JAN-3-2024

DBMS
LAB

Assignment NO:#

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PRG:BSCYS-0013

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- **Login To Database:**

```
C:\Users\Rehaan>
C:\Users\Rehaan>mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 868
Server version: 10.4.24-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.
```

- **Creating A Database:**

```
MariaDB [(none)]> create database managemenmt;
Query OK, 1 row affected (0.006 sec)

MariaDB [(none)]> _
```

- **Creating Tables in database**

    1:Region

```
MariaDB [(none)]> use  managemenmt;
Database changed
MariaDB [managemenmt]> create table regions(region_id int primary key not null,region_name varchar(50));
Query OK, 0 rows affected (0.111 sec)

MariaDB [managemenmt]>
```

-

- **2:Countries:**

```
MariaDB [managemenmt]> create table countries(country_id int primary key not null,country_name varchar(50),regions_id int,foreign key(regions_id) references regions(reg
ion_id));
Query OK, 0 rows affected (0.052 sec)

MariaDB [managemenmt]>
```

- **3:Location:**

```
MariaDB [managemenmt]> create table locations(location_id int primary key not null,street_adress varchar(50),postal_codes varchar(50),city varchar(50),state_province va
rchar(50),country_id int,foreign key(country_id) references countries(country_id));
Query OK, 0 rows affected (0.034 sec)

MariaDB [managemenmt]>
```

- **3:Department:**

```
MariaDB [managemenmt]> create table departments(department_id int primary key not null,department_name varchar(50),manager_id int,loc_id int ,foreign key (loc_id) refer
ences locations(location_id));
Query OK, 0 rows affected (0.086 sec)

MariaDB [managemenmt]>
```

- **Jobs:**

```
MariaDB [managemenmt]> create table jobs(job_id int primary key not null,job_titel varchar(50),min_salary int,max_salary int);
Query OK, 0 rows affected (0.035 sec)
```

- **Job history:**

```
MariaDB [managemenmt]> create table job_history(employee_id int not null,start_date date not null,end_date date,department_id int ,job_id int,PRIMARY KEY (employee_id,
start_date), foreign key(job_id) references jobs(job id ));
Query OK, 0 rows affected (0.052 sec)
```

- **Employee:**

```
MariaDB [managemenmt]> CREATE TABLE employees (
    ->     employee_id INT PRIMARY KEY,
    ->     first_name VARCHAR(50),
    ->     last_name VARCHAR(50),
    ->     email VARCHAR(50),
    ->     phone_number VARCHAR(50),
    ->     hire_date DATE,
    ->     job_id INT,
    ->     salary INT,
    ->     commission_pct INT,
    ->     manager_id INT,
    ->     department_id INT,
    ->     FOREIGN KEY (department_id) REFERENCES departments(department_id),
    ->     FOREIGN KEY (employee_id) REFERENCES job_history(employee_id),
    ->     FOREIGN KEY (manager_id) REFERENCES employees(employee_id)  -- Fixed reference to the employees table
    -> );
Query OK, 0 rows affected (0.047 sec)

MariaDB [managemenmt]>
```

- **Showing Tables:**

```
MariaDB [managemenmt]> show tables;
+-----------------------+
| Tables_in_managemenmt |
+-----------------------+
| countries             |
| departments           |
| employees             |
| job_history           |
| jobs                  |
| locations             |
| regions               |
+-----------------------+
7 rows in set (0.001 sec)

MariaDB [managemenmt]> _
```

```
MariaDB [managemenmt]> describe  regions;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| region_id   | int(11)     | NO   | PRI | NULL    |       |
| region_name | varchar(50) | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
2 rows in set (0.027 sec)

MariaDB [managemenmt]> describe locations;
+----------------+-------------+------+-----+---------+-------+
| Field          | Type        | Null | Key | Default | Extra |
+----------------+-------------+------+-----+---------+-------+
| location_id    | int(11)     | NO   | PRI | NULL    |       |
| street_adress  | varchar(50) | YES  |     | NULL    |       |
| postal_codes   | varchar(50) | YES  |     | NULL    |       |
| city           | varchar(50) | YES  |     | NULL    |       |
| state_province | varchar(50) | YES  |     | NULL    |       |
| country_id     | int(11)     | YES  | MUL | NULL    |       |
+----------------+-------------+------+-----+---------+-------+
6 rows in set (0.881 sec)

MariaDB [managemenmt]> describe jobs;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| job_id    | int(11)     | NO   | PRI | NULL    |       |
| job_titel | varchar(50) | YES  |     | NULL    |       |
| min_salary| int(11)     | YES  |     | NULL    |       |
| max_salary| int(11)     | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
4 rows in set (0.035 sec)
```

```
MariaDB [managemenmt]> describe job_history;
+---------------+----------+------+-----+---------+-------+
| Field         | Type     | Null | Key | Default | Extra |
+---------------+----------+------+-----+---------+-------+
| employee_id   | int(11)  | NO   | PRI | NULL    |       |
| start_date    | date     | NO   | PRI | NULL    |       |
| end_date      | date     | YES  |     | NULL    |       |
| department_id | int(11)  | YES  |     | NULL    |       |
| job_id        | int(11)  | YES  | MUL | NULL    |       |
+---------------+----------+------+-----+---------+-------+
5 rows in set (0.607 sec)

MariaDB [managemenmt]> describe  employees;
+----------------+-------------+------+-----+---------+-------+
| Field          | Type        | Null | Key | Default | Extra |
+----------------+-------------+------+-----+---------+-------+
| employee_id    | int(11)     | NO   | PRI | NULL    |       |
| first_name     | varchar(50) | YES  |     | NULL    |       |
| last_name      | varchar(50) | YES  |     | NULL    |       |
| email          | varchar(50) | YES  |     | NULL    |       |
| phone_number   | varchar(50) | YES  |     | NULL    |       |
| hire_date      | date        | YES  |     | NULL    |       |
| job_id         | int(11)     | YES  |     | NULL    |       |
| salary         | int(11)     | YES  |     | NULL    |       |
| commission_pct | int(11)     | YES  |     | NULL    |       |
| manager_id     | int(11)     | YES  | MUL | NULL    |       |
| department_id  | int(11)     | YES  | MUL | NULL    |       |
+----------------+-------------+------+-----+---------+-------+
11 rows in set (0.999 sec)

MariaDB [managemenmt]> describe  departments;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| department_id   | int(11)     | NO   | PRI | NULL    |       |
| department_name | varchar(50) | YES  |     | NULL    |       |
| manager_id      | int(11)     | YES  |     | NULL    |       |
| loc_id          | int(11)     | YES  | MUL | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
4 rows in set (0.124 sec)

MariaDB [managemenmt]>
```

```
MariaDB [managemenmt]> describe countries;
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| country_id   | int(11)     | NO   | PRI | NULL    |       |
| country_name | varchar(50) | YES  |     | NULL    |       |
| regions_id   | int(11)     | YES  | MUL | NULL    |       |
+--------------+-------------+------+-----+---------+-------+
3 rows in set (0.048 sec)
```

- **Entering Data in It:**

```
MariaDB [managemenmt]> select *from regions;
+-----------+----------------+
| region_id | region_name    |
+-----------+----------------+
|         1 | Asia           |
|         2 | Europe         |
|         3 | North America  |
|         4 | South America  |
|         5 | Africa         |
|         6 | Australia      |
|         7 | Antarctica     |
|         8 | Middle East    |
|         9 | Central America|
|        10 | Southeast Asia |
+-----------+----------------+
10 rows in set (0.001 sec)
```

```
MariaDB [managemenmt]> select *from countries;
+------------+---------------+------------+
| country_id | country_name  | regions_id |
+------------+---------------+------------+
|          1 | United States |          3 |
|          2 | China         |          1 |
|          3 | Brazil        |          4 |
|          4 | Germany       |          2 |
|          5 | South Africa  |          5 |
|          6 | Australia     |          6 |
|          7 | India         |          1 |
|          8 | Mexico        |          3 |
|          9 | France        |          2 |
|         10 | Canada        |          3 |
+------------+---------------+------------+
10 rows in set (0.000 sec)
```

```
MariaDB [managemenmt]> INSERT INTO locations (location_id, street_adress, postal_codes, city, state_province, country_id) VALUES
    -> (1, '123 Main St', '12345', 'New York', 'NY', 1),
    -> (2, '456 Oak St', '67890', 'Beijing', NULL, 2),
    -> (3, '789 Maple St', '54321', 'Rio de Janeiro', NULL, 3),
    -> (4, '101 Pine St', '98765', 'Berlin', 'Berlin', 4),
    -> (5, '202 Cedar St', '13579', 'Johannesburg', 'Gauteng', 5),
    -> (6, '303 Birch St', '24680', 'Sydney', 'NSW', 6),
    -> (7, '404 Elm St', '11223', 'Mumbai', 'Maharashtra', 7),
    -> (8, '505 Spruce St', '33445', 'Mexico City', NULL, 8),
    -> (9, '606 Fir St', '55667', 'Paris', 'Ile-de-France', 9),
    -> (10, '707 Redwood St', '77889', 'Toronto', 'Ontario', 10);
Query OK, 10 rows affected (0.007 sec)
Records: 10  Duplicates: 0  Warnings: 0

MariaDB [managemenmt]> select *from locations;
+-------------+----------------+--------------+----------------+---------------+------------+
| location_id | street_adress  | postal_codes | city           | state_province | country_id |
+-------------+----------------+--------------+----------------+---------------+------------+
|           1 | 123 Main St    | 12345        | New York       | NY            |          1 |
|           2 | 456 Oak St     | 67890        | Beijing        | NULL          |          2 |
|           3 | 789 Maple St   | 54321        | Rio de Janeiro | NULL          |          3 |
|           4 | 101 Pine St    | 98765        | Berlin         | Berlin        |          4 |
|           5 | 202 Cedar St   | 13579        | Johannesburg   | Gauteng       |          5 |
|           6 | 303 Birch St   | 24680        | Sydney         | NSW           |          6 |
|           7 | 404 Elm St     | 11223        | Mumbai         | Maharashtra   |          7 |
|           8 | 505 Spruce St  | 33445        | Mexico City    | NULL          |          8 |
|           9 | 606 Fir St     | 55667        | Paris          | Ile-de-France |          9 |
|          10 | 707 Redwood St | 77889        | Toronto        | Ontario       |         10 |
+-------------+----------------+--------------+----------------+---------------+------------+
10 rows in set (0.001 sec)

MariaDB [managemenmt]> INSERT INTO departments (department_id, department_name, manager_id, loc_id) VALUES
    -> (1, 'HR', 101, 1),
    -> (2, 'IT', 102, 2),
    -> (3, 'Marketing', 103, 3),
    -> (4, 'Finance', 104, 4),
    -> (5, 'Operations', 105, 5),
    -> (6, 'Sales', 106, 6),
    -> (7, 'Customer Support', 107, 7),
    -> (8, 'Research and Development', 108, 8),
    -> (9, 'Legal', 109, 9),
    -> (10, 'Quality Assurance', 110, 10);
Query OK, 10 rows affected (0.184 sec)
Records: 10  Duplicates: 0  Warnings: 0

MariaDB [managemenmt]> select *from departments;
+---------------+--------------------------+------------+--------+
| department_id | department_name          | manager_id | loc_id |
+---------------+--------------------------+------------+--------+
|             1 | HR                       |        101 |      1 |
|             2 | IT                       |        102 |      2 |
|             3 | Marketing                |        103 |      3 |
|             4 | Finance                  |        104 |      4 |
|             5 | Operations               |        105 |      5 |
|             6 | Sales                    |        106 |      6 |
|             7 | Customer Support         |        107 |      7 |
|             8 | Research and Development  |        108 |      8 |
|             9 | Legal                    |        109 |      9 |
|            10 | Quality Assurance        |        110 |     10 |
+---------------+--------------------------+------------+--------+
10 rows in set (0.000 sec)
```

```
MariaDB [managemenmt]> select *from jobs;
+--------+---------------------------+------------+------------+
| job_id | job_titel                 | min_salary | max_salary |
+--------+---------------------------+------------+------------+
|      1 | Software Engineer         |      60000 |     100000 |
|      2 | Data Scientist            |      70000 |     120000 |
|      3 | Marketing Specialist      |      50000 |      90000 |
|      4 | Financial Analyst         |      60000 |     110000 |
|      5 | Operations Manager        |      70000 |     120000 |
|      6 | Sales Representative       |      50000 |      90000 |
|      7 | Customer Support Specialist |    45000 |      80000 |
|      8 | Research Scientist        |      65000 |     110000 |
|      9 | Legal Counsel             |      75000 |     130000 |
|     10 | Quality Assurance Analyst |      55000 |      95000 |
+--------+---------------------------+------------+------------+
10 rows in set (0.000 sec)

MariaDB [managemenmt]> select *from jobs;job_history
+--------+---------------------------+------------+------------+
| job_id | job_titel                 | min_salary | max_salary |
+--------+---------------------------+------------+------------+
|      1 | Software Engineer         |      60000 |     100000 |
|      2 | Data Scientist            |      70000 |     120000 |
|      3 | Marketing Specialist      |      50000 |      90000 |
|      4 | Financial Analyst         |      60000 |     110000 |
|      5 | Operations Manager        |      70000 |     120000 |
|      6 | Sales Representative       |      50000 |      90000 |
|      7 | Customer Support Specialist |    45000 |      80000 |
|      8 | Research Scientist        |      65000 |     110000 |
|      9 | Legal Counsel             |      75000 |     130000 |
|     10 | Quality Assurance Analyst |      55000 |      95000 |
+--------+---------------------------+------------+------------+
10 rows in set (0.001 sec)
```

```
MariaDB [managemenmt]> INSERT INTO employees (employee_id, first_name, last_name, email, phone_number, hire_date, job_id, salary, commission_pct, manager_id, departme
_id) VALUES
    -> (101, 'John', 'Doe', 'john.doe@example.com', '123-456-7890', '2022-01-01', 1, 60000, NULL, NULL, 1),
    -> (102, 'Jane', 'Smith', 'jane.smith@example.com', '987-654-3210', '2022-02-01', 2, 70000, NULL, 101, 2),
    -> (103, 'Bob', 'Johnson', 'bob.johnson@example.com', '456-789-0123', '2022-03-01', 3, 50000, NULL, 102, 3),
    -> (104, 'Alice', 'Williams', 'alice.williams@example.com', '789-012-3456', '2022-04-01', 4, 60000, NULL, 103, 4),
    -> (105, 'Charlie', 'Brown', 'charlie.brown@example.com', '234-567-8901', '2022-05-01', 5, 70000, NULL, 104, 5),
    -> (106, 'Eva', 'Miller', 'eva.miller@example.com', '567-890-1234', '2022-06-01', 6, 50000, NULL, 105, 6),
    -> (107, 'David', 'Lee', 'david.lee@example.com', '890-123-4567', '2022-07-01', 7, 45000, NULL, 106, 7),
    -> (108, 'Grace', 'Smith', 'grace.smith@example.com', '123-234-5678', '2022-08-01', 8, 65000, NULL, 107, 8),
    -> (109, 'Frank', 'Jones', 'frank.jones@example.com', '345-678-9012', '2022-09-01', 9, 75000, NULL, 108, 9),
    -> (110, 'Helen', 'Clark', 'helen.clark@example.com', '678-901-2345', '2022-10-01', 10, 55000, NULL, 109, 10);
Query OK, 10 rows affected (0.008 sec)
Records: 10  Duplicates: 0  Warnings: 0

MariaDB [managemenmt]> select *from employees;
+-------------+------------+-----------+----------------------------+--------------+------------+--------+--------+----------------+------------+---------------+
| employee_id | first_name | last_name | email                      | phone_number | hire_date  | job_id | salary | commission_pct | manager_id | department_id |
+-------------+------------+-----------+----------------------------+--------------+------------+--------+--------+----------------+------------+---------------+
|         101 | John       | Doe       | john.doe@example.com        | 123-456-7890 | 2022-01-01 |      1 |  60000 |           NULL |       NULL |             1 |
|         102 | Jane       | Smith     | jane.smith@example.com      | 987-654-3210 | 2022-02-01 |      2 |  70000 |           NULL |        101 |             2 |
|         103 | Bob        | Johnson   | bob.johnson@example.com     | 456-789-0123 | 2022-03-01 |      3 |  50000 |           NULL |        102 |             3 |
|         104 | Alice      | Williams  | alice.williams@example.com  | 789-012-3456 | 2022-04-01 |      4 |  60000 |           NULL |        103 |             4 |
|         105 | Charlie    | Brown     | charlie.brown@example.com   | 234-567-8901 | 2022-05-01 |      5 |  70000 |           NULL |        104 |             5 |
|         106 | Eva        | Miller    | eva.miller@example.com      | 567-890-1234 | 2022-06-01 |      6 |  50000 |           NULL |        105 |             6 |
|         107 | David      | Lee       | david.lee@example.com       | 890-123-4567 | 2022-07-01 |      7 |  45000 |           NULL |        106 |             7 |
|         108 | Grace      | Smith     | grace.smith@example.com     | 123-234-5678 | 2022-08-01 |      8 |  65000 |           NULL |        107 |             8 |
|         109 | Frank      | Jones     | frank.jones@example.com     | 345-678-9012 | 2022-09-01 |      9 |  75000 |           NULL |        108 |             9 |
|         110 | Helen      | Clark     | helen.clark@example.com     | 678-901-2345 | 2022-10-01 |     10 |  55000 |           NULL |        109 |            10 |
+-------------+------------+-----------+----------------------------+--------------+------------+--------+--------+----------------+------------+---------------+
10 rows in set (0.001 sec)
```

- **Applying Different Queries in it**

Query 1:

```
MariaDB [managemenmt]> SELECT * FROM employees ORDER BY first_name ASC;
+-------------+------------+-----------+---------------------------+--------------+------------+--------+--------+----------------+------------+---------------+
| employee_id | first_name | last_name | email                     | phone_number | hire_date  | job_id | salary | commission_pct | manager_id | department_id |
+-------------+------------+-----------+---------------------------+--------------+------------+--------+--------+----------------+------------+---------------+
|         104 | Alice      | Williams  | alice.williams@example.com | 789-012-3456 | 2022-04-01 |      4 |  60000 |           NULL |        103 |             4 |
|         103 | Bob        | Johnson   | bob.johnson@example.com    | 456-789-0123 | 2022-03-01 |      3 |  50000 |           NULL |        102 |             3 |
|         105 | Charlie    | Brown     | charlie.brown@example.com  | 234-567-8901 | 2022-05-01 |      5 |  70000 |           NULL |        104 |             5 |
|         107 | David      | Lee       | david.lee@example.com      | 890-123-4567 | 2022-07-01 |      7 |  45000 |           NULL |        106 |             7 |
|         106 | Eva        | Miller    | eva.miller@example.com     | 567-890-1234 | 2022-06-01 |      6 |  50000 |           NULL |        105 |             6 |
|         109 | Frank      | Jones     | frank.jones@example.com    | 345-678-9012 | 2022-09-01 |      9 |  75000 |           NULL |        108 |             9 |
|         108 | Grace      | Smith     | grace.smith@example.com    | 123-234-5678 | 2022-08-01 |      8 |  65000 |           NULL |        107 |             8 |
|         110 | Helen      | Clark     | helen.clark@example.com    | 678-901-2345 | 2022-10-01 |     10 |  55000 |           NULL |        109 |            10 |
|         102 | Jane       | Smith     | jane.smith@example.com     | 987-654-3210 | 2022-02-01 |      2 |  70000 |           NULL |        101 |             2 |
|         101 | John       | Doe       | john.doe@example.com       | 123-456-7890 | 2022-01-01 |      1 |  60000 |           NULL |       NULL |             1 |
+-------------+------------+-----------+---------------------------+--------------+------------+--------+--------+----------------+------------+---------------+
10 rows in set (0.001 sec)
```

```
MariaDB [managemenmt]> SELECT *
    -> FROM employees
    -> WHERE salary BETWEEN 10000 AND 50000
    -> ORDER BY last_name;
+-------------+------------+-----------+-------------------------+--------------+------------+--------+--------+----------------+------------+---------------+
| employee_id | first_name | last_name | email                   | phone_number | hire_date  | job_id | salary | commission_pct | manager_id | department_id |
+-------------+------------+-----------+-------------------------+--------------+------------+--------+--------+----------------+------------+---------------+
|         103 | Bob        | Johnson   | bob.johnson@example.com | 456-789-0123 | 2022-03-01 |      3 |  50000 |           NULL |        102 |             3 |
|         107 | David      | Lee       | david.lee@example.com   | 890-123-4567 | 2022-07-01 |      7 |  45000 |           NULL |        106 |             7 |
|         106 | Eva        | Miller    | eva.miller@example.com  | 567-890-1234 | 2022-06-01 |      6 |  50000 |           NULL |        105 |             6 |
+-------------+------------+-----------+-------------------------+--------------+------------+--------+--------+----------------+------------+---------------+
3 rows in set (0.001 sec)
```

```
MariaDB [managemenmt]> SELECT department_id, MIN(salary) AS min_salary
    -> FROM employees
    -> GROUP BY department_id;
+---------------+------------+
| department_id | min_salary |
+---------------+------------+
|             1 |      60000 |
|             2 |      70000 |
|             3 |      50000 |
|             4 |      60000 |
|             5 |      70000 |
|             6 |      50000 |
|             7 |      45000 |
|             8 |      65000 |
|             9 |      75000 |
|            10 |      55000 |
+---------------+------------+
10 rows in set (0.001 sec)
```

```
ERROR 1054 (42S22): Unknown column 'location_id' in 'where clause'
MariaDB [managemenmt]> SELECT d.department_id, d.department_name
    -> FROM departments d
    -> JOIN locations l ON d.loc_id = l.location_id
    -> WHERE l.location_id > 1000;
Empty set (0.002 sec)
```

```
MariaDB [managemenmt]> SELECT
    ->    MAX(salary) AS Maximum,
    ->    MIN(salary) AS Minimum,
    ->    SUM(salary) AS Sum,
    ->    AVG(salary) AS Average
    -> FROM employees;
+---------+---------+--------+-----------+
| Maximum | Minimum | Sum    | Average   |
+---------+---------+--------+-----------+
|   75000 |   45000 | 600000 | 60000.0000 |
+---------+---------+--------+-----------+
1 row in set (0.001 sec)
```

```
MariaDB [managemenmt]> SELECT MAX(salary) - MIN(salary) AS difference
    -> FROM employees;
+------------+
| difference |
+------------+
|      30000 |
+------------+
1 row in set (0.000 sec)

MariaDB [managemenmt]> SELECT job_titel
    -> FROM jobs
    -> WHERE (max_salary - min_salary) > (SELECT AVG(min_salary + max_salary) / 2 FROM jobs);
Empty set (0.001 sec)

MariaDB [managemenmt]>
```

```
MariaDB [managemenmt]> SELECT e.first_name, e.last_name, j.job_titel
    -> FROM employees e
    -> JOIN jobs j ON e.job_id = j.job_id
    -> WHERE e.manager_id = 100;
Empty set (0.001 sec)

MariaDB [managemenmt]>
```