HOTEL DATABASE MANAGEMENT SYSTEM

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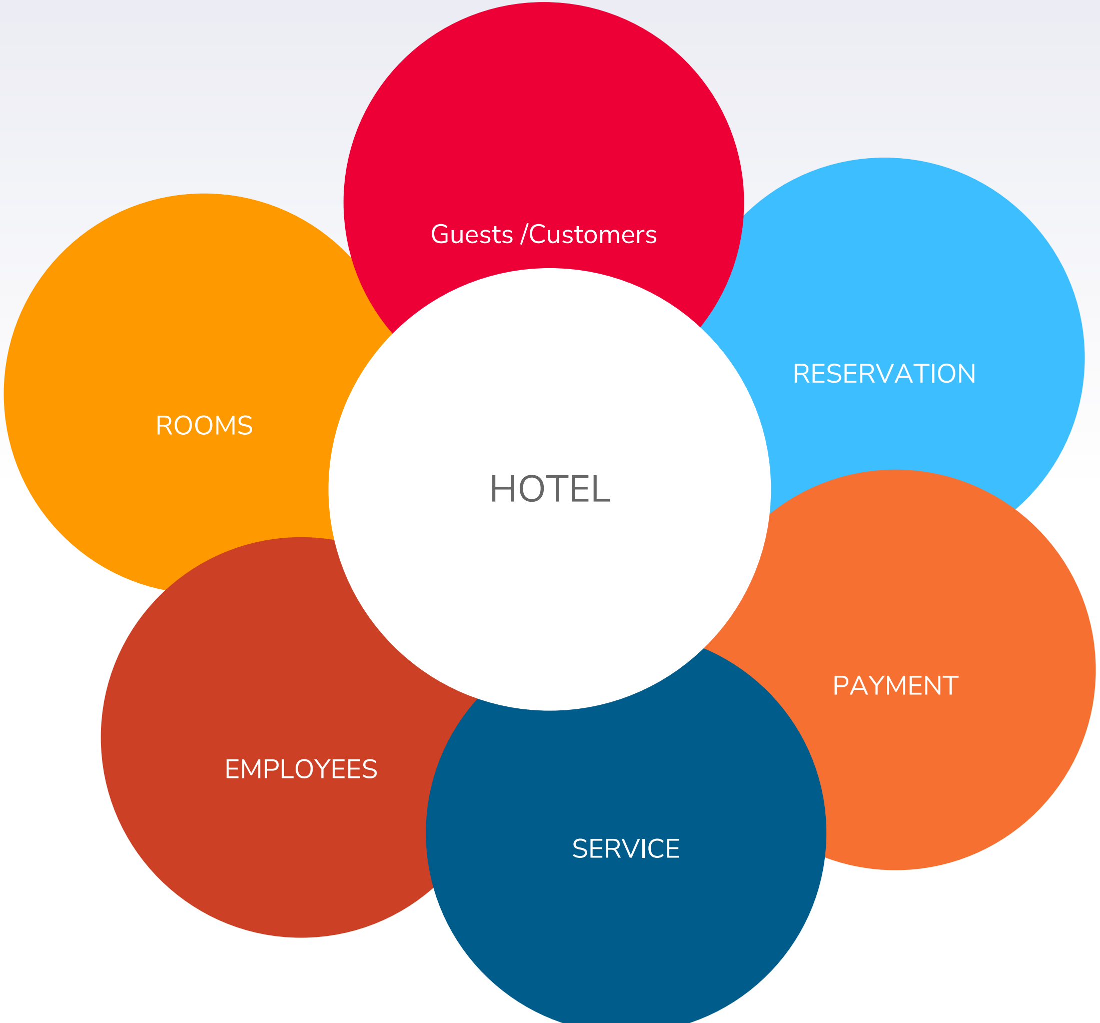
Presentation Agenda

- Introduction
- Entity Relationship Model
  - ER Diagram
  - ER Diagram Explanation
- Schemas
- Queries
  - Basic Queries : Create , Select , Alter & Update Table
  - Intermediate Quaries: Nested Queries & Sub-Queries
  - Advanced Queries: Join Queries
- Mathematical Notations
- Conclusion

Introduction


HOTEL

Guests /Customers

RESERVATION

PAYMENT

SERVICE

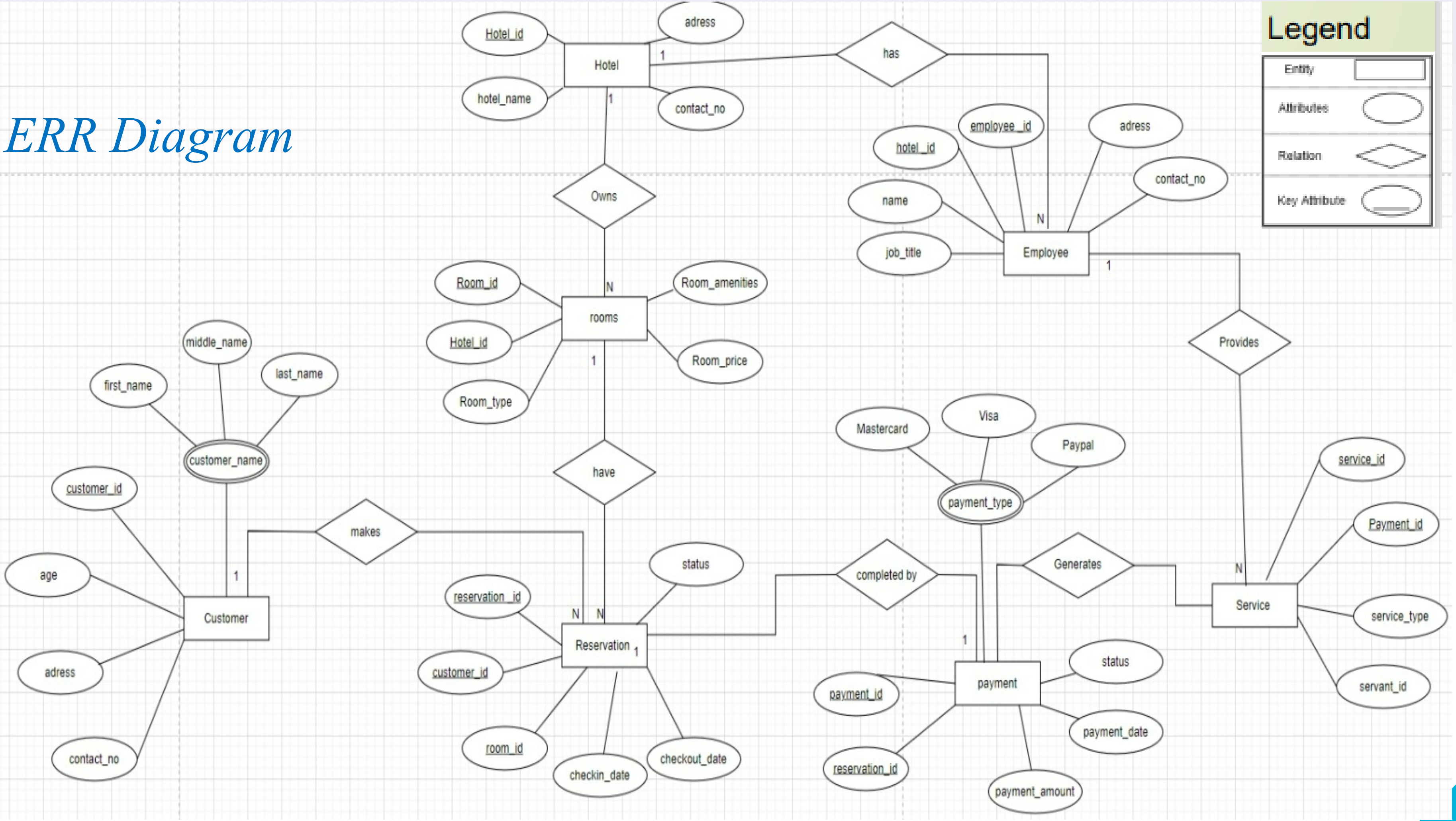
EMPLOYEES

ROOMS

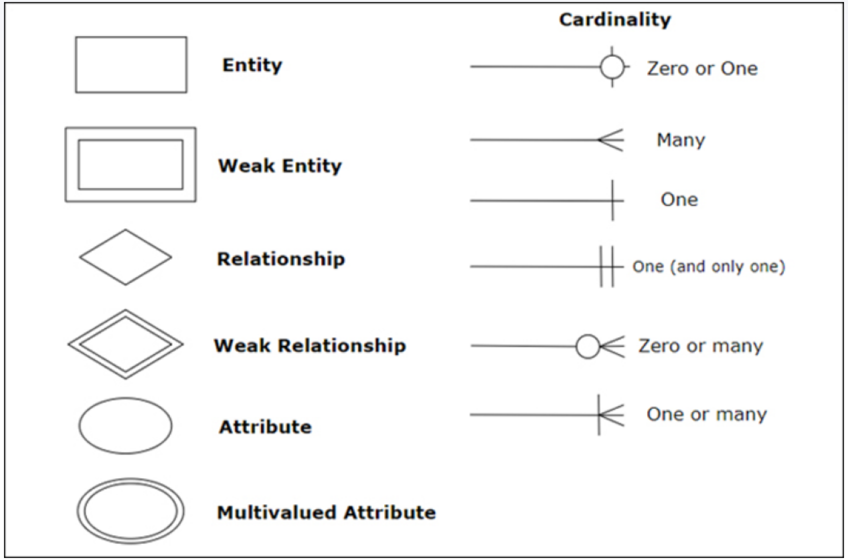
Business Rules for the Hotel Management System

- A Hotel has many rooms, and each room can be of different types.
- A hotel has many employees.
  Each employee can provide different services.
- A customer can make many reservations. And each reservation generates a bill
- Reservation is completed by bill payment.
- Payment activates different services.
- Services are provided by employees

ERR Diagram


Legend
Entity
Attributes
Relation
Key Attribute
Hotel_id
adress
Hotel
hotel_name
contact_no
1
1
has
1
N
Owns
N
employee_id
adress
hotel_id
contact_no
name
job_title
Employee
1
Room_id
Room_amenities
rooms
Hotel_id
Room_price
Room_type
1
Provides
middle_name
first_name
last_name
customer_name
customer_id
makes
have
Mastercard
Visa
Paypal
payment_type
service_id
Payment_id
age
1
Customer
adress
contact_no
status
reservation_id
N
N
Reservation
1
customer_id
room_id
checkin_date
checkout_date
completed by
Generates
N
Service
service_type
servant_id
1
payment
status
payment_id
payment_date
reservation_id
payment_amount

ERR Diagram Explanation



Entities are represented by rectangles

Actions are represented by diamond shapes

Attributes are represented by ovals

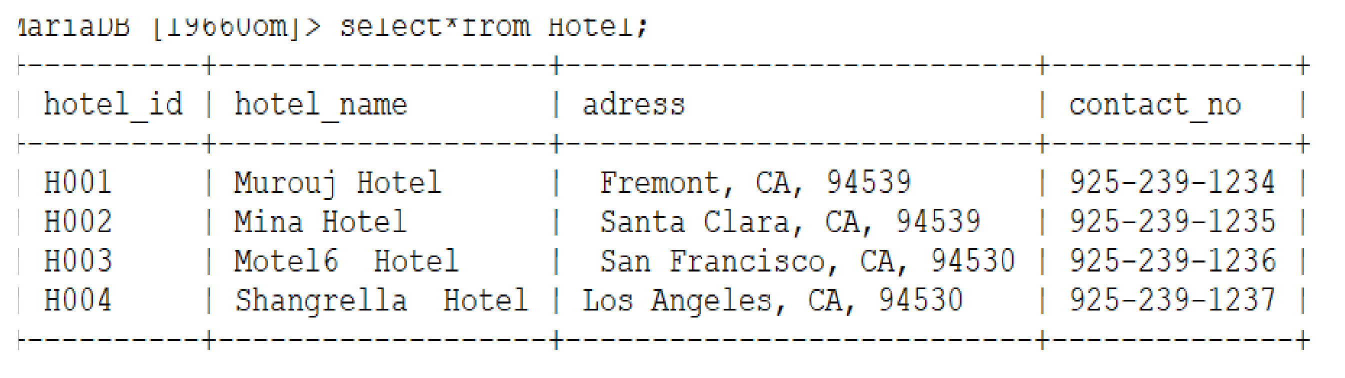
Connecting lines and solid lines that connect attributes show the relationships of entities in the diagram

1:1 represents (One to One)

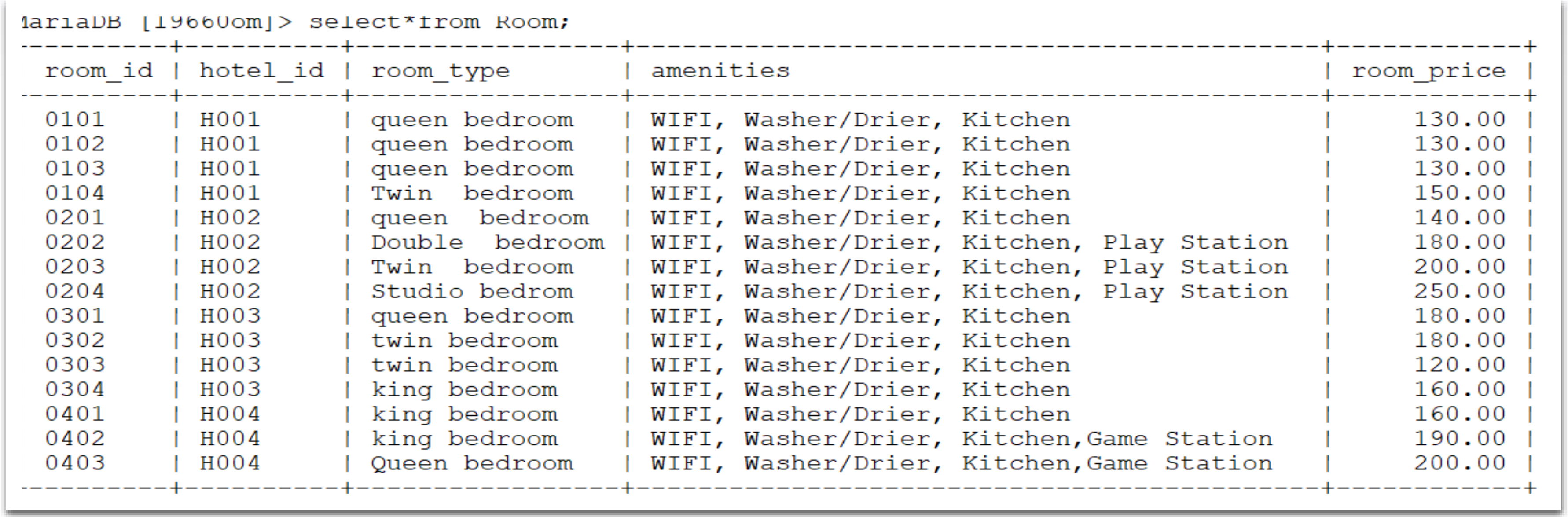
1:N represents (One to Many)

M:N represents (Many to Many)

Schemas

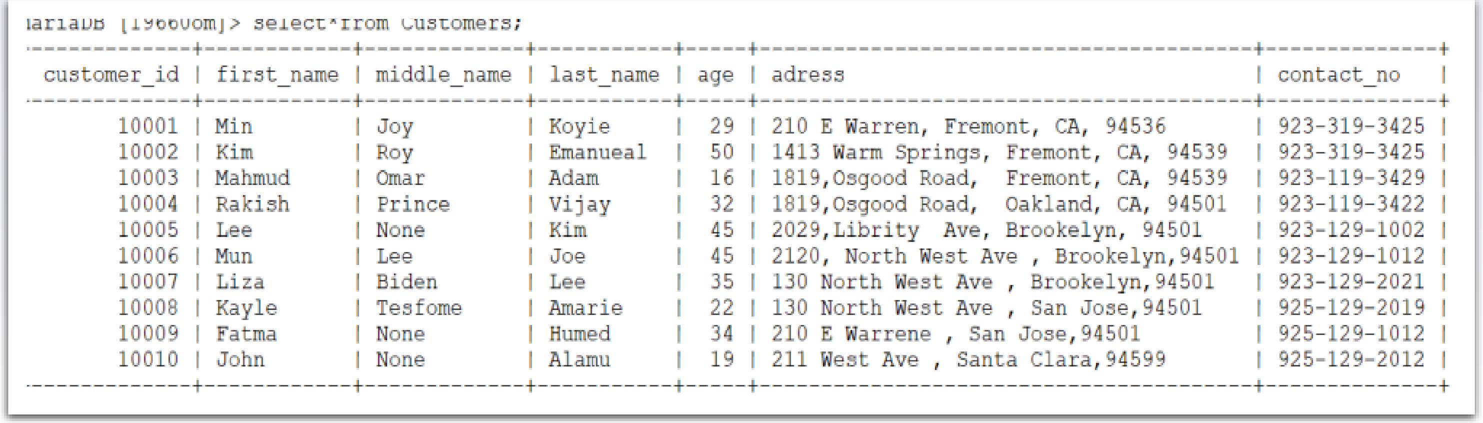


```
MariaDB [19660om]> select*from Hotel;
+----------+------------------+-------------------------+-------------+
| hotel_id | hotel_name       | adress                  | contact_no  |
+----------+------------------+-------------------------+-------------+
| H001     | Murouj Hotel     |  Fremont, CA, 94539     | 925-239-1234 |
| H002     | Mina Hotel       |  Santa Clara, CA, 94539 | 925-239-1235 |
| H003     | Motel6  Hotel    |  San Francisco, CA, 94530 | 925-239-1236 |
| H004     | Shangrella  Hotel | Los Angeles, CA, 94530  | 925-239-1237 |
+----------+------------------+-------------------------+-------------+
```

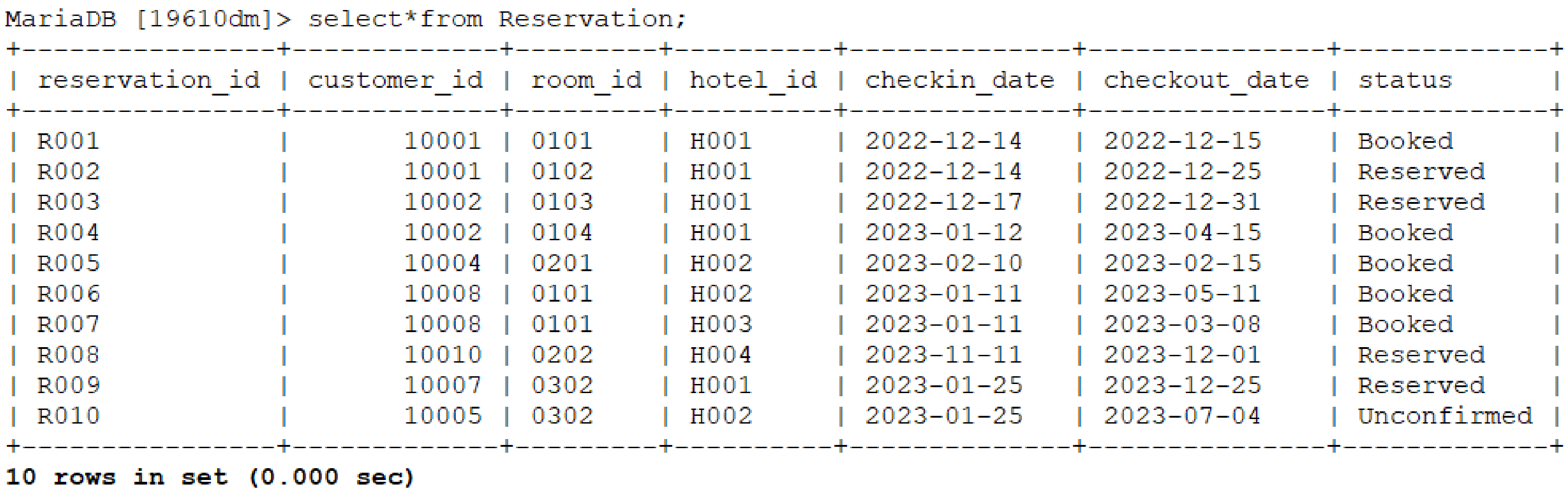


```
MariaDB [19660om]> select*from Room;
+---------+----------+-----------------+-----------------------------------------------+------------+
 room_id | hotel_id | room_type       | amenities                                     | room_price |
+---------+----------+-----------------+-----------------------------------------------+------------+
 0101    | H001     | queen bedroom   | WIFI, Washer/Drier, Kitchen                   |     130.00 |
 0102    | H001     | queen bedroom   | WIFI, Washer/Drier, Kitchen                   |     130.00 |
 0103    | H001     | queen bedroom   | WIFI, Washer/Drier, Kitchen                   |     130.00 |
 0104    | H001     | Twin  bedroom   | WIFI, Washer/Drier, Kitchen                   |     150.00 |
 0201    | H002     | queen  bedroom  | WIFI, Washer/Drier, Kitchen                   |     140.00 |
 0202    | H002     | Double  bedroom | WIFI, Washer/Drier, Kitchen, Play Station     |     180.00 |
 0203    | H002     | Twin  bedroom   | WIFI, Washer/Drier, Kitchen, Play Station     |     200.00 |
 0204    | H002     | Studio bedrom   | WIFI, Washer/Drier, Kitchen, Play Station     |     250.00 |
 0301    | H003     | queen bedroom   | WIFI, Washer/Drier, Kitchen                   |     180.00 |
 0302    | H003     | twin bedroom    | WIFI, Washer/Drier, Kitchen                   |     180.00 |
 0303    | H003     | twin bedroom    | WIFI, Washer/Drier, Kitchen                   |     120.00 |
 0304    | H003     | king bedroom    | WIFI, Washer/Drier, Kitchen                   |     160.00 |
 0401    | H004     | king bedroom    | WIFI, Washer/Drier, Kitchen                   |     160.00 |
 0402    | H004     | king bedroom    | WIFI, Washer/Drier, Kitchen,Game Station      |     190.00 |
 0403    | H004     | Queen bedroom   | WIFI, Washer/Drier, Kitchen,Game Station      |     200.00 |
+---------+----------+-----------------+-----------------------------------------------+------------+
```

Schemas

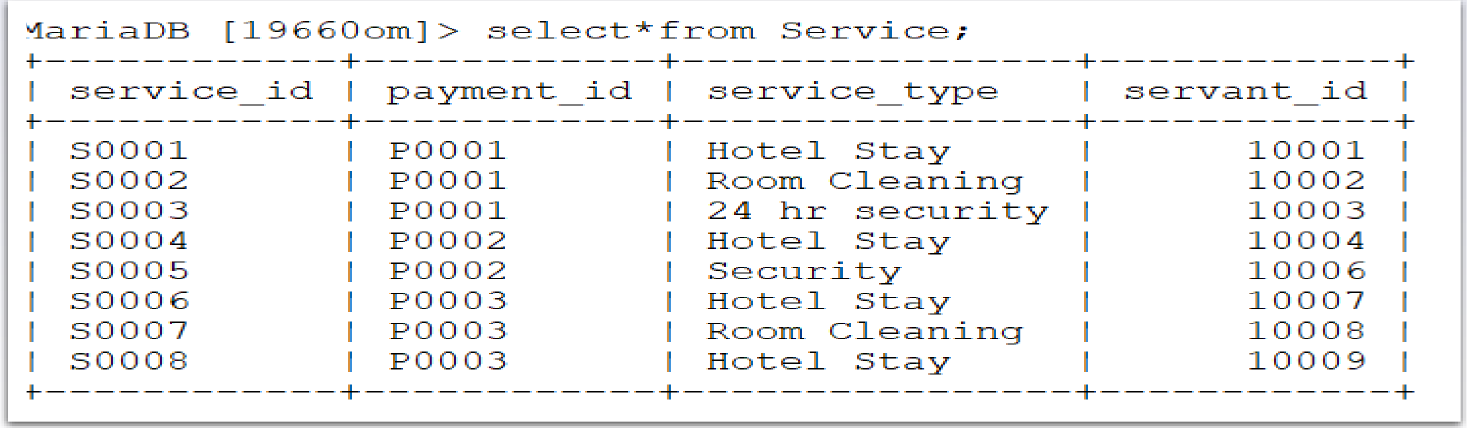


```
ariaDB [19610dm]> select*from Customers;
-------------+------------+-------------+-----------+-----+----------------------------------------+--------------+
 customer_id | first_name | middle_name | last_name | age | adress                                 | contact_no   |
-------------+------------+-------------+-----------+-----+----------------------------------------+--------------+
       10001 | Min        | Joy         | Koyie     |  29 | 210 E Warren, Fremont, CA, 94536       | 923-319-3425 |
       10002 | Kim        | Roy         | Emanueal  |  50 | 1413 Warm Springs, Fremont, CA, 94539  | 923-319-3425 |
       10003 | Mahmud     | Omar        | Adam      |  16 | 1819,Osgood Road,  Fremont, CA, 94539  | 923-119-3429 |
       10004 | Rakish     | Prince      | Vijay     |  32 | 1819,Osgood Road,  Oakland, CA, 94501  | 923-119-3422 |
       10005 | Lee        | None        | Kim       |  45 | 2029,Librity  Ave, Brookelyn, 94501    | 923-129-1002 |
       10006 | Mun        | Lee         | Joe       |  45 | 2120, North West Ave , Brookelyn,94501 | 923-129-1012 |
       10007 | Liza       | Biden       | Lee       |  35 | 130 North West Ave , Brookelyn,94501   | 923-129-2021 |
       10008 | Kayle      | Tesfome     | Amarie    |  22 | 130 North West Ave , San Jose,94501    | 925-129-2019 |
       10009 | Fatma      | None        | Humed     |  34 | 210 E Warrene , San Jose,94501         | 925-129-1012 |
       10010 | John       | None        | Alamu     |  19 | 211 West Ave , Santa Clara,94599       | 925-129-2012 |
-------------+------------+-------------+-----------+-----+----------------------------------------+--------------+
```

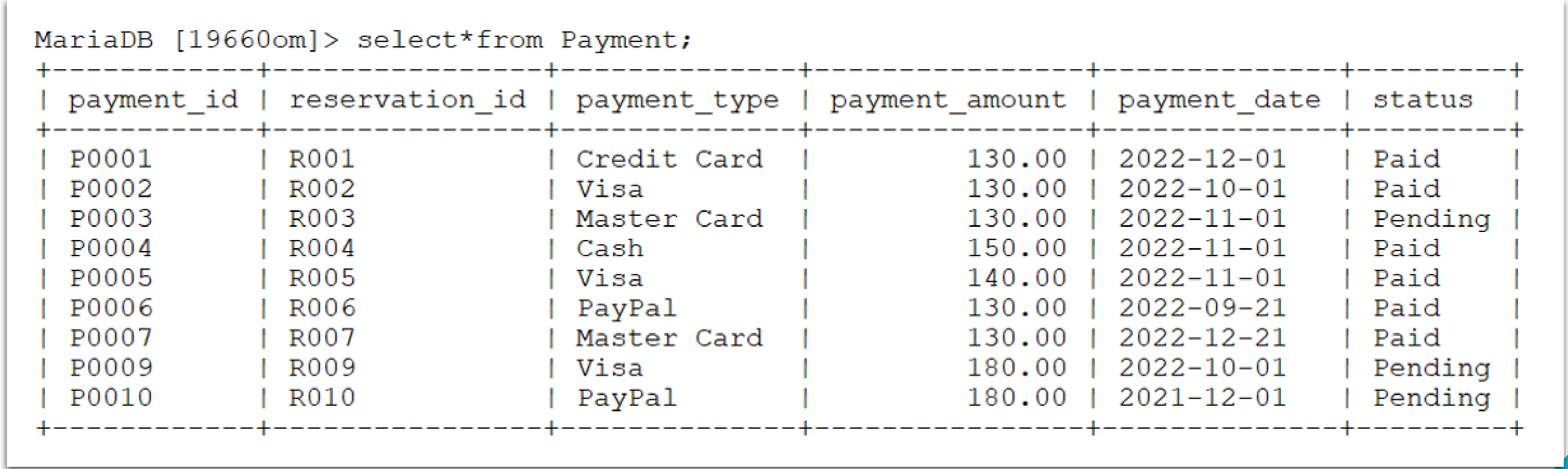


```
MariaDB [19610dm]> select*from Reservation;
+----------------+-------------+---------+----------+--------------+---------------+-------------+
| reservation_id | customer_id | room_id | hotel_id | checkin_date | checkout_date | status      |
+----------------+-------------+---------+----------+--------------+---------------+-------------+
| R001           |       10001 | 0101    | H001     | 2022-12-14   | 2022-12-15    | Booked      |
| R002           |       10001 | 0102    | H001     | 2022-12-14   | 2022-12-25    | Reserved    |
| R003           |       10002 | 0103    | H001     | 2022-12-17   | 2022-12-31    | Reserved    |
| R004           |       10002 | 0104    | H001     | 2023-01-12   | 2023-04-15    | Booked      |
| R005           |       10004 | 0201    | H002     | 2023-02-10   | 2023-02-15    | Booked      |
| R006           |       10008 | 0101    | H002     | 2023-01-11   | 2023-05-11    | Booked      |
| R007           |       10008 | 0101    | H003     | 2023-01-11   | 2023-03-08    | Booked      |
| R008           |       10010 | 0202    | H004     | 2023-11-11   | 2023-12-01    | Reserved    |
| R009           |       10007 | 0302    | H001     | 2023-01-25   | 2023-12-25    | Reserved    |
| R010           |       10005 | 0302    | H002     | 2023-01-25   | 2023-07-04    | Unconfirmed |
+----------------+-------------+---------+----------+--------------+---------------+-------------+
10 rows in set (0.000 sec)
```

Schemas

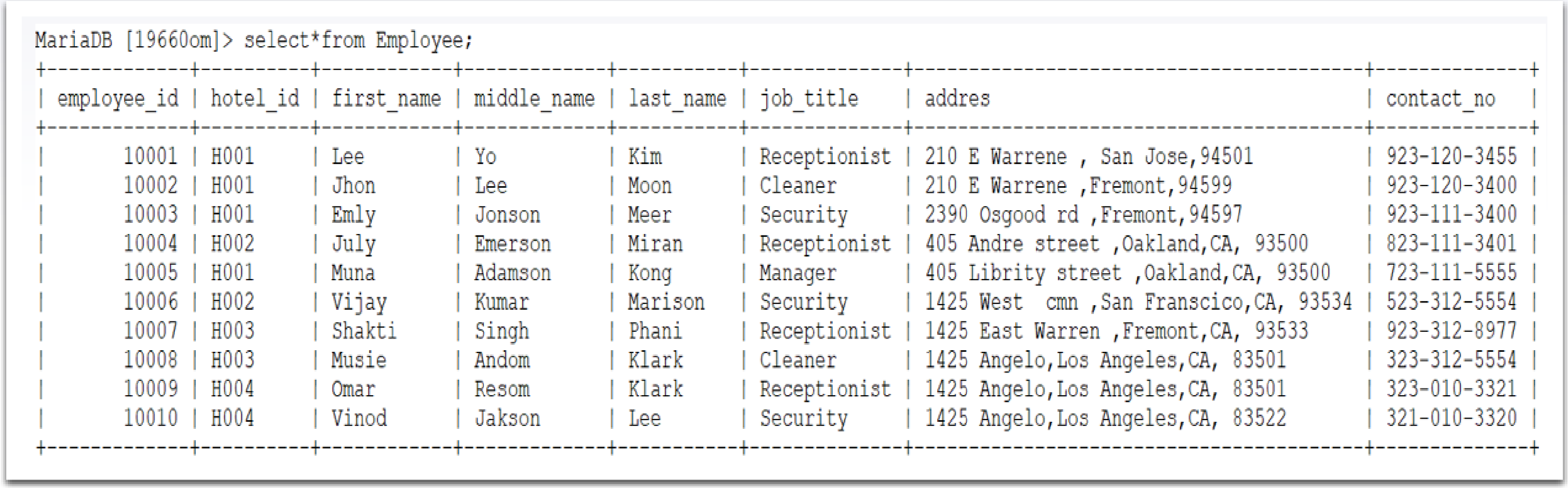


```
MariaDB [19660om]> select*from Service;
+------------+-------------+-----------------+-------------+
| service_id | payment_id  | service_type    | servant_id  |
+------------+-------------+-----------------+-------------+
| S0001      | P0001       | Hotel Stay      |       10001 |
| S0002      | P0001       | Room Cleaning   |       10002 |
| S0003      | P0001       | 24 hr security  |       10003 |
| S0004      | P0002       | Hotel Stay      |       10004 |
| S0005      | P0002       | Security        |       10006 |
| S0006      | P0003       | Hotel Stay      |       10007 |
| S0007      | P0003       | Room Cleaning   |       10008 |
| S0008      | P0003       | Hotel Stay      |       10009 |
+------------+-------------+-----------------+-------------+
```



```
MariaDB [19660om]> select*from Payment;
+------------+----------------+--------------+----------------+--------------+---------+
| payment_id | reservation_id | payment_type | payment_amount | payment_date | status  |
+------------+----------------+--------------+----------------+--------------+---------+
| P0001      | R001           | Credit Card  |         130.00 | 2022-12-01   | Paid    |
| P0002      | R002           | Visa         |         130.00 | 2022-10-01   | Paid    |
| P0003      | R003           | Master Card  |         130.00 | 2022-11-01   | Pending |
| P0004      | R004           | Cash         |         150.00 | 2022-11-01   | Paid    |
| P0005      | R005           | Visa         |         140.00 | 2022-11-01   | Paid    |
| P0006      | R006           | PayPal       |         130.00 | 2022-09-21   | Paid    |
| P0007      | R007           | Master Card  |         130.00 | 2022-12-21   | Paid    |
| P0009      | R009           | Visa         |         180.00 | 2022-10-01   | Pending |
| P0010      | R010           | PayPal       |         180.00 | 2021-12-01   | Pending |
+------------+----------------+--------------+----------------+--------------+---------+
```

Schemas



```
MariaDB [19660om]> select*from Employee;
+-------------+----------+------------+-------------+-----------+--------------+-----------------------------------------+--------------+
| employee_id | hotel_id | first_name | middle_name | last_name | job_title    | addres                                  | contact_no   |
+-------------+----------+------------+-------------+-----------+--------------+-----------------------------------------+--------------+
|       10001 | H001     | Lee        | Yo          | Kim       | Receptionist | 210 E Warrene , San Jose,94501          | 923-120-3455 |
|       10002 | H001     | Jhon       | Lee         | Moon      | Cleaner      | 210 E Warrene ,Fremont,94599            | 923-120-3400 |
|       10003 | H001     | Emly       | Jonson      | Meer      | Security     | 2390 Osgood rd ,Fremont,94597           | 923-111-3400 |
|       10004 | H002     | July       | Emerson     | Miran     | Receptionist | 405 Andre street ,Oakland,CA, 93500     | 823-111-3401 |
|       10005 | H001     | Muna       | Adamson     | Kong      | Manager      | 405 Librity street ,Oakland,CA, 93500   | 723-111-5555 |
|       10006 | H002     | Vijay      | Kumar       | Marison   | Security     | 1425 West  cmn ,San Franscico,CA, 93534 | 523-312-5554 |
|       10007 | H003     | Shakti     | Singh       | Phani     | Receptionist | 1425 East Warren ,Fremont,CA, 93533     | 923-312-8977 |
|       10008 | H003     | Musie      | Andom       | Klark     | Cleaner      | 1425 Angelo,Los Angeles,CA, 83501       | 323-312-5554 |
|       10009 | H004     | Omar       | Resom       | Klark     | Receptionist | 1425 Angelo,Los Angeles,CA, 83501       | 323-010-3321 |
|       10010 | H004     | Vinod      | Jakson      | Lee       | Security     | 1425 Angelo,Los Angeles,CA, 83522       | 321-010-3320 |
+-------------+----------+------------+-------------+-----------+--------------+-----------------------------------------+--------------+
```

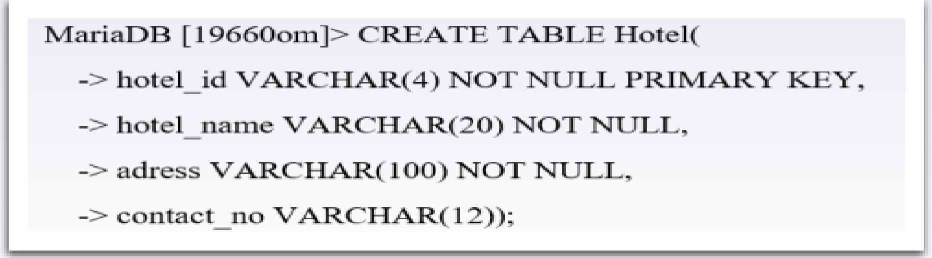
Basic Queries : Creating and Inserting Records into Tables

Syntax

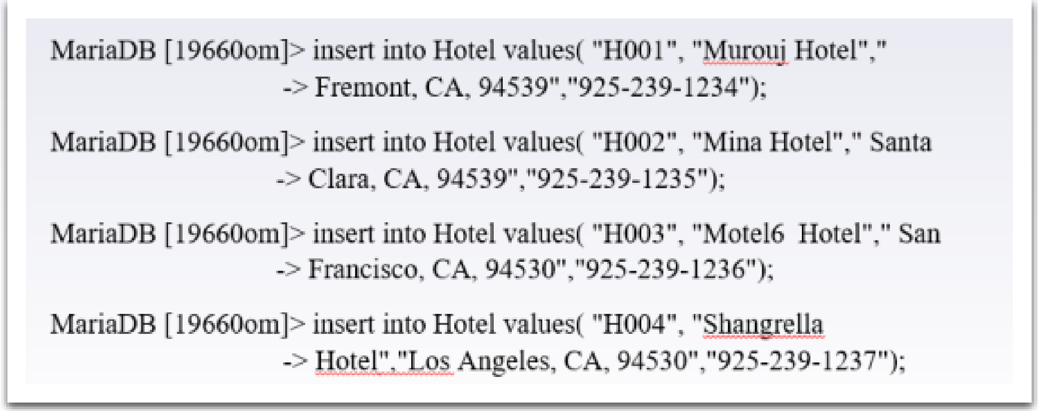
CREATE TABLE table_name (
column1 datatype,
column2 datatype,
column3 datatype,
....);

Use of Query

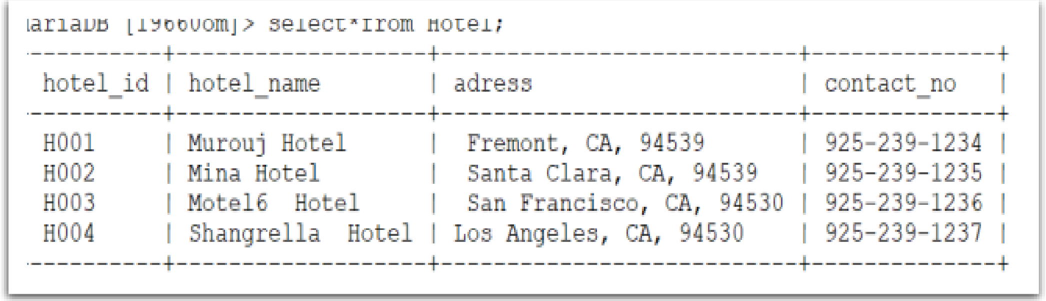
CREATE TABLE statement is used to create a new table in a database.



```
MariaDB [19660om]> CREATE TABLE Hotel(
    -> hotel_id VARCHAR(4) NOT NULL PRIMARY KEY,
    -> hotel_name VARCHAR(20) NOT NULL,
    -> adress VARCHAR(100) NOT NULL,
    -> contact_no VARCHAR(12));
```

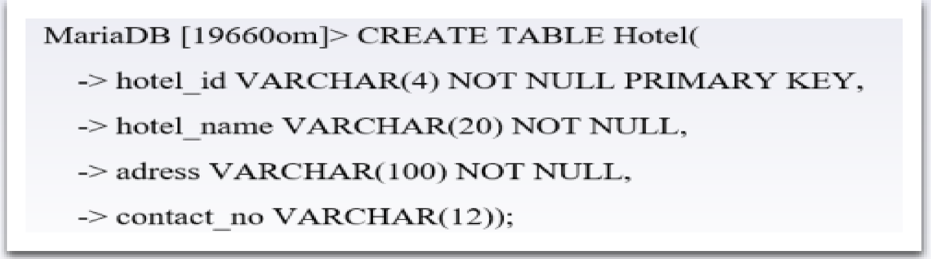


```
MariaDB [19660om]> insert into Hotel values( "H001", "Murouj Hotel","
                   -> Fremont, CA, 94539","925-239-1234");
MariaDB [19660om]> insert into Hotel values( "H002", "Mina Hotel"," Santa
                  -> Clara, CA, 94539","925-239-1235");
MariaDB [19660om]> insert into Hotel values( "H003", "Motel6  Hotel"," San
                  -> Francisco, CA, 94530","925-239-1236");
MariaDB [19660om]> insert into Hotel values( "H004", "Shangrella
                   -> Hotel","Los Angeles, CA, 94530","925-239-1237");
```



```
ariaDB [19660om]> select*from Hotel;
----------+------------------+----------------------------+-------------+
 hotel_id | hotel_name       | adress                     | contact_no  |
----------+------------------+----------------------------+-------------+
 H001     | Murouj Hotel     |  Fremont, CA, 94539        | 925-239-1234 |
 H002     | Mina Hotel       |  Santa Clara, CA, 94539    | 925-239-1235 |
 H003     | Motel6  Hotel    |  San Francisco, CA, 94530  | 925-239-1236 |
 H004     | Shangrella  Hotel | Los Angeles, CA, 94530    | 925-239-1237 |
----------+------------------+----------------------------+-------------+
```

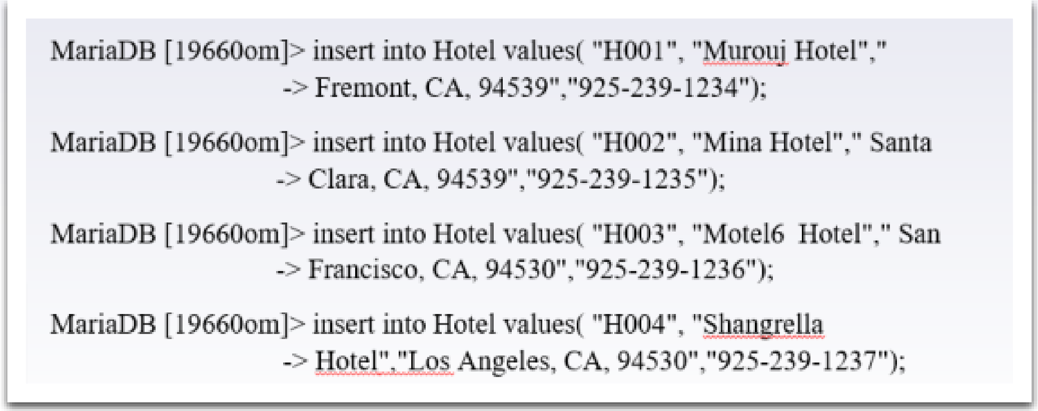
Basic Queries : Creating and Inserting records into Tables



```
MariaDB [19660om]> CREATE TABLE Hotel(
    -> hotel_id VARCHAR(4) NOT NULL PRIMARY KEY,
    -> hotel_name VARCHAR(20) NOT NULL,
    -> adress VARCHAR(100) NOT NULL,
    -> contact_no VARCHAR(12));
```

Syntax

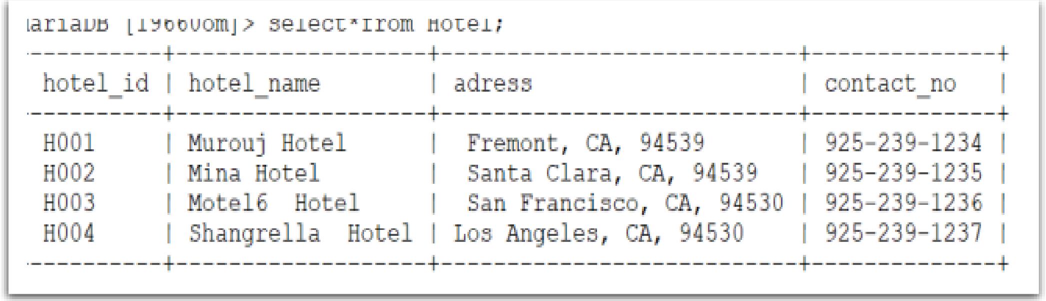
INSERT INTO table_name (column1, column2,...)
VALUES (value1, value2, ...);



```
MariaDB [19660om]> insert into Hotel values( "H001", "Murouj Hotel","
                   -> Fremont, CA, 94539","925-239-1234");

MariaDB [19660om]> insert into Hotel values( "H002", "Mina Hotel"," Santa
                   -> Clara, CA, 94539","925-239-1235");

MariaDB [19660om]> insert into Hotel values( "H003", "Motel6  Hotel"," San
                   -> Francisco, CA, 94530","925-239-1236");

MariaDB [19660om]> insert into Hotel values( "H004", "Shangrella
                   -> Hotel","Los Angeles, CA, 94530","925-239-1237");
```

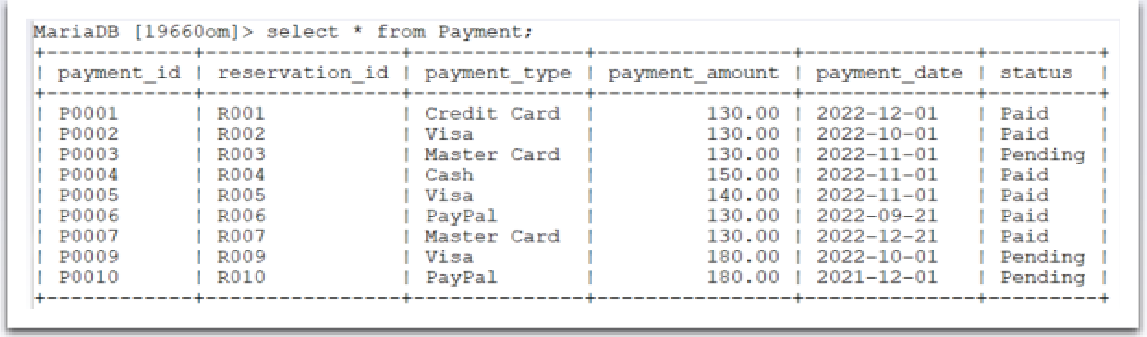
Use of Query

INSERT INTO statement is used to insert new records in a table.



```
ariaDB [19660om]> select*from Hotel;
----------+-----------------+------------------------+-------------+
 hotel_id | hotel_name      | adress                 | contact_no  |
----------+-----------------+------------------------+-------------+
 H001     | Murouj Hotel    |  Fremont, CA, 94539    | 925-239-1234 |
 H002     | Mina Hotel      |  Santa Clara, CA, 94539 | 925-239-1235 |
 H003     | Motel6  Hotel   |  San Francisco, CA, 94530 | 925-239-1236 |
 H004     | Shangrella  Hotel | Los Angeles, CA, 94530  | 925-239-1237 |
----------+-----------------+------------------------+-------------+
```

Basic Queries : Select Record From Table (Select query)

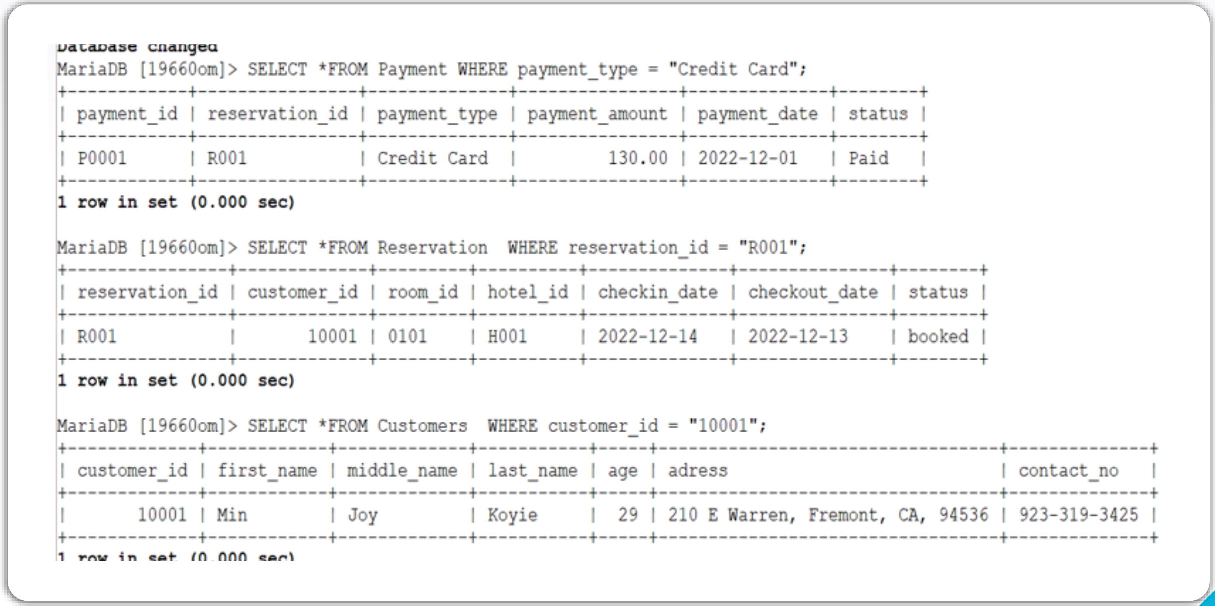


```
MariaDB [19660om]> select * from Payment;
+------------+----------------+--------------+----------------+--------------+---------+
| payment_id | reservation_id | payment_type | payment_amount | payment_date | status  |
+------------+----------------+--------------+----------------+--------------+---------+
| P0001      | R001           | Credit Card  |         130.00 | 2022-12-01   | Paid    |
| P0002      | R002           | Visa         |         130.00 | 2022-10-01   | Paid    |
| P0003      | R003           | Master Card  |         130.00 | 2022-11-01   | Pending |
| P0004      | R004           | Cash         |         150.00 | 2022-11-01   | Paid    |
| P0005      | R005           | Visa         |         140.00 | 2022-11-01   | Paid    |
| P0006      | R006           | PayPal       |         130.00 | 2022-09-21   | Paid    |
| P0007      | R007           | Master Card  |         130.00 | 2022-12-21   | Paid    |
| P0009      | R009           | Visa         |         180.00 | 2022-10-01   | Pending |
| P0010      | R010           | PayPal       |         180.00 | 2021-12-01   | Pending |
+------------+----------------+--------------+----------------+--------------+---------+
```

Syntax

SELECT column1, column2,
...FROM table_name;

SELECT column1, column2, ...
FROM table_name
WHERE condition;



```
Database changed
MariaDB [19660om]> SELECT *FROM Payment WHERE payment_type = "Credit Card";
+------------+----------------+--------------+----------------+--------------+--------+
| payment_id | reservation_id | payment_type | payment_amount | payment_date | status |
+------------+----------------+--------------+----------------+--------------+--------+
| P0001      | R001           | Credit Card  |         130.00 | 2022-12-01   | Paid   |
+------------+----------------+--------------+----------------+--------------+--------+
1 row in set (0.000 sec)

MariaDB [19660om]> SELECT *FROM Reservation  WHERE reservation_id = "R001";
+----------------+-------------+---------+----------+--------------+---------------+--------+
| reservation_id | customer_id | room_id | hotel_id | checkin_date | checkout_date | status |
+----------------+-------------+---------+----------+--------------+---------------+--------+
| R001           |       10001 | 0101    | H001     | 2022-12-14   | 2022-12-13    | booked |
+----------------+-------------+---------+----------+--------------+---------------+--------+
1 row in set (0.000 sec)

MariaDB [19660om]> SELECT *FROM Customers  WHERE customer_id = "10001";
+-------------+------------+-------------+-----------+-----+-----------------------------------+--------------+
| customer_id | first_name | middle_name | last_name | age | adress                            | contact_no   |
+-------------+------------+-------------+-----------+-----+-----------------------------------+--------------+
|       10001 | Min        | Joy         | Koyie     |  29 | 210 E Warren, Fremont, CA, 94536 | 923-319-3425 |
+-------------+------------+-------------+-----------+-----+-----------------------------------+--------------+
1 row in set (0.000 sec)
```

Use of Query

SELECT statement is used to select data from a database

SELECT is also used with *WHERE* to select a filtered records

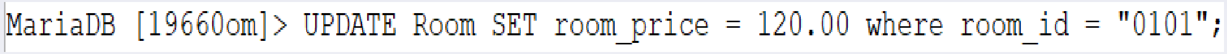
Basic Queries : Modify Table (Update query)

Syntax

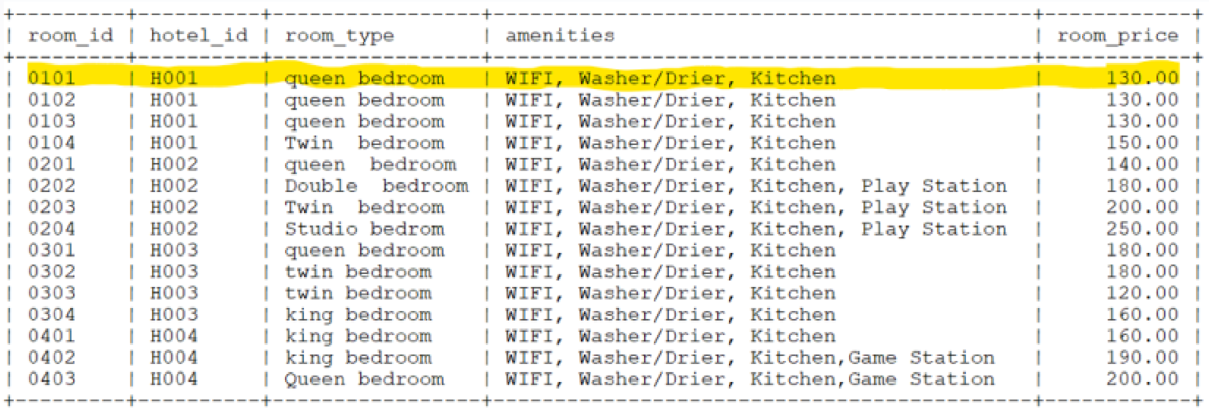
UPDATE *table_name*
    SET *column1 = value1,*
        column2 = value2, ...
    WHERE *condition;*

Use of Query

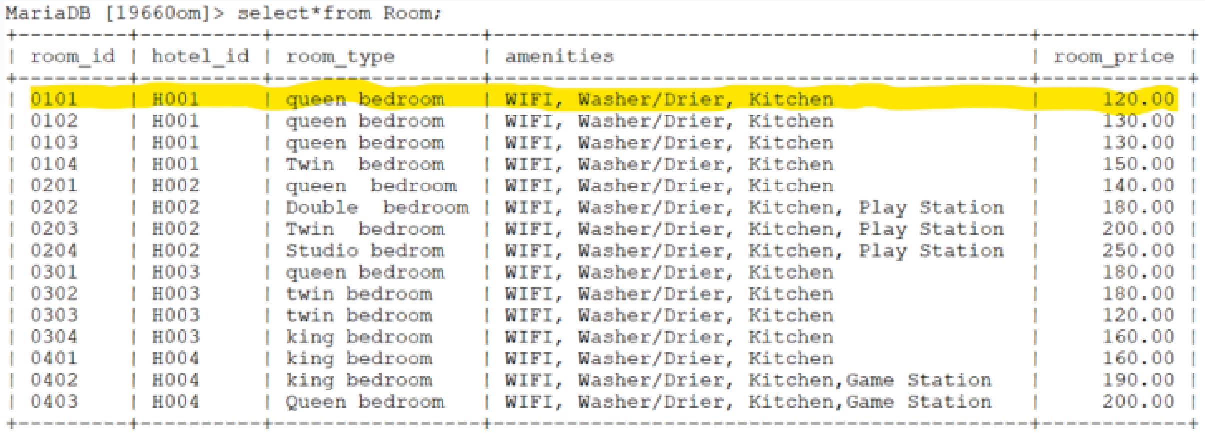
UPDATE statement is used to modify the existing records in a table.



```
MariaDB [19660om]> UPDATE Room SET room_price = 120.00 where room_id = "0101";
```



```
+---------+----------+----------------+-----------------------------------------+------------+
| room_id | hotel_id | room_type      | amenities                               | room_price |
+---------+----------+----------------+-----------------------------------------+------------+
| 0101    | H001     | queen bedroom  | WIFI, Washer/Drier, Kitchen             |     130.00 |
| 0102    | H001     | queen bedroom  | WIFI, Washer/Drier, Kitchen             |     130.00 |
| 0103    | H001     | queen bedroom  | WIFI, Washer/Drier, Kitchen             |     130.00 |
| 0104    | H001     | Twin  bedroom  | WIFI, Washer/Drier, Kitchen             |     150.00 |
| 0201    | H002     | queen  bedroom | WIFI, Washer/Drier, Kitchen             |     140.00 |
| 0202    | H002     | Double  bedroom| WIFI, Washer/Drier, Kitchen, Play Station |   180.00 |
| 0203    | H002     | Twin  bedroom  | WIFI, Washer/Drier, Kitchen, Play Station |   200.00 |
| 0204    | H002     | Studio bedrom  | WIFI, Washer/Drier, Kitchen, Play Station |   250.00 |
| 0301    | H003     | queen bedroom  | WIFI, Washer/Drier, Kitchen             |     180.00 |
| 0302    | H003     | twin bedroom   | WIFI, Washer/Drier, Kitchen             |     180.00 |
| 0303    | H003     | twin bedroom   | WIFI, Washer/Drier, Kitchen             |     120.00 |
| 0304    | H003     | king bedroom   | WIFI, Washer/Drier, Kitchen             |     160.00 |
| 0401    | H004     | king bedroom   | WIFI, Washer/Drier, Kitchen             |     160.00 |
| 0402    | H004     | king bedroom   | WIFI, Washer/Drier, Kitchen,Game Station |    190.00 |
| 0403    | H004     | Queen bedroom  | WIFI, Washer/Drier, Kitchen,Game Station |    200.00 |
+---------+----------+----------------+-----------------------------------------+------------+
```



```
MariaDB [19660om]> select*from Room;
+---------+----------+----------------+-----------------------------------------+------------+
| room_id | hotel_id | room_type      | amenities                               | room_price |
+---------+----------+----------------+-----------------------------------------+------------+
| 0101    | H001     | queen bedroom  | WIFI, Washer/Drier, Kitchen             |     120.00 |
| 0102    | H001     | queen bedroom  | WIFI, Washer/Drier, Kitchen             |     130.00 |
| 0103    | H001     | queen bedroom  | WIFI, Washer/Drier, Kitchen             |     130.00 |
| 0104    | H001     | Twin  bedroom  | WIFI, Washer/Drier, Kitchen             |     150.00 |
| 0201    | H002     | queen  bedroom | WIFI, Washer/Drier, Kitchen             |     140.00 |
| 0202    | H002     | Double  bedroom| WIFI, Washer/Drier, Kitchen, Play Station |   180.00 |
| 0203    | H002     | Twin  bedroom  | WIFI, Washer/Drier, Kitchen, Play Station |   200.00 |
| 0204    | H002     | Studio bedrom  | WIFI, Washer/Drier, Kitchen, Play Station |   250.00 |
| 0301    | H003     | queen bedroom  | WIFI, Washer/Drier, Kitchen             |     180.00 |
| 0302    | H003     | twin bedroom   | WIFI, Washer/Drier, Kitchen             |     180.00 |
| 0303    | H003     | twin bedroom   | WIFI, Washer/Drier, Kitchen             |     120.00 |
| 0304    | H003     | king bedroom   | WIFI, Washer/Drier, Kitchen             |     160.00 |
| 0401    | H004     | king bedroom   | WIFI, Washer/Drier, Kitchen             |     160.00 |
| 0402    | H004     | king bedroom   | WIFI, Washer/Drier, Kitchen,Game Station |    190.00 |
| 0403    | H004     | Queen bedroom  | WIFI, Washer/Drier, Kitchen,Game Station |    200.00 |
+---------+----------+----------------+-----------------------------------------+------------+
```

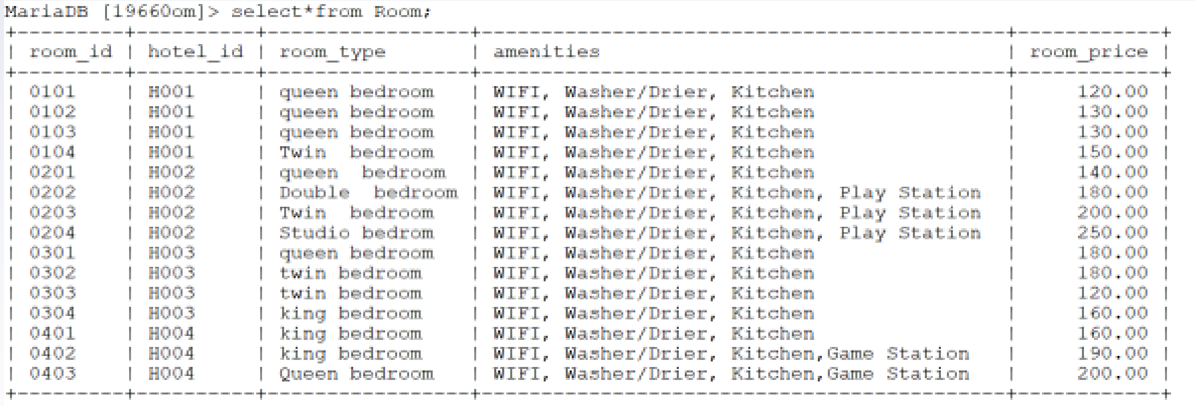
Basic Queries : Modify Table (Update query)

Syntax

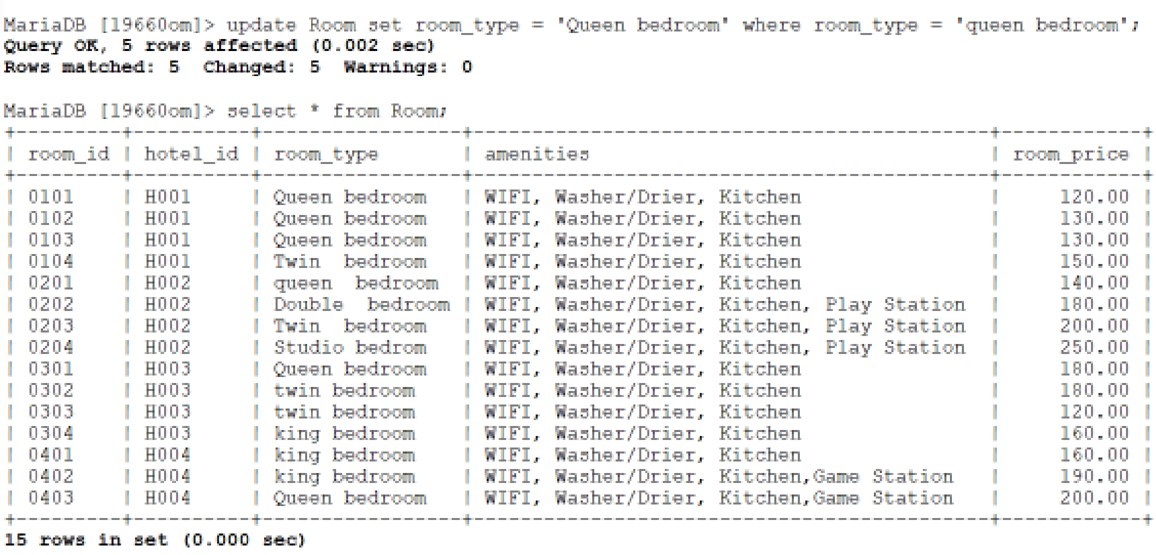
UPDATE *Room*
SET *room_type = ’Queen bedroom’*
WHERE *room_type = ‘queen bedroom’;*

Use of Query

UPDATE statement is used to modify the existing records in a table.



```
MariaDB [19660om]> select*from Room;
+---------+----------+------------------+--------------------------------------------------+------------+
| room_id | hotel_id | room_type        | amenities                                        | room_price |
+---------+----------+------------------+--------------------------------------------------+------------+
| 0101    | H001     | queen bedroom    | WIFI, Washer/Drier, Kitchen                      |     120.00 |
| 0102    | H001     | queen bedroom    | WIFI, Washer/Drier, Kitchen                      |     130.00 |
| 0103    | H001     | queen bedroom    | WIFI, Washer/Drier, Kitchen                      |     130.00 |
| 0104    | H001     | Twin  bedroom    | WIFI, Washer/Drier, Kitchen                      |     150.00 |
| 0201    | H002     | queen  bedroom   | WIFI, Washer/Drier, Kitchen                      |     140.00 |
| 0202    | H002     | Double  bedroom  | WIFI, Washer/Drier, Kitchen, Play Station        |     180.00 |
| 0203    | H002     | Twin  bedroom    | WIFI, Washer/Drier, Kitchen, Play Station        |     200.00 |
| 0204    | H002     | Studio bedrom    | WIFI, Washer/Drier, Kitchen, Play Station        |     250.00 |
| 0301    | H003     | queen bedroom    | WIFI, Washer/Drier, Kitchen                      |     180.00 |
| 0302    | H003     | twin bedroom     | WIFI, Washer/Drier, Kitchen                      |     180.00 |
| 0303    | H003     | twin bedroom     | WIFI, Washer/Drier, Kitchen                      |     120.00 |
| 0304    | H003     | king bedroom     | WIFI, Washer/Drier, Kitchen                      |     160.00 |
| 0401    | H004     | king bedroom     | WIFI, Washer/Drier, Kitchen                      |     160.00 |
| 0402    | H004     | king bedroom     | WIFI, Washer/Drier, Kitchen,Game Station         |     190.00 |
| 0403    | H004     | Queen bedroom    | WIFI, Washer/Drier, Kitchen,Game Station         |     200.00 |
+---------+----------+------------------+--------------------------------------------------+------------+
```



```
MariaDB [19660om]> update Room set room_type = 'Queen bedroom' where room_type = 'queen bedroom';
Query OK, 5 rows affected (0.002 sec)
Rows matched: 5  Changed: 5  Warnings: 0

MariaDB [19660om]> select * from Room;
+---------+----------+------------------+--------------------------------------------------+------------+
| room_id | hotel_id | room_type        | amenities                                        | room_price |
+---------+----------+------------------+--------------------------------------------------+------------+
| 0101    | H001     | Queen bedroom    | WIFI, Washer/Drier, Kitchen                      |     120.00 |
| 0102    | H001     | Queen bedroom    | WIFI, Washer/Drier, Kitchen                      |     130.00 |
| 0103    | H001     | Queen bedroom    | WIFI, Washer/Drier, Kitchen                      |     130.00 |
| 0104    | H001     | Twin  bedroom    | WIFI, Washer/Drier, Kitchen                      |     150.00 |
| 0201    | H002     | queen  bedroom   | WIFI, Washer/Drier, Kitchen                      |     140.00 |
| 0202    | H002     | Double  bedroom  | WIFI, Washer/Drier, Kitchen, Play Station        |     180.00 |
| 0203    | H002     | Twin  bedroom    | WIFI, Washer/Drier, Kitchen, Play Station        |     200.00 |
| 0204    | H002     | Studio bedrom    | WIFI, Washer/Drier, Kitchen, Play Station        |     250.00 |
| 0301    | H003     | Queen bedroom    | WIFI, Washer/Drier, Kitchen                      |     180.00 |
| 0302    | H003     | twin bedroom     | WIFI, Washer/Drier, Kitchen                      |     180.00 |
| 0303    | H003     | twin bedroom     | WIFI, Washer/Drier, Kitchen                      |     120.00 |
| 0304    | H003     | king bedroom     | WIFI, Washer/Drier, Kitchen                      |     160.00 |
| 0401    | H004     | king bedroom     | WIFI, Washer/Drier, Kitchen                      |     160.00 |
| 0402    | H004     | king bedroom     | WIFI, Washer/Drier, Kitchen,Game Station         |     190.00 |
| 0403    | H004     | Queen bedroom    | WIFI, Washer/Drier, Kitchen,Game Station         |     200.00 |
+---------+----------+------------------+--------------------------------------------------+------------+
15 rows in set (0.000 sec)
```

Basic Queries : Alter Table
(Alter query)

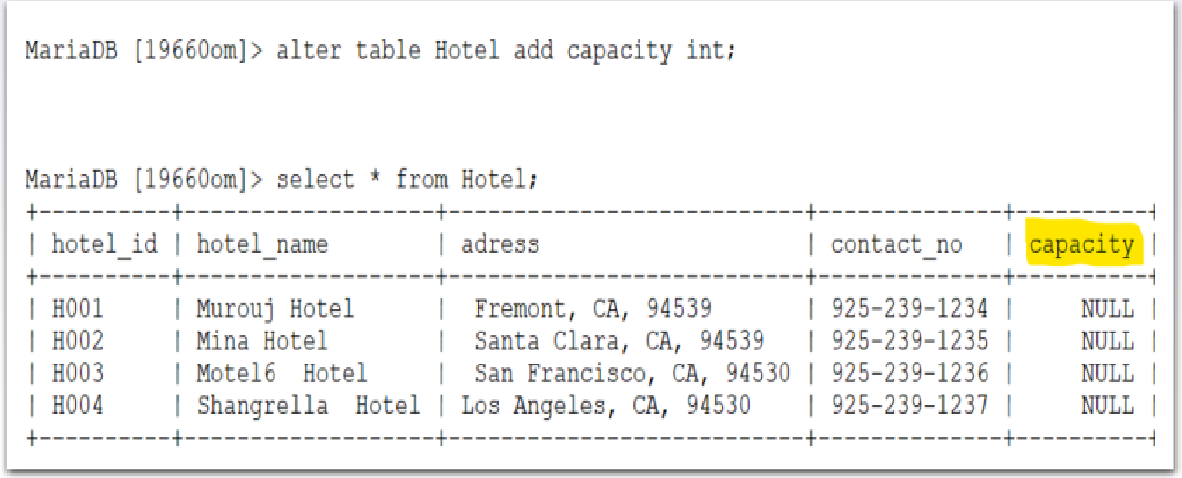
Syntax

ALTER TABLE *table_name*
ADD *column_name datatype*;

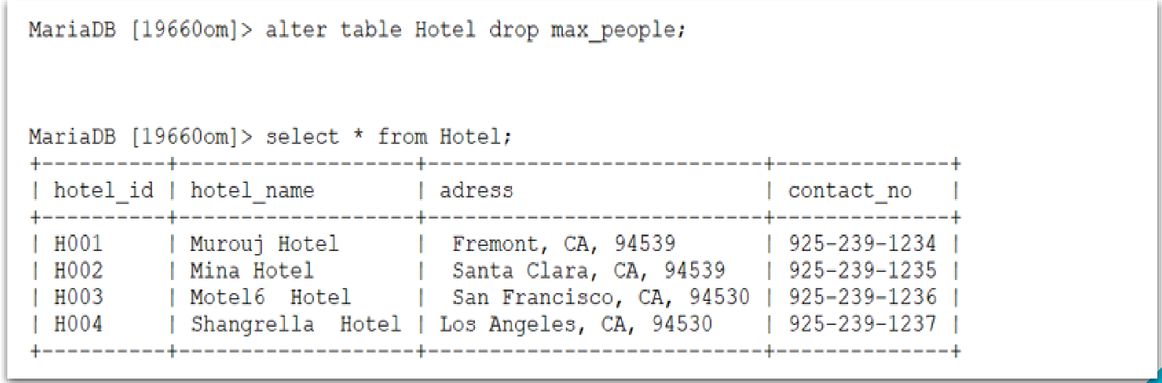
ALTER TABLE *table_name*
DROP *column_name*;

Use of Query

ALTER TABLE statement is used to add, delete, or modify columns in an existing table



```
MariaDB [19660om]> alter table Hotel add capacity int;


MariaDB [19660om]> select * from Hotel;
+----------+-------------------+---------------------------+--------------+----------+
| hotel_id | hotel_name        | adress                    | contact_no   | capacity |
+----------+-------------------+---------------------------+--------------+----------+
| H001     | Murouj Hotel      |  Fremont, CA, 94539       | 925-239-1234 |     NULL |
| H002     | Mina Hotel        |  Santa Clara, CA, 94539   | 925-239-1235 |     NULL |
| H003     | Motel6  Hotel     |  San Francisco, CA, 94530 | 925-239-1236 |     NULL |
| H004     | Shangrella  Hotel | Los Angeles, CA, 94530    | 925-239-1237 |     NULL |
+----------+-------------------+---------------------------+--------------+----------+
```



```
MariaDB [19660om]> alter table Hotel drop max_people;


MariaDB [19660om]> select * from Hotel;
+----------+-------------------+---------------------------+--------------+
| hotel_id | hotel_name        | adress                    | contact_no   |
+----------+-------------------+---------------------------+--------------+
| H001     | Murouj Hotel      |  Fremont, CA, 94539       | 925-239-1234 |
| H002     | Mina Hotel        |  Santa Clara, CA, 94539   | 925-239-1235 |
| H003     | Motel6  Hotel     |  San Francisco, CA, 94530 | 925-239-1236 |
| H004     | Shangrella  Hotel | Los Angeles, CA, 94530    | 925-239-1237 |
+----------+-------------------+---------------------------+--------------+
```

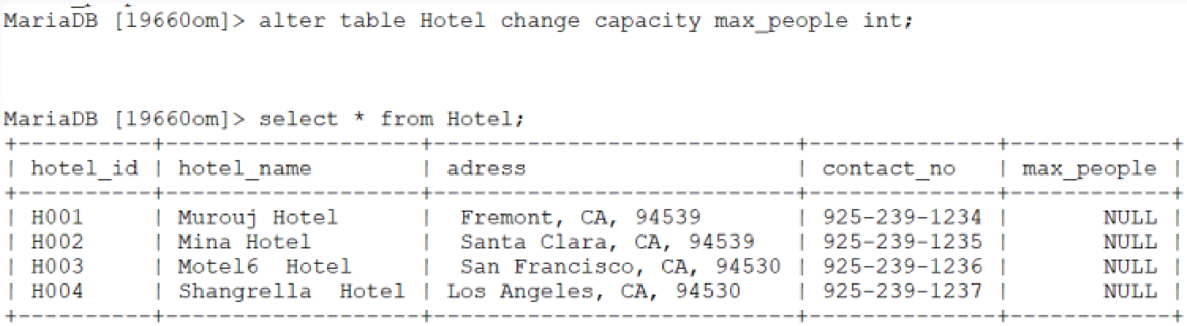
Basic Queries : Alter Table
(rename column query)

Syntax

ALTER TABLE *table_name*
CHANGE *old_column new_column datatype*;

Use of Query

Change the name of a column in the table



```
MariaDB [19660om]> alter table Hotel change capacity max_people int;


MariaDB [19660om]> select * from Hotel;
+----------+------------------+-------------------------+--------------+------------+
| hotel_id | hotel_name       | adress                  | contact_no   | max_people |
+----------+------------------+-------------------------+--------------+------------+
| H001     | Murouj Hotel     |  Fremont, CA, 94539     | 925-239-1234 |       NULL |
| H002     | Mina Hotel       |  Santa Clara, CA, 94539 | 925-239-1235 |       NULL |
| H003     | Motel6  Hotel    |  San Francisco, CA, 94530 | 925-239-1236 |       NULL |
| H004     | Shangrella  Hotel | Los Angeles, CA, 94530 | 925-239-1237 |       NULL |
+----------+------------------+-------------------------+--------------+------------+
```

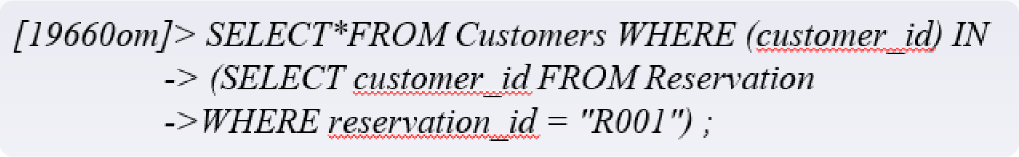
Intermediate Queries :
(Nested query)

Syntax

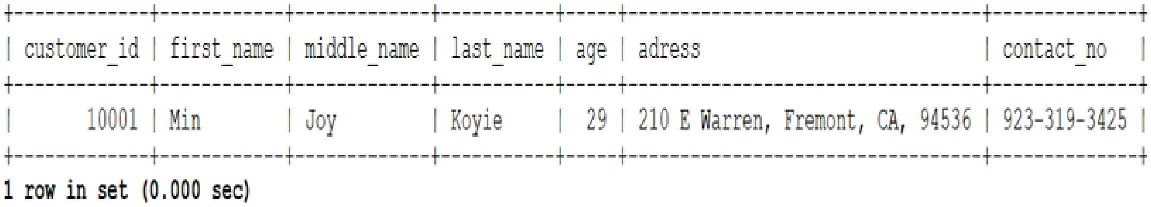
SELECT Column1,Column2…
FROM Table_Name
WHERE Column_Name IN
(SELECT
Column1,Column2…. FROM
Table_Name_2)…;

Use of Query

Nested Queries, a query is written inside a query. The result of inner query is used in execution of outer query



```
[19660om]> SELECT*FROM Customers WHERE (customer_id) IN
          -> (SELECT customer_id FROM Reservation
          ->WHERE reservation_id = "R001") ;
```



```
+-------------+------------+-------------+-----------+-----+------------------------------------+--------------+
| customer_id | first_name | middle_name | last_name | age | adress                             | contact_no   |
+-------------+------------+-------------+-----------+-----+------------------------------------+--------------+
|       10001 | Min        | Joy         | Koyie     |  29 | 210 E Warren, Fremont, CA, 94536   | 923-319-3425 |
+-------------+------------+-------------+-----------+-----+------------------------------------+--------------+
1 row in set (0.000 sec)
```

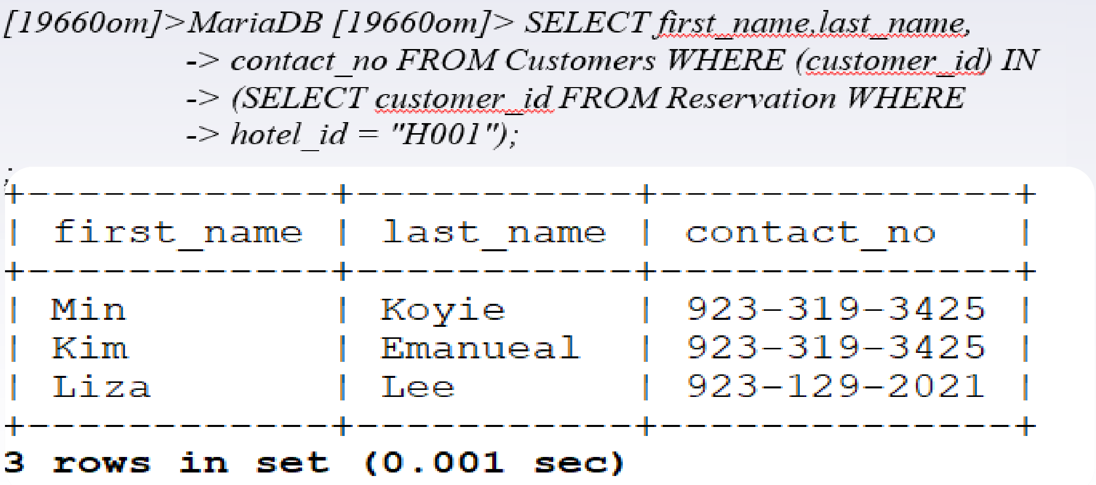
Intermediate Queries :
(Nested query)

Syntax

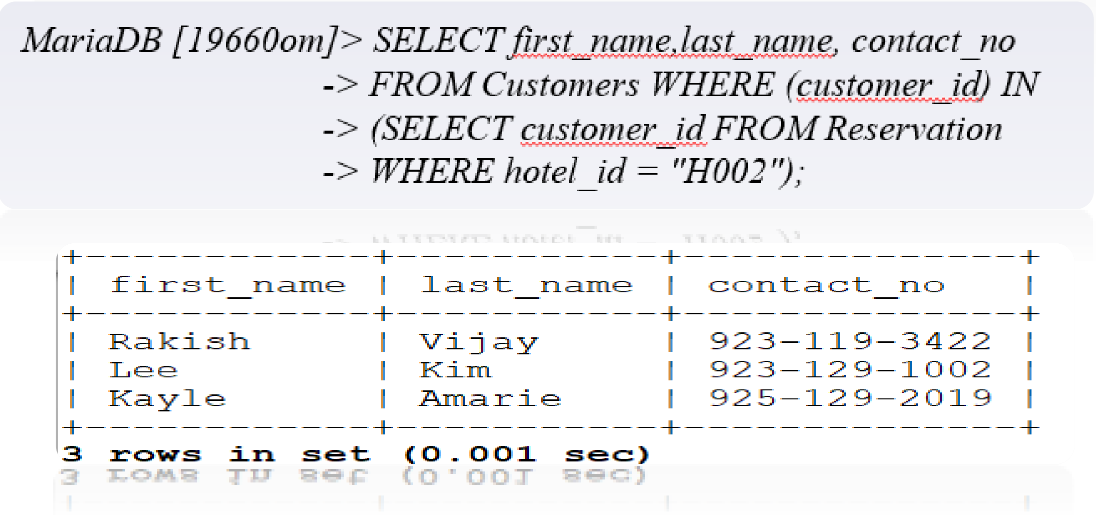
```
SELECT Column1,Column2…
FROM Table_Name
WHERE Column_Name IN
(SELECT Column1,Column2….
FROM Table_Name_2 WHERE
condition)…;
```

Use of Query

Nested Queries, a query is written inside a query. The result of inner query is used in execution of outer query



```
[19660om]>MariaDB [19660om]> SELECT first_name,last_name,
                      -> contact_no FROM Customers WHERE (customer_id) IN
                      -> (SELECT customer_id FROM Reservation WHERE
                      -> hotel_id = "H001");
;
+-------------+-------------+---------------+
| first_name  | last_name   | contact_no    |
+-------------+-------------+---------------+
| Min         | Koyie       | 923-319-3425  |
| Kim         | Emanueal    | 923-319-3425  |
| Liza        | Lee         | 923-129-2021  |
+-------------+-------------+---------------+
3 rows in set (0.001 sec)
```



```
MariaDB [19660om]> SELECT first_name,last_name, contact_no
                      -> FROM Customers WHERE (customer_id) IN
                      -> (SELECT customer_id FROM Reservation
                      -> WHERE hotel_id = "H002");

+-------------+-------------+---------------+
| first_name  | last_name   | contact_no    |
+-------------+-------------+---------------+
| Rakish      | Vijay       | 923-119-3422  |
| Lee         | Kim         | 923-129-1002  |
| Kayle       | Amarie      | 925-129-2019  |
+-------------+-------------+---------------+
3 rows in set (0.001 sec)
```

Intermediate Queries :
(Nested query)

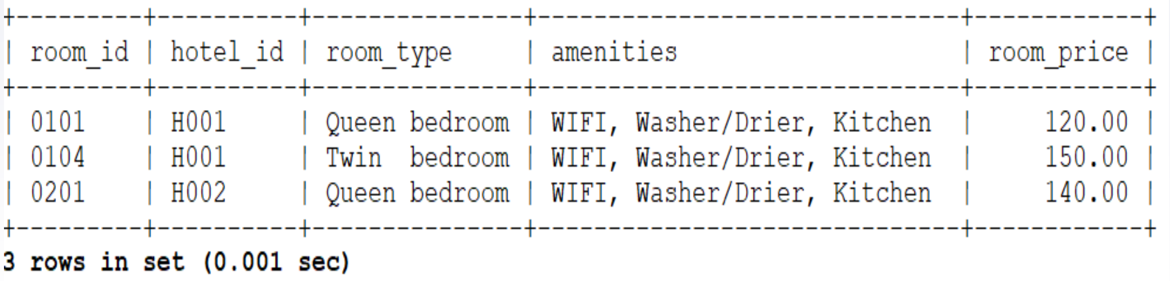
Syntax

SELECT Column1,Column2…
FROM Table_Name
WHERE Column_Name IN
(SELECT Column1,Column2….
FROM Table_Name_2 WHERE
condition)…;

Use of Query

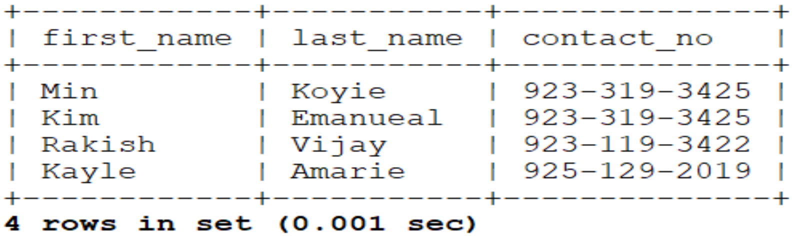
Nested Queries, a query is written inside a query. The result of inner query is used in execution of outer query

```
MariaDB [19660om]> SELECT*FROM Room WHERE
                  -> (Room_id) IN (SELECT room_id FROM
                  -> Reservation WHERE status = "booked");
```



```
+---------+----------+---------------+-------------------------------+------------+
| room_id | hotel_id | room_type     | amenities                     | room_price |
+---------+----------+---------------+-------------------------------+------------+
| 0101    | H001     | Queen bedroom | WIFI, Washer/Drier, Kitchen   |     120.00 |
| 0104    | H001     | Twin  bedroom | WIFI, Washer/Drier, Kitchen   |     150.00 |
| 0201    | H002     | Queen bedroom | WIFI, Washer/Drier, Kitchen   |     140.00 |
+---------+----------+---------------+-------------------------------+------------+
3 rows in set (0.001 sec)
```

```
MariaDB [19660om]> SELECT first_name,last_name, contact_no
                  ->  FROM Customers WHERE (customer_id) IN
                  -> (SELECT customer_id FROM Reservation WHERE
                  -> (room_id) IN (SELECT    room_id     FROM
                  -> Reservation WHERE status = "booked"));
```



```
+------------+-----------+--------------+
| first_name | last_name | contact_no   |
+------------+-----------+--------------+
| Min        | Koyie     | 923-319-3425 |
| Kim        | Emanueal  | 923-319-3425 |
| Rakish     | Vijay     | 923-119-3422 |
| Kayle      | Amarie    | 925-129-2019 |
+------------+-----------+--------------+
4 rows in set (0.001 sec)
```

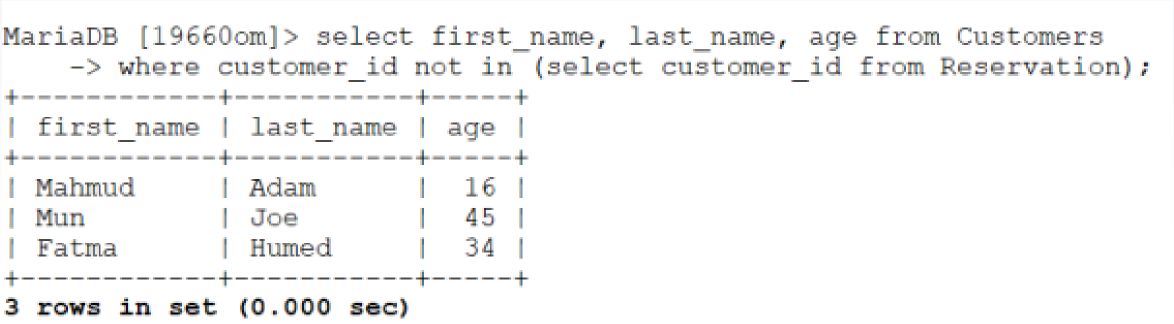
Intermediate Queries :
(Nested query)

Syntax

SELECT first_name, last_name, age
FROM Customers
WHERE customer_id NOT IN
(SELECT customer_id
FROM Reservation);

Use of Query

The query selects the name and age of customers who didn't make any reservations.



```
MariaDB [19660om]> select first_name, last_name, age from Customers
    -> where customer_id not in (select customer_id from Reservation);
+------------+-----------+-----+
| first_name | last_name | age |
+------------+-----------+-----+
| Mahmud     | Adam      |  16 |
| Mun        | Joe       |  45 |
| Fatma      | Humed     |  34 |
+------------+-----------+-----+
3 rows in set (0.000 sec)
```

Advanced Queries :
(Inner join query)

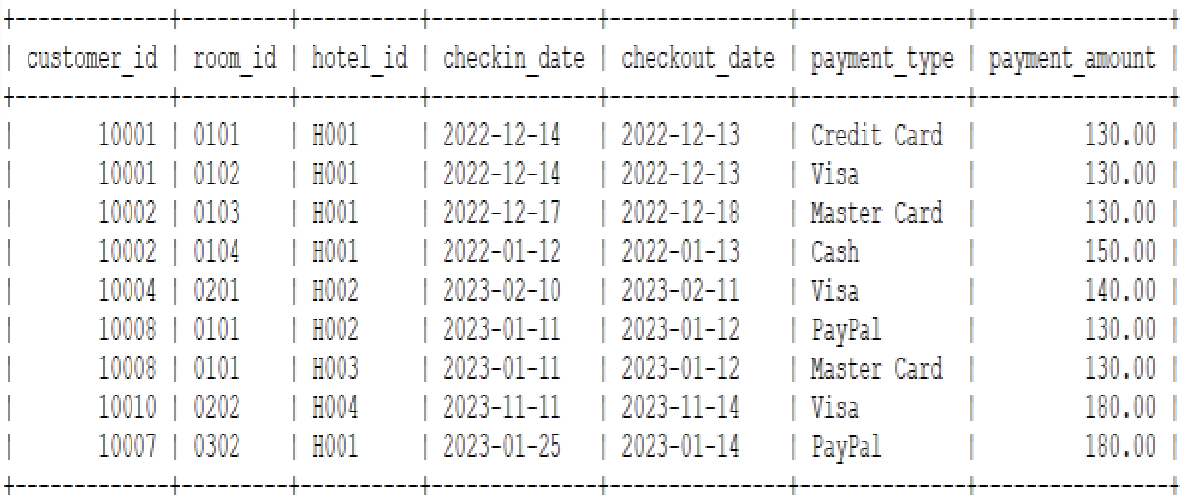
Syntax

SELECT *column_name(s)*
FROM *table1* INNER JOIN *table2*
ON *table1.column_name =*
table2.column_name;

Use of Query

INNER JOIN keyword selects records that have matching values in both tables.

```
MariaDB [19660om]> SELECT c.first_name , c.last_name ,c.contact_no ,
                 -> r.checkin_date, r.checkout_date
                 -> FROM Customers c INNER JOIN Reservation r
                 -> ON c.customer_id = r.customer_id;
```



```
+-------------+---------+----------+--------------+---------------+--------------+----------------+
| customer_id | room_id | hotel_id | checkin_date | checkout_date | payment_type | payment_amount |
+-------------+---------+----------+--------------+---------------+--------------+----------------+
|       10001 | 0101    | H001     | 2022-12-14   | 2022-12-13    | Credit Card  |         130.00 |
|       10001 | 0102    | H001     | 2022-12-14   | 2022-12-13    | Visa         |         130.00 |
|       10002 | 0103    | H001     | 2022-12-17   | 2022-12-18    | Master Card  |         130.00 |
|       10002 | 0104    | H001     | 2022-01-12   | 2022-01-13    | Cash         |         150.00 |
|       10004 | 0201    | H002     | 2023-02-10   | 2023-02-11    | Visa         |         140.00 |
|       10008 | 0101    | H002     | 2023-01-11   | 2023-01-12    | PayPal       |         130.00 |
|       10008 | 0101    | H003     | 2023-01-11   | 2023-01-12    | Master Card  |         130.00 |
|       10010 | 0202    | H004     | 2023-11-11   | 2023-11-14    | Visa         |         180.00 |
|       10007 | 0302    | H001     | 2023-01-25   | 2023-01-14    | PayPal       |         180.00 |
+-------------+---------+----------+--------------+---------------+--------------+----------------+
```

Advanced Queries :
(left join query)

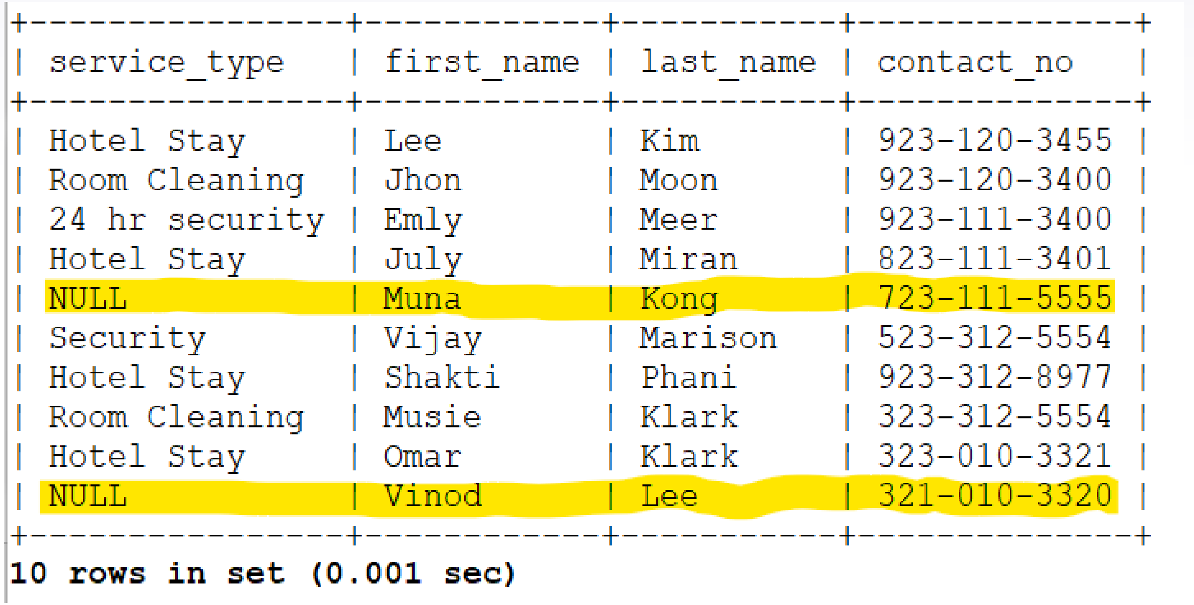
MariaDB [19660om]> SELECT Service.service_type,Employee.first_name ,
-> Employee.last_name, Employee.contact_no FROM Employee
-> LEFT JOIN Service ON
-> Employee.employee_id =Service.servant_id ;

Syntax

SELECT column_name(s)
FROM table1
LEFT JOIN table2
ON
table1.column_name = table2.column_name;

Use of Query

LEFT JOIN keyword returns all records from the left table (table1), and the matching records from the right table (table2)



```
+-----------------+-------------+------------+---------------+
| service_type    | first_name  | last_name  | contact_no    |
+-----------------+-------------+------------+---------------+
| Hotel Stay      | Lee         | Kim        | 923-120-3455  |
| Room Cleaning   | Jhon        | Moon       | 923-120-3400  |
| 24 hr security  | Emly        | Meer       | 923-111-3400  |
| Hotel Stay      | July        | Miran      | 823-111-3401  |
| NULL            | Muna        | Kong       | 723-111-5555  |
| Security        | Vijay       | Marison    | 523-312-5554  |
| Hotel Stay      | Shakti      | Phani      | 923-312-8977  |
| Room Cleaning   | Musie       | Klark      | 323-312-5554  |
| Hotel Stay      | Omar        | Klark      | 323-010-3321  |
| NULL            | Vinod       | Lee        | 321-010-3320  |
+-----------------+-------------+------------+---------------+
10 rows in set (0.001 sec)
```

Advanced Queries :
(Right join query)

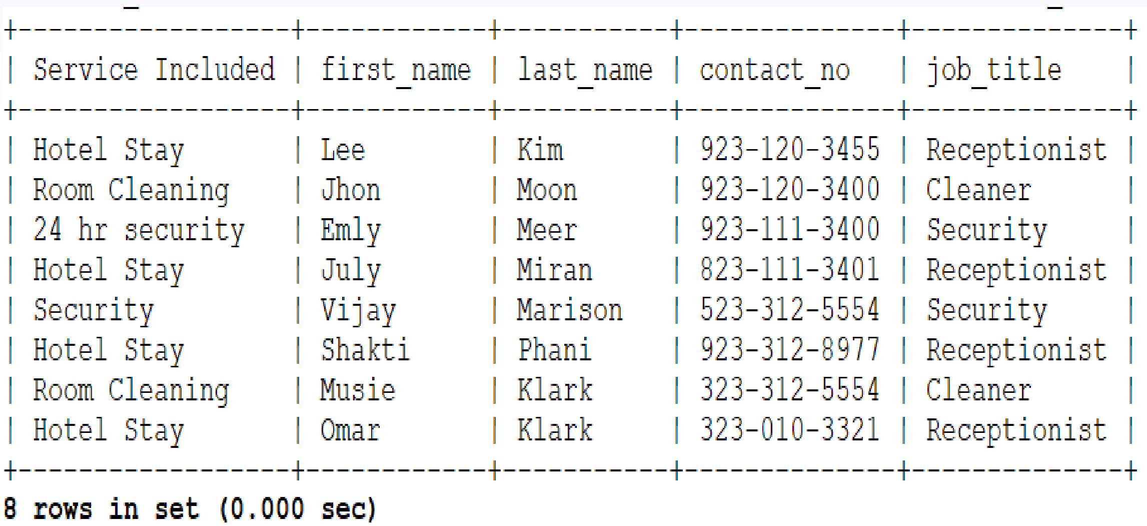
Syntax

```
SELECT column_name(s)
FROM table1
RIGHT JOIN table2
ON table1.column_name =
 table2.column_name;
```

Use of Query

RIGHT JOIN keyword returns all records from the right table (table2), and the matching records from the left table (table1)

```
MariaDB [19660om]> SELECT Service.service_type as
                -> "Service Included", Employee.first_name ,
                -> Employee.last_name, Employee.contact_no,
                -> Employee.job_title  FROM Employee
                -> RIGHT JOIN Service ON
                -> Employee.employee_id =Service.servant_id ;
```



```
+------------------+------------+-----------+--------------+--------------+
| Service Included | first_name | last_name | contact_no   | job_title    |
+------------------+------------+-----------+--------------+--------------+
| Hotel Stay       | Lee        | Kim       | 923-120-3455 | Receptionist |
| Room Cleaning    | Jhon       | Moon      | 923-120-3400 | Cleaner      |
| 24 hr security   | Emly       | Meer      | 923-111-3400 | Security     |
| Hotel Stay       | July       | Miran     | 823-111-3401 | Receptionist |
| Security         | Vijay      | Marison   | 523-312-5554 | Security     |
| Hotel Stay       | Shakti     | Phani     | 923-312-8977 | Receptionist |
| Room Cleaning    | Musie      | Klark     | 323-312-5554 | Cleaner      |
| Hotel Stay       | Omar       | Klark     | 323-010-3321 | Receptionist |
+------------------+------------+-----------+--------------+--------------+
8 rows in set (0.000 sec)
```

Advanced Queries :
(two way join)

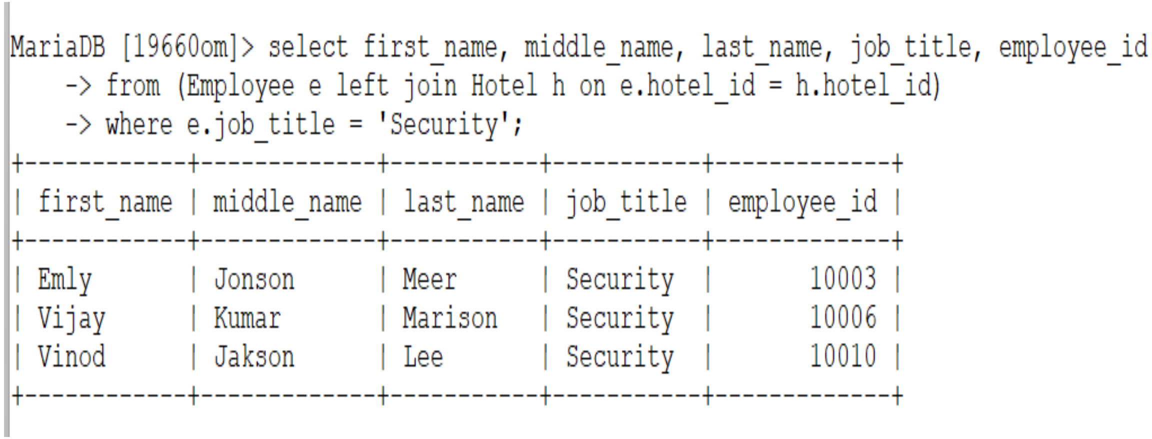
Syntax

SELECT *column_name(s)*
FROM *table1*
LEFT JOIN *table2*
ON *table1.column_name =*
table2.column_name
WHERE *condition(s);*

Use of Query

The query will left join Employee and Hotel table, and select the name, job title, and employee_id of Security members.

SELECT first_name, middle_name, last_name, job_title, employee_id
From (Employee e left join Hotel h on e.hotel_id = h.hotel_id)
Where e.job_title = ‘Security’;



```
MariaDB [19660om]> select first_name, middle_name, last_name, job_title, employee_id
    -> from (Employee e left join Hotel h on e.hotel_id = h.hotel_id)
    -> where e.job_title = 'Security';
+------------+-------------+-----------+-----------+-------------+
| first_name | middle_name | last_name | job_title | employee_id |
+------------+-------------+-----------+-----------+-------------+
| Emly       | Jonson      | Meer      | Security  |       10003 |
| Vijay      | Kumar       | Marison   | Security  |       10006 |
| Vinod      | Jakson      | Lee       | Security  |       10010 |
+------------+-------------+-----------+-----------+-------------+
```

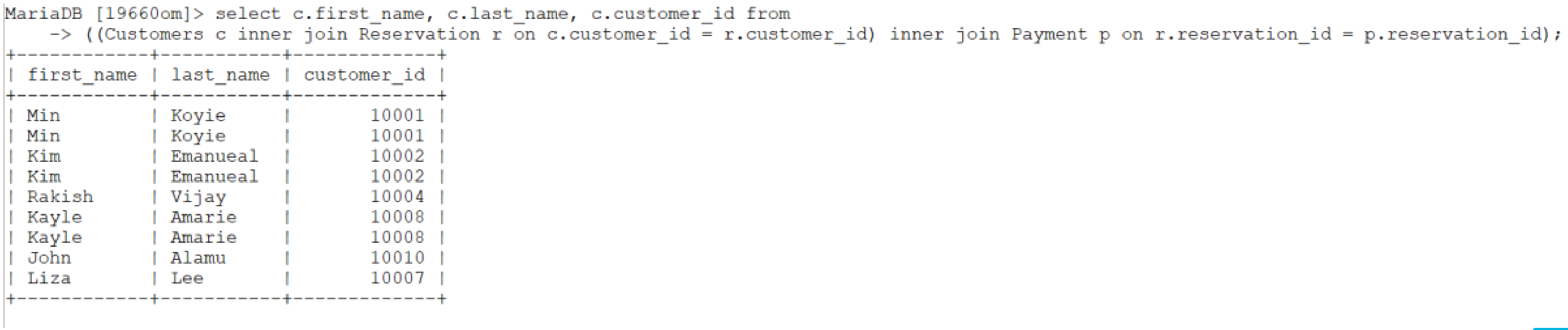
Advanced Queries :
(three way join)

Use of Query

The query selects first_name, last_name, and customer_id from the result of joining 3 tables: Customers, Reservation, and Payment

Syntax

SELECT *c.first_name, c.last_name, c.customer_id*
FROM *((Customers c* INNER JOIN *Reservation r*
ON *c.customer_id = r.customer_id)*
INNER JOIN Payment p
ON r.reservation_id = p.reservation_id);



```
MariaDB [19660om]> select c.first_name, c.last_name, c.customer_id from
    -> ((Customers c inner join Reservation r on c.customer_id = r.customer_id) inner join Payment p on r.reservation_id = p.reservation_id);
+------------+-----------+-------------+
| first_name | last_name | customer_id |
+------------+-----------+-------------+
| Min        | Koyie     |       10001 |
| Min        | Koyie     |       10001 |
| Kim        | Emanueal  |       10002 |
| Kim        | Emanueal  |       10002 |
| Rakish     | Vijay     |       10004 |
| Kayle      | Amarie    |       10008 |
| Kayle      | Amarie    |       10008 |
| John       | Alamu     |       10010 |
| Liza       | Lee       |       10007 |
+------------+-----------+-------------+
```

Mathematical notation

SELECT: σ (sigma)

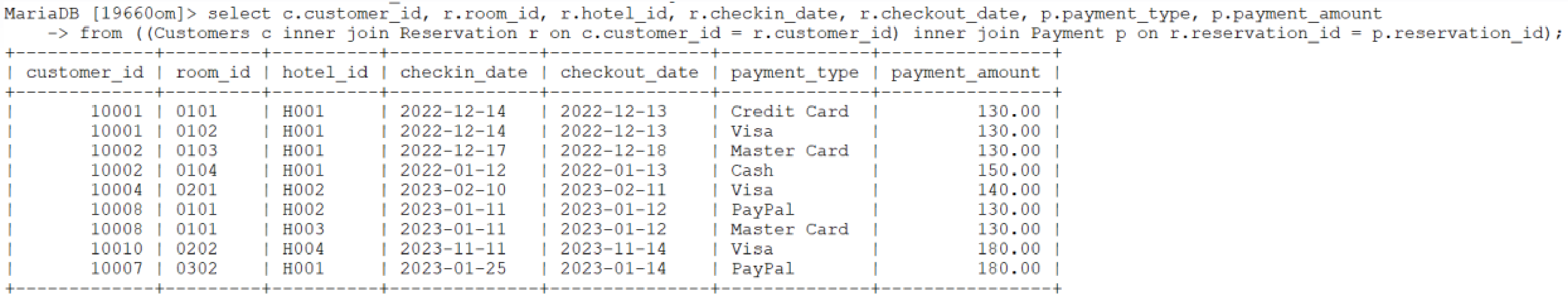
PROJECT: π (pi)

RENAME: ρ (rho)

Mathematical Notation

$$CustStat \leftarrow ((Customer \bowtie_{customerId} Reservation) \bowtie_{reservationId} Payment)$$

$$Result \leftarrow \pi_{customerId,roomId,hotelId,checkinDate,checkoutDate,paymentType,paymentAmount}(CustStat)$$



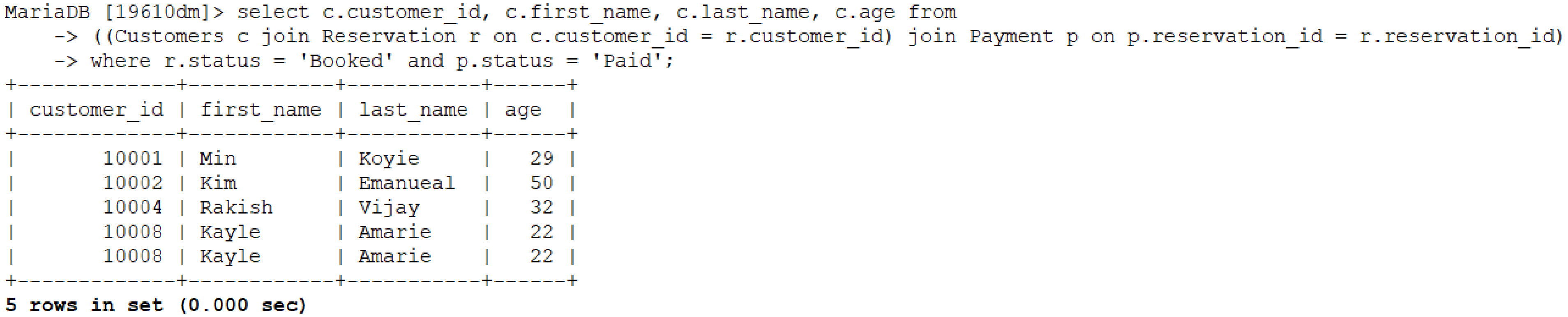
```
MariaDB [19660om]> select c.customer_id, r.room_id, r.hotel_id, r.checkin_date, r.checkout_date, p.payment_type, p.payment_amount
    -> from ((Customers c inner join Reservation r on c.customer_id = r.customer_id) inner join Payment p on r.reservation_id = p.reservation_id);
+-------------+---------+----------+--------------+---------------+--------------+----------------+
| customer_id | room_id | hotel_id | checkin_date | checkout_date | payment_type | payment_amount |
+-------------+---------+----------+--------------+---------------+--------------+----------------+
|       10001 | 0101    | H001     | 2022-12-14   | 2022-12-13    | Credit Card  |         130.00 |
|       10001 | 0102    | H001     | 2022-12-14   | 2022-12-13    | Visa         |         130.00 |
|       10002 | 0103    | H001     | 2022-12-17   | 2022-12-18    | Master Card  |         130.00 |
|       10002 | 0104    | H001     | 2022-01-12   | 2022-01-13    | Cash         |         150.00 |
|       10004 | 0201    | H002     | 2023-02-10   | 2023-02-11    | Visa         |         140.00 |
|       10008 | 0101    | H002     | 2023-01-11   | 2023-01-12    | PayPal       |         130.00 |
|       10008 | 0101    | H003     | 2023-01-11   | 2023-01-12    | Master Card  |         130.00 |
|       10010 | 0202    | H004     | 2023-11-11   | 2023-11-14    | Visa         |         180.00 |
|       10007 | 0302    | H001     | 2023-01-25   | 2023-01-14    | PayPal       |         180.00 |
+-------------+---------+----------+--------------+---------------+--------------+----------------+
```

The query joins Customers and Reservation table, and then join Payment table. Next, the query selects customer_id, room_id, hotel_id, checkin_date, checkout_date, payment_type, and payment_amount.

Mathematical Notation

$$PaidBooked \leftarrow ((Customer \bowtie_{customerId} Reservation) \bowtie_{reservationId} Payment)$$

$$Result \leftarrow \pi_{customerId,\, firstName, lastName, age}(\sigma_{reservationStatus='Booked' \text{ } AND \text{ } paidStatus='Paid'} PaidBooked)$$



```
MariaDB [19610dm]> select c.customer_id, c.first_name, c.last_name, c.age from
    -> ((Customers c join Reservation r on c.customer_id = r.customer_id) join Payment p on p.reservation_id = r.reservation_id)
    -> where r.status = 'Booked' and p.status = 'Paid';
+-------------+------------+-----------+------+
| customer_id | first_name | last_name | age  |
+-------------+------------+-----------+------+
|       10001 | Min        | Koyie     |   29 |
|       10002 | Kim        | Emanueal  |   50 |
|       10004 | Rakish     | Vijay     |   32 |
|       10008 | Kayle      | Amarie    |   22 |
|       10008 | Kayle      | Amarie    |   22 |
+-------------+------------+-----------+------+
5 rows in set (0.000 sec)
```

The query selects the information of customers who already booked and paid for the reservation of the hotels.

Conclusion

The Presented Hotel Management System successfully facilitates the management of internal hotel activities and resources such as room management, employee's data and services. The system also manages reservations record, payment history, and customer data

THANK YOU!