CS 306 PROJECT PHASE 2

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1. Choose two tables (relations) from your project that are connected through a primary key and a foreign key, meaning that the primary key of one table should appear as a foreign key in the other table.

```sql
CREATE DATABASE mydatabase5;

USE mydatabase5;

CREATE TABLE Warehouse (
    WarehouseID INT PRIMARY KEY,
    Location VARCHAR(255),
    Capacity INT,
    ResponsiblePerson VARCHAR(255)
);

CREATE TABLE Shipment (
    ShipmentID INT PRIMARY KEY,
    SupplierID INT,
    WarehouseID INT,
    ShipmentDate DATE,
    ArrivalDate DATE,
    FOREIGN KEY (WarehouseID) REFERENCES Warehouse(WarehouseID)
);
```

2. Insert 10 rows to each table you have chosen using "insert into" statements

```sql
INSERT INTO Warehouse VALUES (11, 'Location A', 1000, 'John Doe');
INSERT INTO Warehouse VALUES (12, 'Location B', 1500, 'Oscar Wilde');
INSERT INTO Warehouse VALUES (13, 'Location C', 1200, 'Jim Beam');
INSERT INTO Warehouse VALUES (14, 'Location D', 950, 'Anne Rice');
INSERT INTO Warehouse VALUES (15, 'Location E', 1600, 'John Doe');
INSERT INTO Warehouse VALUES (16, 'Location F', 1100, 'Lisa Ray');
INSERT INTO Warehouse VALUES (17, 'Location G', 1050, 'Oscar Wilde');
INSERT INTO Warehouse VALUES (18, 'Location H', 1300, 'Mia Tang');
INSERT INTO Warehouse VALUES (19, 'Location I', 1700, 'Anne Rice');
INSERT INTO Warehouse VALUES (20, 'Location J', 1800, 'Jim Beam');


INSERT INTO Shipment VALUES (1, 10982, 11, '2023-01-01', '2023-01-03');
INSERT INTO Shipment VALUES (2, 10983, 12, '2023-02-01', '2023-02-04');
INSERT INTO Shipment VALUES (3, 10984, 13, '2023-03-01', '2023-03-05');
INSERT INTO Shipment VALUES (4, 10985, 14, '2023-04-01', '2023-04-06');
INSERT INTO Shipment VALUES (5, 10986, 15, '2023-05-01', '2023-05-07');
INSERT INTO Shipment VALUES (6, 10987, 16, '2023-06-01', '2023-06-08');
INSERT INTO Shipment VALUES (7, 10988, 17, '2023-07-01', '2023-07-09');
INSERT INTO Shipment VALUES (8, 10990, 18, '2023-08-01', '2023-08-10');
INSERT INTO Shipment VALUES (9, 10991, 19, '2023-09-01', '2023-09-11');
INSERT INTO Shipment VALUES (10, 10992, 20, '2023-10-01', '2023-10-12');
```

3. Display all the rows of the two tables through executing "select * from <table_name> " commands on mysql and include the snapshot of the result in your report.

```sql
SELECT * FROM Warehouse;
SELECT * FROM Shipment;
```

WarehouseID	Location	Capacity	ResponsiblePerson
11	Location A	1000	John Doe
12	Location B	1500	Oscar Wilde
13	Location C	1200	Jim Beam
14	Location D	950	Anne Rice
15	Location E	1600	John Doe
16	Location F	1100	Lisa Ray
17	Location G	1050	Oscar Wilde
18	Location H	1300	Mia Tang
19	Location I	1700	Anne Rice
20	Location J	1800	Jim Beam
NULL	NULL	NULL	NULL

ShipmentID	SupplierID	WarehouseID	ShipmentDate	ArrivalDate
1	10982	11	2023-01-01	2023-01-03
2	10983	12	2023-02-01	2023-02-04
3	10984	13	2023-03-01	2023-03-05
4	10985	14	2023-04-01	2023-04-06
5	10986	15	2023-05-01	2023-05-07
6	10987	16	2023-06-01	2023-06-08
7	10988	17	2023-07-01	2023-07-09
8	10990	18	2023-08-01	2023-08-10
9	10991	19	2023-09-01	2023-09-11
10	10992	20	2023-10-01	2023-10-12
NULL	NULL	NULL	NULL	NULL

4. Write down a query in English which will require joining the two of the tables you have selected, then write down its relational algebra equivalent.

/*"Show a list of ShipmentIds and corresponding Locations." */

$\rho(W, \text{Warehouse})$

$\rho(S, \text{Shipment})$

$\Pi_{S.\text{ShipmentID}, W.\text{Location}} (W \bowtie_{\text{WarehouseID}} S)$

5. Write down the SQL version of the relational algebra query and execute the query in mysql. Include the snapshot of the result in your report.

```
54 •  SELECT Shipment.ShipmentID, Warehouse.Location
55    FROM Shipment
56    JOIN Warehouse ON Shipment.WarehouseID = Warehouse.WarehouseID;
```

ShipmentID	Location
1	Location A
2	Location B
3	Location C
4	Location D
5	Location E
6	Location F
7	Location G
8	Location H
9	Location I
10	Location J

6. Write down a query in English which will require "group by" operation, a statistical operator (SUM, AVG, MIN, MX etc), and will also require joining the two tables. Then write down the SQL version, execute it on mysql and include the snapshot of the result in your report.

```sql
/* "Calculate the average shipment time (difference between ArrivalDate and ShipmentDate) for each warehouse,
including the warehouse location and responsible person." */

SELECT Warehouse.WarehouseID, Warehouse.Location, Warehouse.ResponsiblePerson,
       ROUND(AVG(DATEDIFF(Shipment.ArrivalDate, Shipment.ShipmentDate))) as AvgShipmentTime
FROM Shipment
JOIN Warehouse ON Shipment.WarehouseID = Warehouse.WarehouseID
GROUP BY Warehouse.WarehouseID, Warehouse.Location, Warehouse.ResponsiblePerson;

/* I used round function to turn the AvgShipmentTime to integer. */
```

WarehouseID	Location	ResponsiblePerson	AvgShipmentTime
11	Location A	John Doe	2
12	Location B	Oscar Wilde	3
13	Location C	Jim Beam	4
14	Location D	Anne Rice	5
15	Location E	John Doe	6
16	Location F	Lisa Ray	7
17	Location G	Oscar Wilde	8
18	Location H	Mia Tang	9
19	Location I	Anne Rice	10
20	Location J	Jim Beam	11

7. Add a "check" constraint to a table in your project by updating the create table statement Your constraint should involve a SQL query. Each student should write a different constraint. Adding a constraint to an existing table is done through the command "ALTER TABLE <table_name> ADD CONSTRAINT CHECK (condition)"

```sql
ALTER TABLE Shipment
ADD CONSTRAINT CHECK (ArrivalDate > ShipmentDate);
```

8. Execute the alter table command on mysql and try to insert a row which does not satisfy the constraint using insert into statement. Include the snapshot of your work in the report which shows that you have added the constraint and tried to insert a row violating that constraint.

```sql
INSERT INTO Shipment VALUES (11, 1, 1, '2023-01-10', '2023-01-08');

/* it should fail due to chech constraint*/
```

```
1183  17:12:36  ALTER TABLE Shipment ADD CONSTRAINT CHECK (ArrivalDate > ShipmentDate)   10 row(s) affected Records: 10  Duplicates: 0  Warni...  0.014 sec
1184  17:12:36  INSERT INTO Shipment VALUES (11, 1, 1, '2023-01-10', '2023-01-08')       Error Code: 3819. Check constraint 'shipment_chk_...  0.00034 sec
```

Error Code: 3819. Check constraint 'shipment_chk_1' is violated.