## Assignment No. 3

**By**
**Neeraj Pratap Hazarika**
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## A. Creation of Tables:

Creation of Customer table:

Query:
CREATE TABLE Customer(
cust_id INT PRIMARY KEY CHECK (cust_id BETWEEN 100 AND 10000),
cust_name VARCHAR(100),
annual_revenue INT,
cust_type VARCHAR(12) CHECK (cust_type IN ('MANUFACTURER', 'WHOLESALER', 'RETAILER'))
);

```
mysql> DESC Customer;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| cust_id       | int(11)      | NO   | PRI | NULL    |       |
| cust_name     | varchar(100) | YES  |     | NULL    |       |
| annual_revenue| int(11)      | YES  |     | NULL    |       |
| cust_type     | varchar(12)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM Customer;
+---------+-----------+----------------+--------------+
| cust_id | cust_name | annual_revenue | cust_type    |
+---------+-----------+----------------+--------------+
|     101 | NEERAJ    |           1010 | RETAILER     |
|     200 | MANAV     |           1000 | MANUFACTURER |
|     300 | SAURAV    |           2002 | WHOLESALER   |
|    1420 | RAJESH    |          50211 | RETAILER     |
+---------+-----------+----------------+--------------+
4 rows in set (0.00 sec)
```

Creation of Truck table:

Query:
CREATE TABLE Truck(
truck_no INT PRIMARY KEY,
driver_name VARCHAR(100)
);

```
mysql> DESC Truck;
+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| truck_no     | int(11)       | NO   | PRI | NULL    |       |
| driver_name  | varchar(100)  | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM Truck;
+----------+-------------+
| truck_no | driver_name |
+----------+-------------+
|        1 | RAUNAK      |
|        2 | BONI        |
|        3 | IQBAL       |
|        4 | FARHAM      |
+----------+-------------+
4 rows in set (0.00 sec)
```

Creation of City table:

Query:
CREATE TABLE City(
city_name VARCHAR(100) PRIMARY KEY,
population INT
);

```
mysql> DESC City;
+-------------+--------------+------+-----+---------+-------+
| Field       | Type         | Null | Key | Default | Extra |
+-------------+--------------+------+-----+---------+-------+
| city_name   | varchar(100) | NO   | PRI | NULL    |       |
| population  | int(11)      | YES  |     | NULL    |       |
+-------------+--------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM City;
+-----------+------------+
| city_name | population |
+-----------+------------+
| Chennai   |     100001 |
| Guwahati  |       1010 |
| Kolkata   |    1000000 |
| Mumbai    |     100020 |
+-----------+------------+
4 rows in set (0.00 sec)
```

Creation of Shipment table:

Query:
CREATE TABLE Shipment(
shipment_no INT,
cust_id INT REFERENCES Customer(cust_id) ON DELETE CASCADE,
weight INT CHECK (weight<1000),
truck_no INT REFERENCES Truck(truck_no) ON DELETE SET NULL,
destination VARCHAR(100) REFERENCES City(city_name),
ship_date DATE,
PRIMARY KEY(shipment_no, cust_id)
);

```
mysql> DESC Shipment;
+-------------+--------------+------+-----+---------+-------+
| Field       | Type         | Null | Key | Default | Extra |
+-------------+--------------+------+-----+---------+-------+
| shipment_no | int(11)      | NO   | PRI | NULL    |       |
| cust_id     | int(11)      | NO   | PRI | NULL    |       |
| weight      | int(11)      | YES  |     | NULL    |       |
| truck_no    | int(11)      | YES  |     | NULL    |       |
| destination | varchar(100) | YES  |     | NULL    |       |
| ship_date   | date         | YES  |     | NULL    |       |
+-------------+--------------+------+-----+---------+-------+
6 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM Shipment;
+-------------+---------+--------+----------+-------------+------------+
| shipment_no | cust_id | weight | truck_no | destination | ship_date  |
+-------------+---------+--------+----------+-------------+------------+
|           1 |     101 |    103 |        3 | Kolkata     | 2020-01-02 |
|           2 |     200 |    900 |        1 | Chennai     | 2021-02-15 |
|           3 |     300 |     89 |        2 | Mumbai      | 2022-01-29 |
|           4 |    1420 |    102 |        4 | Guwahati    | 2022-04-04 |
|           5 |     200 |    150 |        2 | Guwahati    | 2021-01-10 |
|           6 |     300 |    140 |        3 | Guwahati    | 2022-05-09 |
|           7 |    1420 |    190 |        4 | Guwahati    | 2021-10-10 |
|           8 |     101 |    201 |        3 | Guwahati    | 2021-03-03 |
|           9 |     101 |    180 |        3 | Chennai     | 2020-10-10 |
|          10 |    1420 |    200 |        3 | Mumbai      | 2021-04-04 |
+-------------+---------+--------+----------+-------------+------------+
10 rows in set (0.00 sec)
```

**B. Queries and their Solutions:**

   1) <u>Give names of customer who have sent packages (shipments) to Kolkata, Chennai and Mumbai. (You have to solve this problem using set theoretic operation)</u>

Query & Output:
(SELECT C.cust_name
FROM Shipment S, Customer C
WHERE S.cust_id = C.cust_id
AND destination = 'Kolkata')
UNION
(SELECT C.cust_name

FROM Shipment S, Customer C
WHERE S.cust_id = C.cust_id
AND destination = 'Chennai')
UNION
(SELECT C.cust_name
FROM Shipment S, Customer C
WHERE S.cust_id = C.cust_id
AND destination = 'Mumbai');

```
mysql> (SELECT C.cust_name
= C.cus      -> FROM Shipment S, Customer C
    -> WHERE S.cust_id = C.cust_id
 = 'Kol     -> AND destination = 'Kolkata')
    -> UNION
    -> (SELECT C.cust_name
    -> FROM Shipment S, Customer C
    -> WHERE S.cust_id = C.cust_id
    -> AND destination = 'Chennai')
    -> UNION
    -> (SELECT C.cust_name
    -> FROM Shipment S, Customer C
    -> WHERE S.cust_id = C.cust_id
    -> AND destination = 'Mumbai');
+-----------+
| cust_name |
+-----------+
| NEERAJ    |
| MANAV     |
| SAURAV    |
+-----------+
3 rows in set (0.00 sec)
```

2) <u>List the names of the driver who have delivered shipments weighing over 200 pounds.</u>

Query & Output:
SELECT T.driver_name
FROM Truck T, Shipment S
WHERE T.truck_no = S.truck_no
AND S.weight>200;

```
mysql> SELECT T.driver_name
    -> FROM Truck T, Shipment S
    -> WHERE T.truck_no = S.truck_no
    -> AND S.weight>200;
+-------------+
| driver_name |
+-------------+
| RAUNAK      |
+-------------+
1 row in set (0.00 sec)
```

3) Retrieve the maximum and minimum weights of the shipments. Rename the output as Max_Weight and Min_Weight respectively.

Query & Output:
SELECT MAX(weight) AS Max_Weight, MIN(weight) AS Min_Weight
FROM Shipment;

```
mysql> SELECT MAX(weight) AS Max_Weight, MIN(weight) AS Min_Weight
    -> FROM Shipment;
+------------+------------+
| Max_Weight | Min_Weight |
+------------+------------+
|        900 |         89 |
+------------+------------+
1 row in set (0.00 sec)
```

4) For each customer, what is the average weight of package sent by the customer?

Query & Output:
SELECT C.cust_id, C.cust_name, AVG(S.weight)
FROM Customer C, Shipment S
WHERE C.cust_id = S.cust_id
GROUP BY C.cust_id;

```
mysql> SELECT C.cust_id, C.cust_name, AVG(S.weight)
    -> FROM Customer C, Shipment S
    -> WHERE C.cust_id = S.cust_id
    -> GROUP BY C.cust_id;
+---------+-----------+---------------+
| cust_id | cust_name | AVG(S.weight) |
+---------+-----------+---------------+
|     101 | NEERAJ    |      103.0000 |
|     200 | MANAV     |      525.0000 |
|     300 | SAURAV    |      114.5000 |
|    1420 | RAJESH    |      146.0000 |
+---------+-----------+---------------+
4 rows in set (0.00 sec)
```

5) <u>List the names and populations of cities that have received shipments weighing over 100 pounds.</u>

Query & Output:
SELECT C.city_name, C.population
FROM City C, Shipment S
WHERE C.city_name = S.destination
AND S.weight>100;

```
mysql> SELECT C.city_name, C.population
    -> FROM City C, Shipment S
    -> WHERE C.city_name = S.destination
    -> AND S.weight>100;
+-----------+------------+
| city_name | population |
+-----------+------------+
| Kolkata   |    1000000 |
| Chennai   |     100001 |
| Guwahati  |       1010 |
| Guwahati  |       1010 |
| Guwahati  |       1010 |
| Guwahati  |       1010 |
+-----------+------------+
6 rows in set (0.00 sec)
```

6) <u>List cities that have received shipments from every customer.</u>

Query & Output:

```
SELECT destination
FROM
(SELECT COUNT(DISTINCT(cust_id)) AS distinct_cust, destination
FROM Shipment
GROUP BY destination) CD
WHERE CD.distinct_cust =
(SELECT COUNT(DISTINCT(cust_id))
FROM Customer);
```

```
mysql> SELECT destination
    -> FROM
    -> (SELECT COUNT(DISTINCT(cust_id)) AS distinct_cust, destination
    -> FROM Shipment
    -> GROUP BY destination) CD
    -> WHERE CD.distinct_cust =
    -> (SELECT COUNT(DISTINCT(cust_id))
    -> FROM Customer);
+-------------+
| destination |
+-------------+
| Guwahati    |
+-------------+
1 row in set (0.00 sec)
```

7) <u>For each city, what is the maximum weight of a package sent to that city?</u>

Query & Output:
SELECT destination, MAX(weight)
FROM Shipment
GROUP BY destination;

```
mysql> SELECT destination, MAX(weight)
    -> FROM Shipment
    -> GROUP BY destination;
+-------------+-------------+
| destination | MAX(weight) |
+-------------+-------------+
| Chennai     |         900 |
| Guwahati    |         190 |
| Kolkata     |         103 |
| Mumbai      |          89 |
+-------------+-------------+
4 rows in set (0.00 sec)
```

8) List the name and annual revenue of customers whose shipments have been delivered by truck driver 'IQBAL'.

Query & Output:
SELECT C.cust_name, C.annual_revenue
FROM Customer C, Truck T, Shipment S
WHERE C.cust_id = S.cust_id
AND T.truck_no = S.truck_no
AND T.driver_name = 'IQBAL';

```
mysql> SELECT C.cust_name, C.annual_revenue
    -> FROM Customer C, Truck T, Shipment S
    -> WHERE C.cust_id = S.cust_id
    -> AND T.truck_no = S.truck_no
    -> AND T.driver_name = 'IQBAL';
+-----------+----------------+
| cust_name | annual_revenue |
+-----------+----------------+
| NEERAJ    |           1010 |
| SAURAV    |           2002 |
+-----------+----------------+
2 rows in set (0.00 sec)
```

9) List drivers who have delivered shipments to every city.

Query & Output:
SELECT T.driver_name
FROM
(SELECT COUNT(DISTINCT(destination)) AS Ds, truck_no

FROM Shipment
GROUP BY truck_no) TD, Truck T
WHERE TD.truck_no = T.truck_no
AND TD.Ds =
(SELECT COUNT(DISTINCT(city_name))
FROM City);

```
mysql> SELECT T.driver_name
    -> FROM
    -> (SELECT COUNT(DISTINCT(destination)) AS Ds, truck_no
    -> FROM Shipment
    -> GROUP BY truck_no) TD, Truck T
    -> WHERE TD.truck_no = T.truck_no
    -> AND TD.Ds =
    -> (SELECT COUNT(DISTINCT(city_name))
    -> FROM City);
+-------------+
| driver_name |
+-------------+
| IQBAL       |
+-------------+
1 row in set (0.00 sec)
```

10) For each city, with population over 1 million, what is the minimum weight of a package sent to that city.

Query & Output:
SELECT C.city_name, MIN(S.weight)
FROM City C, Shipment S
WHERE C.city_name = S.destination
AND C.population > 100000
GROUP BY C.city_name;

```
mysql> SELECT C.city_name, MIN(S.weight)
    -> FROM City C, Shipment S
    -> WHERE C.city_name = S.destination
    -> AND C.population > 100000
    -> GROUP BY C.city_name;
+-----------+---------------+
| city_name | MIN(S.weight) |
+-----------+---------------+
| Chennai   |           900 |
| Kolkata   |           103 |
| Mumbai    |            89 |
+-----------+---------------+
3 rows in set (0.00 sec)
```