MIDTERM TEST

NAME : _____ SRI KRESNA MAHA DEWA _____ SCORE:_____ YEAR/

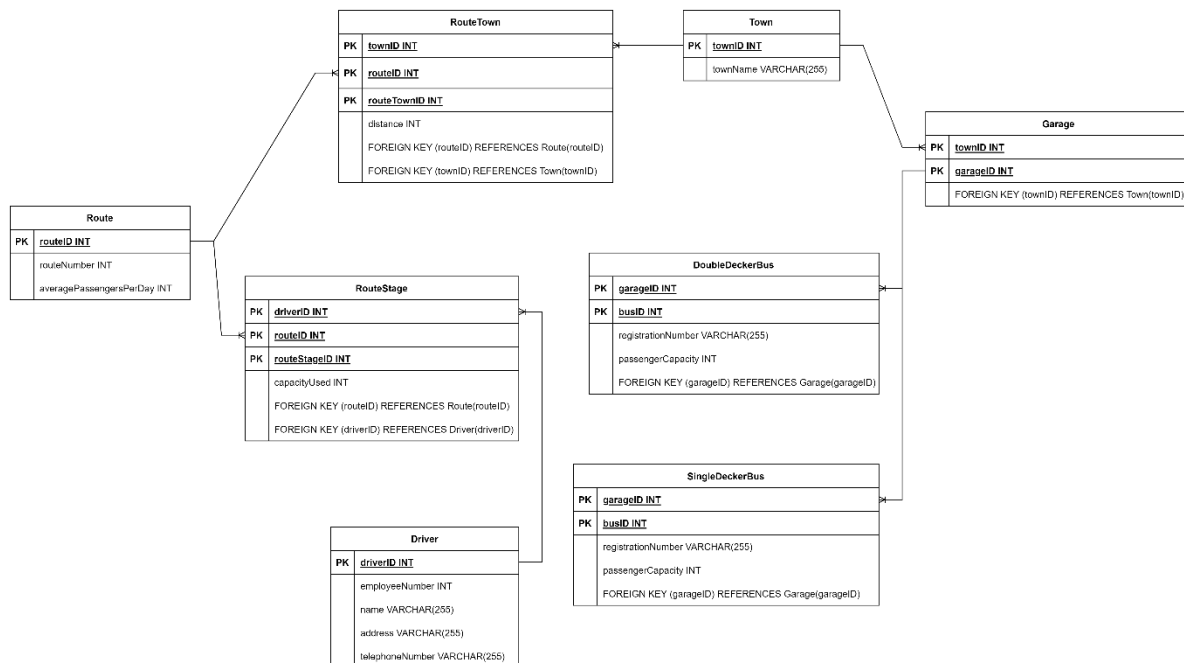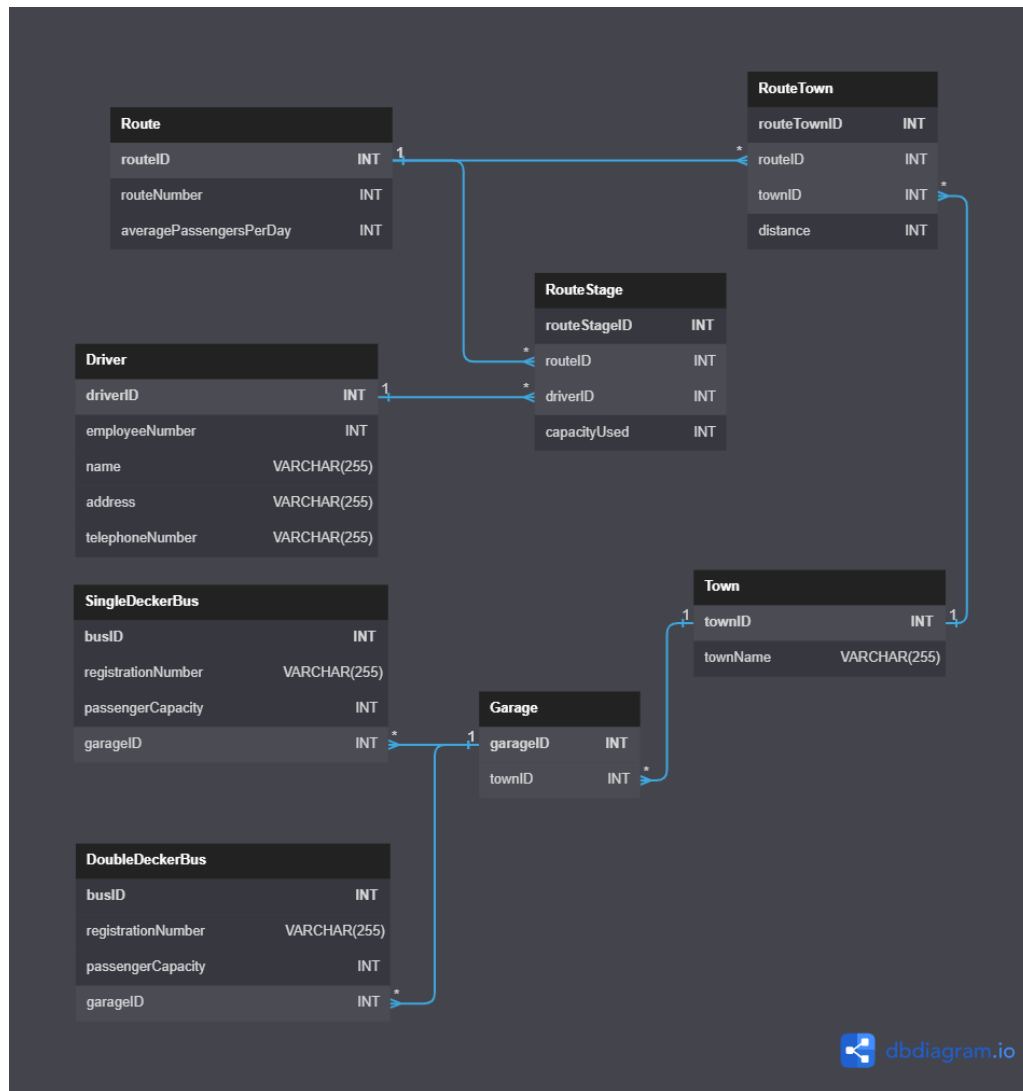SECTION : _____ 2022 _____ DATE OF EXAM:___ 28 April 2023 ___

Part I: Analysis. Considering the business rules provided, analyze and perform he following tasks.
a. Create the Entity-Relationship Diagram for the following business rule, assume relevant attributes.(10pts)

A Country Bus Company owns a number of busses. Each bus is allocated to a particular route, although some routes may have several busses. Each route passes through a number of towns. One or more drivers are allocated to each stage of a route, which corresponds to a journey through some or all of the towns on a route. Some of the towns have a garage where busses are kept and each of the busses are identified by the registration number and can carry different numbers of passengers, since the vehicles vary in size and can be single or double-decked. Each route is identified by a route number and information is available on the average number of passengers carried per day for each route. Drivers have an employee number, name, address, and sometimes a telephone number.

b. Transform the ERD into Relational Schema.(5pts)

ANSWER PART 1:

Route

routeID	INT
routeNumber	INT
averagePassengersPerDay	INT

RouteTown

routeTownID	INT
routeID	INT
townID	INT
distance	INT

RouteStage

routeStageID	INT
routeID	INT
driverID	INT
capacityUsed	INT

Driver

driverID	INT
employeeNumber	INT
name	VARCHAR(255)
address	VARCHAR(255)
telephoneNumber	VARCHAR(255)

SingleDeckerBus

busID	INT
registrationNumber	VARCHAR(255)
passengerCapacity	INT
garageID	INT

Town

townID	INT
townName	VARCHAR(255)

Garage

garageID	INT
townID	INT

DoubleDeckerBus

busID	INT
registrationNumber	VARCHAR(255)
passengerCapacity	INT
garageID	INT

dbdiagram.io

RouteTown

PK	townID INT
PK	routeID INT
PK	routeTownID INT
	distance INT
	FOREIGN KEY (routeID) REFERENCES Route(routeID)
	FOREIGN KEY (townID) REFERENCES Town(townID)

Town

PK	townID INT
	townName VARCHAR(255)

Garage

PK	townID INT
PK	garageID INT
	FOREIGN KEY (townID) REFERENCES Town(townID)

Route

PK	routeID INT
	routeNumber INT
	averagePassengersPerDay INT

RouteStage

PK	driverID INT
PK	routeID INT
PK	routeStageID INT
	capacityUsed INT
	FOREIGN KEY (routeID) REFERENCES Route(routeID)
	FOREIGN KEY (driverID) REFERENCES Driver(driverID)

DoubleDeckerBus

PK	garageID INT
PK	busID INT
	registrationNumber VARCHAR(255)
	passengerCapacity INT
	FOREIGN KEY (garageID) REFERENCES Garage(garageID)

SingleDeckerBus

PK	garageID INT
PK	busID INT
	registrationNumber VARCHAR(255)
	passengerCapacity INT
	FOREIGN KEY (garageID) REFERENCES Garage(garageID)

Driver

PK	driverID INT
	employeeNumber INT
	name VARCHAR(255)
	address VARCHAR(255)
	telephoneNumber VARCHAR(255)

```sql
CREATE DATABASE Bus_Company;
USE Bus_Company;

CREATE TABLE Route (
    routeID INT PRIMARY KEY,
    routeNumber INT,
    averagePassengersPerDay INT
);

CREATE TABLE Town (
    townID INT PRIMARY KEY,
    townName VARCHAR(255)
);

CREATE TABLE RouteTown (
    routeTownID INT PRIMARY KEY,
    routeID INT,
    townID INT,
    distance INT,
    FOREIGN KEY (routeID) REFERENCES Route(routeID),
    FOREIGN KEY (townID) REFERENCES Town(townID)
);

CREATE TABLE Driver (
    driverID INT PRIMARY KEY,
    employeeNumber INT,
    name VARCHAR(255),
    address VARCHAR(255),
    telephoneNumber VARCHAR(255)
);

CREATE TABLE RouteStage (
    routeStageID INT PRIMARY KEY,
    routeID INT,
    driverID INT,
    capacityUsed INT,
    FOREIGN KEY (routeID) REFERENCES Route(routeID),
    FOREIGN KEY (driverID) REFERENCES Driver(driverID)
);

CREATE TABLE Garage (
    garageID INT PRIMARY KEY,
    townID INT,
    FOREIGN KEY (townID) REFERENCES Town(townID)
);

CREATE TABLE SingleDeckerBus (
    busID INT PRIMARY KEY,
    registrationNumber VARCHAR(255),
    passengerCapacity INT,
    garageID INT,
    FOREIGN KEY (garageID) REFERENCES Garage(garageID)
);

CREATE TABLE DoubleDeckerBus (
    busID INT PRIMARY KEY,
    registrationNumber VARCHAR(255),
    passengerCapacity INT,
    garageID INT,
    FOREIGN KEY (garageID) REFERENCES Garage(garageID)
);
```

Part II: Application. Use the provided current state of the Company Database in answering the following queries.

EMPLOYEE

Fname	Lname	Ssn	Bdate	Address	Salary	Dno
John	Smith	123456789	1965-01-09	Fondren, Houston, TX	30000	5
Franklin	Wong	333445555	1955-12-08	Voss, Houston, TX	40000	5
Alicia	Zelaya	999887777	1968-01-19	Castle, Spring, TX	25000	4
Jennifer	Wallace	987654321	1941-06-20	Berry, Bellaire, TX	43000	4
Ramesh	Narayan	666884444	1962-09-15	Fire Oak, Humble, TX	38000	5
James	Borg	888665555	1937-11-10	Stone, Houston, TX	55000	1

PROJECT

Pname	Plocation	Pnumber	Dnum
Computerization	Stafford	1	5
Reorganization	Houston	10	1
Newbenefits	Sugarland	20	4

DEPENDENT

Essn	Dependent_name	Relationship
333445555	Alice	Daughter
333445555	Joy	Spouse
333445555	Theodore	Son
987654321	Abner	Spouse
123456789	Michael	Son
123456789	Alice	Daughter
123456789	Elizabeth	Spouse

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-04-05
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

A. Create the SQL command to satisfy the following queries. Write at the space provided.(3pts each)

1. Find all information about John Smith.

_____

2. What department started on April 5, 1988?

_____

3. Where does James Borg lives?

_____

4. Who are the spouses of the employees?

_____

5. What is the project located at Sugarland?

_____

B. Create the SQL command to satisfy the following queries connecting different tables.(5pts each)

6. Who is the manager of Research department?

_____

_____

7. Who are the employees that work on project Newbenefits?

_____

_____

8. Who are dependents of Franklin Wong?

_____

_____

9. Who are the dependents of employees who were assigned to project Computerization?

_____

_____

10. In what department do employees belong, whose dependent are their sons?

_____

_____

Prepared by:

JUNEL B. VENTURA, MIT
Instructor

ANSWER PART 2 :

```sql
1   CREATE DATABASE Company_Database;
2   USE Company_Database;
3
4   CREATE TABLE EMPLOYEE (
5       Fname VARCHAR(255) NOT NULL,
6       Lname VARCHAR(255) NOT NULL,
7       Ssn INT NOT NULL,
8       Bdata DATE NOT NULL,
9       Address VARCHAR(255) NOT NULL,
10      Salary INT NOT NULL,
11      Dno INT NOT NULL
12  );
13
14  CREATE TABLE PROJECT (
15      Pname VARCHAR(255) NOT NULL,
16      Plocation VARCHAR(255) NOT NULL,
17      Pnumber INT NOT NULL,
18      Dnum INT NOT NULL
19  );
20
21  CREATE TABLE DEPENDENT (
22      Essn INT NOT NULL,
23      Dependent_name VARCHAR(255) NOT NULL,
24      Relationship VARCHAR(255) NOT NULL
25  );
26
27  CREATE TABLE DEPARTMENT (
28      Dname VARCHAR(255) NOT NULL,
29      Dnumber INT NOT NULL,
30      Mgr_ssn INT NOT NULL,
31      Mgr_start_date DATE NOT NULL
32  );
33
34  INSERT INTO EMPLOYEE (Fname, Lname, Ssn, Bdata, Address, Salary, Dno)
35  VALUES('John', 'Smith', 123456789, '1965-01-09', 'Fondren, Houston, TX', 30000, 5),
36      ('Franklin', 'Wong', '333445555', '1955-12-08', 'Voss, Houston, TX', 40000, 5),
37      ('Alicia', 'Zelaya', '999887777', '1968-01-19', 'Castle, Spring, TX', 25000, 4),
38      ('Jennifer', 'Wallace', '987654321', '1941-06-20', 'Berry, Bellaire, TX', 43000, 4),
39      ('Ramesh', 'Narayan', '666884444', '1962-09-15', 'Fire Oak, Humble, TX', 38000, 5),
40      ('James', 'Borg', '888665555', '1937-11-10', 'Stone, Houston, TX', 55000, 1);
41
42  INSERT INTO PROJECT (Pname, Plocation, Pnumber, Dnum)
43  VALUES('Computerization', 'Stafford', 1, 5),
44      ('Reorganization', 'Houston', 10, 1),
45      ('Newbenefits', 'Sugarland', 20, 4);
46
47  INSERT INTO DEPENDENT (Essn, Dependent_name, Relationship)
48  VALUES(333445555, 'Alice', 'Daughter'),
49      (333445555, 'Joy', 'Spouse'),
50      (333445555, 'Theodore', 'Son'),
51      (987654321, 'Abner', 'Spouse'),
52      (123456789, 'Michael', 'Son'),
53      (123456789, 'Alice', 'Daughter'),
54      (123456789, 'Elizabeth', 'Spouse');
55
56  INSERT INTO DEPARTMENT (Dname, Dnumber, Mgr_ssn, Mgr_start_date)
57  VALUES('Research', 5, 333445555, '1988-04-05'),
58      ('Administration', 4, 987654321, '1995-01-01'),
59      ('Headquarters', 1, 888665555, '1981-06-19');
```

ANSWER PART 2 A & B:

A. Create the SQL command to satisfy the following queries.

1. Find all information about John Smith.

```
61 ●    SELECT * FROM EMPLOYEE WHERE Fname='John' AND Lname='Smith';
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Fname	Lname	Ssn	Bdata	Address	Salary	Dno
John	Smith	123456789	1965-01-09	Fondren, Houston, TX	30000	5

2. What department started on April 5, 1988?

```
62 ●    SELECT * FROM DEPARTMENT WHERE Mgr_start_date='1988-04-05';
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-04-05

3. Where does James Borg lives?

```
63 ●    SELECT Address FROM EMPLOYEE WHERE Fname = 'James' AND Lname = 'Borg';
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Address
Stone, Houston, TX

4. Who are the spouses of the employees?

```
64 ●    SELECT Dependent_name FROM DEPENDENT WHERE Relationship='Spouse';
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Dependent_name
Joy
Abner
Elizabeth

5. What is the project located at Sugarland?

```
65 •    SELECT * FROM PROJECT WHERE Plocation='Sugarland';
```

Pname	Plocation	Pnumber	Dnum
Newbenefits	Sugarland	20	4

B. Create the SQL command to satisfy the follwoing queries connecting different tables

6. Who is the manager of Research Department?

```
66 •    SELECT EMPLOYEE.Fname, EMPLOYEE.Lname
67      FROM EMPLOYEE, DEPARTMENT
68      WHERE EMPLOYEE.Ssn = DEPARTMENT.Mgr_ssn
69      AND DEPARTMENT.Dname = 'Research';
```

Fname	Lname
Franklin	Wong

7. Who are the employees that work on project Newbenefits?

```
71 •    SELECT EMPLOYEE.Fname, EMPLOYEE.Lname
72      FROM EMPLOYEE, PROJECT
73      WHERE EMPLOYEE.Ssn = PROJECT.Pnumber
74      AND PROJECT.Pname = 'Newbenefits';
75
```

Fname	Lname

8. Who are dependents of Franklin Wong?

```
76 •    SELECT Dependent_name
77      FROM DEPENDENT, EMPLOYEE
78      WHERE EMPLOYEE.Fname = 'Franklin'
79      AND EMPLOYEE.Lname = 'Wong'
80      AND DEPENDENT.Essn = EMPLOYEE.Ssn;
81
```

Dependent_name
Alice
Joy
Theodore

9. Who are the dependents of employees who were assigned to project Computerization?

```
82  •     SELECT Dependent_name
83        FROM DEPENDENT, PROJECT, EMPLOYEE
84        WHERE PROJECT.Pname = 'Computerization'
85        AND PROJECT.Dnum = EMPLOYEE.Dno
86        AND EMPLOYEE.Ssn = DEPENDENT.Essn;
87
```

Result Grid | Filter Rows: | Export:

Dependent_name
Alice
Joy
Theodore
Michael
Alice
Elizabeth

10. In what department do employees belong, whose dependent are their sons?

```
88  •     SELECT DISTINCT EMPLOYEE.Dno, DEPARTMENT.Dname
89        FROM EMPLOYEE, DEPARTMENT, DEPENDENT
90        WHERE EMPLOYEE.Ssn = DEPENDENT.Essn
91        AND DEPENDENT.Relationship = 'Son'
92        AND EMPLOYEE.Dno = DEPARTMENT.Dnumber;
93
94
```

Result Grid | Filter Rows: | Export: | Wrap Cell

Dno	Dname
5	Research