTULURI

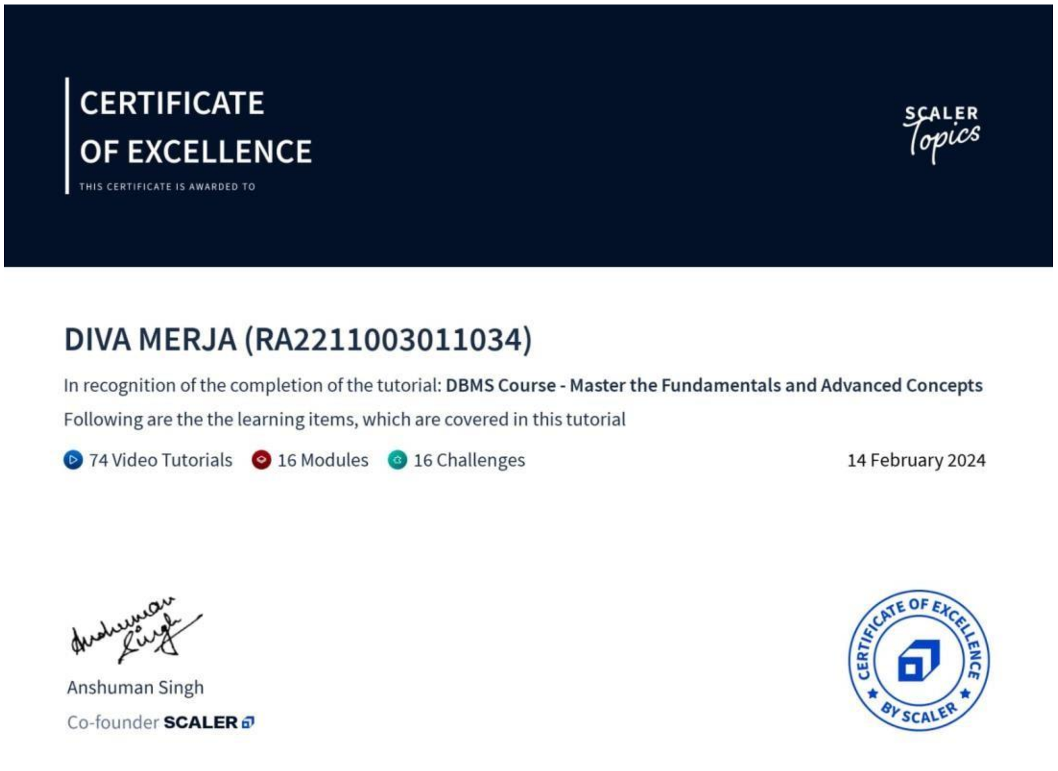
In recognition of the completion of the tutorial: **DBMS Course - Master the Fundamentals and Advanced Concepts**

Following are the the learning items, which are covered in this tutorial

74 Video Tutorials 16 Modules 16 Challenges 03 March 2024

Anshuman Singh
Co-founder **SCALER**

CERTIFICATE OF EXCELLENCE BY SCALER



CERTIFICATE
OF EXCELLENCE
THIS CERTIFICATE IS AWARDED TO

SCALER Topics

DIVA MERJA (RA2211003011034)

In recognition of the completion of the tutorial: **DBMS Course - Master the Fundamentals and Advanced Concepts**

Following are the the learning items, which are covered in this tutorial

74 Video Tutorials 16 Modules 16 Challenges 14 February 2024

Anshuman Singh
Co-founder **SCALER**

CERTIFICATE OF EXCELLENCE BY SCALER