Assignment: Homework 4 – SQL 2

Due: March 14, 2025

Homework 4: SQL 2

Step 1: Start MariaDB (0 pts)

```
Enter password:
Welcome to the MariaDB monitor. Commands end with; or \g.
Your MariaDB connection id is 4
Server version: 11.7.2-MariaDB mariadb.org binary distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

Step 2: Create New Relations and Insert Data (0 pts)

Create New Relations

GoesOn(ssn: integer, id: integer)

| SQL Statements | Output |
|----------------------|---|
| CREATE TABLE GoesOn(| <pre>MariaDB [hw4_database]> CREATE TABLE GoesOn(-> ssn INTEGER,</pre> |
| ssn INTEGER, | -> id INTEGER, |
| id INTEGER, | -> -> PRIMARY KEY(ssn, id) |
| | ->); Query OK, 0 rows affected (0.021 sec) |
| PRIMARY KEY(ssn, id) | MariaDB [hw4_database]> SHOW TABLES; |
|); | Tables_in_hw4_database |
| SHOW TABLES; | booking goeson travelagent traveler |
| DESCRIBE GoesOn; | trip |
| | 5 rows in set (0.009 sec) |
| | MariaDB [hw4_database]> DESCRIBE goeson; |
| | Field Type Null Key Default Extra |
| | ssn int(11) NO PRI NULL |
| | 2 rows in set (0.051 sec) |

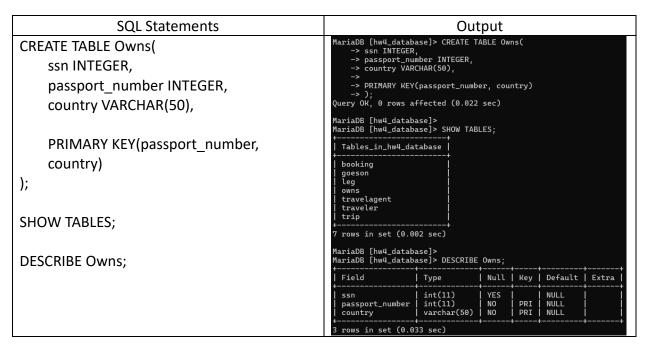
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Leg(Trip id: integer, startLocation: String, endLocation: String, startDate: Date, endDate: Date)

```
SQL Statements
                                                                                                 Output
CREATE TABLE Leg(
                                                                         -> Trip_id INTEGER,
-> startLocation VARCHAR(50),
-> endLocation VARCHAR(50),
-> startDate DATE,
     Trip_id INTEGER,
     startLocation VARCHAR(50),
                                                                         -> endDate DATE
                                                                         -> PRIMARY KEY(Trip_id, startLocation, endLocation)
     endLocation VARCHAR(50),
                                                                     -> );
Query OK, 0 rows affected (0.024 sec)
     startDate DATE,
                                                                     MariaDB [hw4_database]> SHOW TABLES;
     endDate DATE,
                                                                     Tables_in_hw4_database
                                                                       bookina
     PRIMARY KEY(Trip_id, startLocation,
                                                                       goeson
leg
travelagent
     endLocation)
                                                                       traveler
trip
);
                                                                     6 rows in set (0.002 sec)
                                                                     MariaDB [hw4_database]> DESCRIBE Leg;
SHOW TABLES;
                                                                      Field
                                                                                       Туре
                                                                                                     Null | Key
                                                                                                                 | Default | Extra
                                                                       Trip_id
                                                                                       varchar(50)
varchar(50)
                                                                       startLocation
                                                                                                      NO
                                                                                                                   NULL
DESCRIBE Leg;
                                                                       endLocation
                                                                                                             PRI
                                                                                                                   NULL
NULL
                                                                                                     YES
YES
                                                                       startDate
                                                                                       date
date
                                                                       rows in set (0.043 sec)
```

Owns(ssn: integer, passport number: Integer, country: String)



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Passport(passport number: integer, country: String, expirationDate: Date, holderName: String)

```
SQL Statements
                                                                                                        Output
                                                                              TADB [hw4_database]> CREATE TABLE Passport(

-> Passport_number INTEGER,

-> country VARCHAR(50),

-> expirationDate DATE,

-> holderName VARCHAR(50),

->
CREATE TABLE Passport(
      Passport_number INTEGER,
      country VARCHAR(50),
                                                                               -> PRIMARY KEY(passport_number, country)
      expirationDate DATE,
                                                                          -> );
Query OK, 0 rows affected (0.020 sec)
      holderName VARCHAR(50),
                                                                          MariaDB [hw4_database]>
MariaDB [hw4_database]> SHOW TABLES;
                                                                            Tables_in_hw4_database
      PRIMARY KEY(passport number,
                                                                            booking
      country)
                                                                            goeson
leg
);
                                                                            owns
                                                                            passport
                                                                             travelagent
                                                                             traveler
                                                                            trip
SHOW TABLES;
                                                                            rows in set (0.001 sec)
                                                                          MariaDB [hw4_database]>
MariaDB [hw4_database]> DESCRIBE Passport;
DESCRIBE Passport;
                                                                            Field
                                                                                                Type
                                                                                                               Null
                                                                                                                              Default | Extra
                                                                            Passport_number
                                                                                                                NO
NO
                                                                                                varchar(50)
                                                                            country
expirationDate
                                                                                                                        PRI
                                                                                                                              NULL
                                                                                                                              NULL
NULL
                                                                                                varchar(50)
                                                                            holderName
                                                                                                                YES
                                                                            rows in set (0.027 sec)
```

Insert Data

```
SQL Statements
                                                                                                   Output
                                                                       MariaDB [hw4_database]> INSERT INTO GoesOn(ssn, id)
    -> VALUES
INSERT INTO GoesOn(ssn, id)
                                                                            -> (101, 201),
-> (101, 208),
-> (102, 202),
-> (102, 205),
VALUES
      (101, 201),
      (101, 208),
                                                                                (103, 203),
                                                                                (103,
      (102, 202),
                                                                                (106,
                                                                                (106,
      (102, 205),
                                                                       -> (100, 201),
-> (107, 207),
-> (108, 208);
Query OK, 10 rows affected (0.016 sec)
Records: 10 Duplicates: 0 Warnings: 0
      (103, 203),
      (103, 206),
      (106, 206),
                                                                       MariaDB [hw4_database]>
MariaDB [hw4_database]> SELECT * FROM GoesOn;
      (106, 201),
                                                                                 id
                                                                       ssn
      (107, 207),
      (108, 208);
                                                                          101
                                                                                 208
                                                                          102
                                                                                 202
                                                                          102
                                                                                 205
SELECT * FROM GoesOn;
                                                                          103
                                                                                  203
                                                                          103
                                                                                 206
                                                                          106
                                                                                  201
                                                                          106
                                                                                 206
                                                                          107
                                                                                 207
                                                                          108
                                                                                 208
                                                                       10 rows in set (0.005 sec)
```

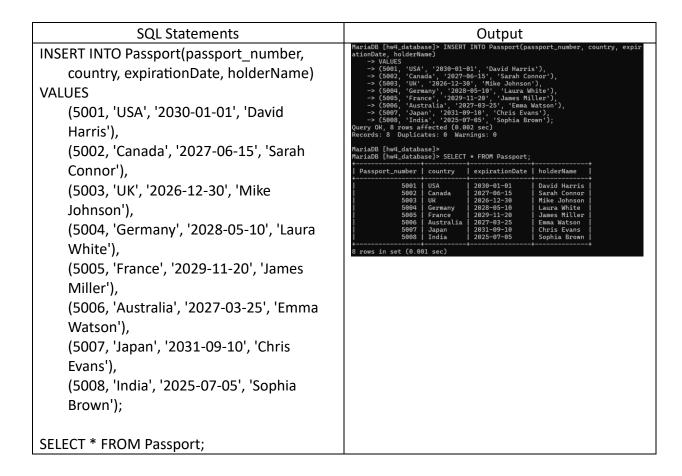
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```
SQL Statements
                                                                      Output
INSERT INTO Leg(Trip_id, startLocation,
    endLocation, startDate, endDate)
VALUES
    (201, 'New York', 'London', '2025-07-10',
    '2025-07-12'),
    (201, 'London', 'Paris', '2025-07-13',
    '2025-07-20'),
    (202, 'Tokyo', 'Seoul', '2025-08-01',
    '2025-08-05'),
    (202, 'Seoul', 'Sydney', '2025-08-06',
    '2025-08-15'),
    (203, 'London', 'Berlin', '2025-09-05',
    '2025-09-08'),
    (203, 'Berlin', 'Rome', '2025-09-09',
    '2025-09-15'),
    (204, 'Miami', 'Atlanta', '2025-06-15',
    '2025-06-17'),
    (204, 'Atlanta', 'New York', '2025-06-18',
    '2025-06-20'),
    (205, 'San Francisco', 'Frankfurt', '2025-
    10-01', '2025-10-06'),
    (205, 'Frankfurt', 'Berlin', '2025-10-07',
    '2025-10-10'),
    (206, 'Chicago', 'Denver', '2025-09-10',
    '2025-09-11'),
    (206, 'Denver', 'Los Angeles', '2025-09-
    12', '2025-09-12'),
    (207, 'Boston', 'Dubai', '2025-07-05',
    '2025-07-10'),
    (207, 'Dubai', 'Singapore', '2025-07-11',
    '2025-07-18'),
    (208, 'New York', 'Istanbul', '2025-09-10',
    '2025-09-12'),
    (208, 'Istanbul', 'Dubai', '2025-09-13',
    '2025-09-15');
SELECT * FROM Leg;
```

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Step 3: SQL Query Exercises (100 pts)

1. [10 Points] Find the name(s) of the travel agent(s) through whom the traveler with the date of birth '1985-06-12' has booked trips. The resulting relation must not include duplicated records.

| SQL Statements | Output |
|---|--|
| SELECT DISTINCT agent FROM Booking A, Traveler T WHERE A.traveler_ssn = T.ssn AND T.dob = '1985-06-12'; | MariaDB [hw4_database]> SELECT DISTINCT agent -> FROM Booking A, Traveler T -> WHERE A.traveler_ssn = T.ssn -> AND T.dob = '1985-06-12'; + |

2. [10 Points] List the date of birth of travelers whose passport expires before January 1, 2027. Use a subquery in the WHERE clause to solve this question.

```
SQL Statements

SELECT dob

FROM Traveler T

WHERE T.ssn IN (

SELECT O.ssn

FROM Owns O

JOIN Passport P ON O.passport_number

= P.passport_number

WHERE P.expirationDate < '2027-01-01'

);

SQL Statements

Output

MariaDB [hw4_database]> SELECT dob

-> FROM Traveler T

-> WHERE T.ssn IN (
-> SELECT O.ssn

-> JOIN Passport P ON O.passport_number = P.passport_number

-> WHERE P.expirationDate < '2027-01-01'

| 1998-09-17 |
| 1999-02-25 |
| 2 rows in set (0.002 sec)
```

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3. [10 Points] Retrieve the names of travel agents who have more experience than any agent whose name starts with 'John'.

```
SQL Statements
                                                        Output
                                        MariaDB [hw4_database]> SELECT name
SELECT name
                                             -> FROM TravelAgent A1
FROM TravelAgent A1
                                             -> WHERE (
WHERE (
                                             -> A1.years_experience > ANY (
   A1.years experience > ANY (
                                             -> SELECT years_experience
                                             -> FROM TravelAgent A2
   SELECT years experience
                                             -> WHERE A2.name LIKE 'John%')
   FROM TravelAgent A2
   WHERE A2.name LIKE 'John%')
);
                                          name
                                          Alice Brown
                                          Daniel Lee
                                          Sarah Williams
                                        3 rows in set (0.027 sec)
```

4. [10 Points] Find the SSNs of travelers who both own a passport and have gone on multiple trips. Use INTERSECT to solve this question.

```
SQL Statements
                                                                  Output
                                                MariaDB [hw4_database]> SELECT T.ssn
SELECT T.ssn
                                                    -> From Owns O
From Owns O
                                                    -> JOIN Traveler T ON O.ssn = T.ssn
JOIN Traveler T ON O.ssn = T.ssn
                                                    -> Group BY T.ssn
                                                    -> HAVING COUNT(0.passport_number) > 0
Group BY T.ssn
                                                    -> INTERSECT
HAVING COUNT(O.passport number) > 0
                                                    -> SELECT T.ssn
                                                    -> FROM GoesOn G
INTERSECT
                                                    -> JOIN Traveler T ON G.ssn = T.ssn
                                                    -> GROUP BY T.ssn
-> HAVING COUNT(G.id) > 1;
SELECT T.ssn
FROM GoesOn G
                                                  ssn
JOIN Traveler T ON G.ssn = T.ssn
                                                   101
GROUP BY T.ssn
                                                   102
                                                   103
HAVING COUNT(G.id) > 1;
                                                   106
                                                4 rows in set (0.009 sec)
```

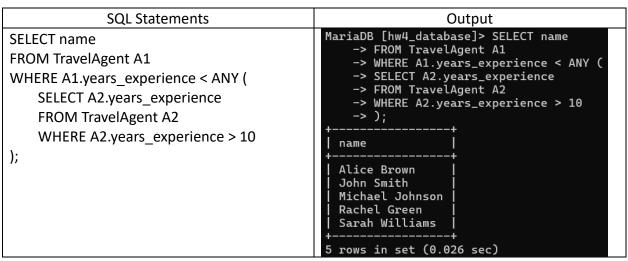
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5. [10 Points] Find the start and end locations of trips booked by each travel agent. You must use natural join in your query.

| SQL Statements | | Οι | ıtput | |
|-----------------------------------|---|---------------------------------|-----------------------------|-------------------------|
| SELECT B.agent, T.start_location, | -> FROM Trip T | | | cation, T.end_location |
| T.end_location | agent | start_location | + end_location | + |
| FROM Trip T | Alice Brown Alice Brown | New York | Paris Dubai | - + |
| NATURAL JOIN (| Alice Brown Daniel Lee | Chicago San Francisco | Los Angeles Berlin | |
| SELECT trip_id AS id, agent | John Smith John Smith Michael Johnson | Tokyo New York London | Sydney Paris Rome | |
| FROM Booking | Rachel Green Sarah Williams | Boston Miami | Dubai New York | |
|) B; | 9 rows in set (0.6 | 13 sec) | | |

6. [10 Points] Find the names of travel agents who have fewer years of experience than any agent with more than 10 years of experience.



7. [10 Points] Find the details of trips where the trip's end date is after the traveler's passport expiration date. You must use theta join in your query.

| SQL Statements | Output |
|---|---|
| SELECT T.* FROM Trip T JOIN Booking B ON T.id = B.trip_id JOIN Owns O ON B.traveler_ssn = O.ssn JOIN Passport P ON O.passport_number = P.passport_number WHERE T.end_date > P.expirationDate; | MariaDB [hw4_database]> SELECT T.* -> FROM Trip T -> JOIN Booking B ON T.id = B.trip_id -> JOIN Owns 0 ON B.traveler_ssn = 0.ssn -> JOIN Passport P ON 0.passport_number = P.passport_number -> WHERE T.end_date > P.expirationDate; id start_location end_location start_date end_date 201 New York Paris 2025-07-10 2025-07-20 1 row in set (0.009 sec) |

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8. [10 Points] List all travel agents and the number of trips they have booked. Only show agents who have booked more than 1 trip. Use GROUP BY and HAVING to solve this question.

| SQL Statements | Output | |
|--|---|--|
| SELECT A.*, COUNT(B.trip_id) AS trip_count | MariaDB [hw4_database]> SELECT A.*, COUNT(B.trip_id) AS trip_count -> FROM TravelAgent A | |
| FROM TravelAgent A | <pre>-> JOIN Booking B ON A.name = B.agent -> GROUP BY A.name -> HAVING COUNT(B.trip_id) > 1;</pre> | |
| JOIN Booking B ON A.name = B.agent | name years_experience phone trip_count | |
| GROUP BY A.name HAVING COUNT(B.trip id) > 1; | Alice Brown 12 123-456-7890 3 John Smith 8 234-567-8901 2 | |
| TIAVING COOKT(B.tilp_ld) > 1, | 2 rows in set (0.021 sec) | |

9. [10 Points] List the travelers who have not gone on any trips.

| SQL Statements | Output | | |
|--|--|--|--|
| SELECT T.* FROM Traveler T LEFT JOIN GoesOn G on T.ssn = G.ssn | MariaDB [hw4_database]> SELECT T.* -> FROM Traveler T -> LEFT JOIN GoesOn G on T.ssn = G.ssn -> WHERE G.ssn IS NULL; | | |
| WHERE G.ssn IS NULL; | name | | |
| | James Miller 105 2000-08-14 Laura White 104 1995-04-23 | | |
| | 2 rows in set (0.109 sec) | | |

10. [10 Points] Find all the trips booked by travel agents with fewer than 5 years of experience.

| SQL Statements | Output |
|---------------------------------------|--|
| SELECT T.* | MariaDB [hw4_database]> SELECT T.* -> FROM Trip T |
| FROM Trip T | <pre>-> JOIN Booking B ON T.id = B.trip_id -> JOIN TravelAgent A ON B.agent= A.name -> WHERE A.years_experience < 5;</pre> |
| JOIN Booking B ON T.id = B.trip_id | where A.years_experience < 5; + |
| JOIN TravelAgent A ON B.agent= A.name | 1 |
| WHERE A.years_experience < 5; | ++ 1 row in set (0.005 sec) |