DBMS LAB – 3 (ANSWER SCRIPT)

1. Design the Company Schema given in the text book named "Fundamentals of Database Systems" authored by Ramez Elmasri and Shamkant B. Navathe. The e-copy of the text book is uploaded in the moodle.

Ans:

```sql
CREATE TABLE Employee
(
Fname VARCHAR(15) NOT NULL,
Minit CHAR,
Lname VARCHAR(15),
Ssn CHAR(10) NOT NULL,
Bdate DATE,
Addr VARCHAR(30),
Sex CHAR,
Salary DECIMAL(10,2),
Super_ssn CHAR(9),
Dno INT NOT NULL,
PRIMARY KEY(Ssn)
);
```

```
Query OK, 0 rows affected (0.04 sec)
```

```sql
CREATE TABLE DEPARTMENT
(
Dname VARCHAR(15) NOT NULL,
Dnumber INT NOT NULL,
Mgr_ssn CHAR(10) NOT NULL,
Mgr_start_date DATE,
PRIMARY KEY(Dnumber),
UNIQUE(Dname),
FOREIGN KEY(Mgr_ssn) REFERENCES Employee(Ssn)
);
```

```
Query OK, 0 rows affected (0.04 sec)
```

```sql
CREATE TABLE DEPT_LOCATION
(
Dnumber INT NOT NULL,
Dlocation VARCHAR(15) NOT NULL,
PRIMARY KEY (Dnumber,Dlocation),
FOREIGN KEY(Dnumber) REFERENCES DEPARTMENT(Dnumber)
);
```

```
Query OK, 0 rows affected (0.04 sec)
```

```sql
CREATE TABLE PROJECT
(
Pname VARCHAR(15) NOT NULL,
Pnumber INT NOT NULL,
Plocation VARCHAR(15),
Dnum INT NOT NULL,
PRIMARY KEY(Pnumber),
UNIQUE(Pname),
FOREIGN KEY (Dnum) REFERENCES DEPARTMENT(Dnumber)
);
```

Query OK, 0 rows affected (0.04 sec)

```sql
CREATE TABLE WORKS_ON
(
Essn CHAR(9) NOT NULL,
Pno INT NOT NULL,
Hours DECIMAL(3,1) NOT NULL,
PRIMARY KEY (Essn,Pno),
FOREIGN KEY (Essn) REFERENCES Employee(Ssn),
FOREIGN KEY (Pno) REFERENCES PROJECT(Pnumber)
);
```

Query OK, 0 rows affected (0.04 sec)

```sql
CREATE TABLE DEPENDENT
(
Essn CHAR(9) NOT NULL,
Dependent_name VARCHAR(15) NOT NULL,
Sex CHAR,
Bdate DATE,
Relationship VARCHAR(8),
PRIMARY KEY (Essn,Dependent_name),
FOREIGN KEY (Essn) REFERENCES Employee(Ssn)
);
```

Query OK, 0 rows affected (0.04 sec)

2. Execute basic queries (Chapter 5) in Company Schema involving only two tables: Employee and Department to simulate the following keywords:

CREATE, DELETE, UPDATE (or MODIFY), INSERT, ALTER, Entity Integrity Constraints and Referential Integrity Constraints.

Ans:

```sql
INSERT INTO Employee
(Fname,Minit,Lname,Ssn,Bdate,Addr,Sex,Salary,Super_ssn,Dno ) values
('John','B','Smith','123456789','1965-12-08','731 Fondren, Houston,
TX','M',30000,'333445555',5),
('Franklin','T','Wong','333445555','1955-12-08','38 Voss, Houston,
TX','M',40000,'888665555',5),
('Alicia','J','Zelaya','999887777','1968-01-19','3321 Castle, Spring,
TX','F',25000,'987654321',4),
('Jennifer','S','Smith','987654321','1941-06-20','291 Berry Houston,
TX','M',43000,'888665555',4),
('Ramesh','K','Narayan','666884444','1962-09-12','975 Fire Oak, Houston,
TX','M',38000,'333445555',5),
('Joyce','A','English','453453453','1972-07-31','5631 Rice, Houston,
TX','F',25000,'333445555',5),
('Ahmad','V','Jabbar','987987987','1969-03-29','980 Dallas, Houston,
TX','M',25000,'987654321',4),
('James','E','Borg','888665555','1937-11-10','450 Stone, Houston,
TX','M',55000,NULL,1);
```

```
+----------+-------+---------+-----------+------------+------------------------+-----+----------+-----------+-----+
| Fname    | Minit | Lname   | Ssn       | Bdate      | Addr                   | Sex | Salary   | Super_ssn | Dno |
+----------+-------+---------+-----------+------------+------------------------+-----+----------+-----------+-----+
| John     | B     | Smith   | 123456789 | 1965-12-08 | 731 Fondren, Houston, TX | M | 30000.00 | 333445555 | 5 |
| Franklin | T     | Wong    | 333445555 | 1955-12-08 | 38 Voss, Houston, TX   | M   | 40000.00 | 888665555 | 5 |
| Joyce    | A     | English | 453453453 | 1972-07-31 | 5631 Rice, Houston, TX | F   | 25000.00 | 333445555 | 5 |
| Ramesh   | K     | Narayan | 666884444 | 1962-09-12 | 975 Fire Oak, Houston, TX | M | 38000.00 | 333445555 | 5 |
| James    | E     | Borg    | 888665555 | 1937-11-10 | 450 Stone, Houston, TX | M   | 55000.00 | NULL      | 1 |
| Jennifer | S     | Smith   | 987654321 | 1941-06-20 | 291 Berry Houston, TX  | M   | 43000.00 | 888665555 | 4 |
| Ahmad    | V     | Jabbar  | 987987987 | 1969-03-29 | 980 Dallas, Houston, TX | M  | 25000.00 | 987654321 | 4 |
| Alicia   | J     | Zelaya  | 999887777 | 1968-01-19 | 3321 Castle, Spring, TX | F  | 25000.00 | 987654321 | 4 |
+----------+-------+---------+-----------+------------+------------------------+-----+----------+-----------+-----+
8 rows in set (0.00 sec)
```

```sql
INSERT INTO DEPARTMENT (Dname,Dnumber,Mgr_ssn,Mgr_start_date) values
('Research',5,'333445555','1989-05-22'),
('Adminstrators',4,'333445555','1981-07-21'),
('Headquarters',1,'888665555','1981-06-19');
```

```
+---------------+---------+-----------+----------------+
| Dname         | Dnumber | Mgr_ssn   | Mgr_start_date |
+---------------+---------+-----------+----------------+
| Headquarters  |       1 | 888665555 | 1981-05-22     |
| Adminstrators |       4 | 333445555 | 1981-07-21     |
| Research      |       5 | 333445555 | 1989-05-22     |
+---------------+---------+-----------+----------------+
```

```sql
INSERT INTO DEPT_LOCATION (Dnumber,Dlocation) values
(1,'Houstan'),
(4,'Stafford'),
(5,'Bellaire'),
(5,'Sugarland'),
(5,'Houstan');
```

```
+---------+-----------+
| Dnumber | Dlocation |
+---------+-----------+
|       1 | Houstan   |
|       4 | Stafford  |
|       5 | Bellaire  |
|       5 | Houstan   |
|       5 | Sugarland |
+---------+-----------+
```

```sql
UPDATE DEPARTMENT set Mgr_start_date='1981-05-22' where Dnumber=1;
```

```
Query OK, 1 row affected (0.02 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

```sql
ALTER TABLE DEPARTMENT MODIFY Dnumber INT(3);
```

```
Query OK, 0 rows affected, 1 warning (0.03 sec)
Records: 0  Duplicates: 0  Warnings: 1
```

3. Execute all the example queries in Chapter 6 pertaining to the Company Schema you have created in Q. No. 1.

```sql
SELECT Fname, Lname, Addr FROM Employee, DEPARTMENT WHERE Dname =
'Research' AND Dnumber = Dno;
```

```
+----------+---------+---------------------------+
| Fname    | Lname   | Addr                      |
+----------+---------+---------------------------+
| John     | Smith   | 731 Fondren, Houston, TX  |
| Franklin | Wong    | 38 Voss, Houston, TX      |
| Joyce    | English | 5631 Rice, Houston, TX    |
| Ramesh   | Narayan | 975 Fire Oak, Houston, TX |
+----------+---------+---------------------------+
```

```sql
SELECT E.Fname, E.Lname, S.Fname, S.Lname FROM Employee AS E, Employee AS S
WHERE E.Super_ssn = S.Ssn;
```

```
+----------+----------+-----------+--------+
| Fname    | Lname    | Fname     | Lname  |
+----------+----------+-----------+--------+
| John     | Smith    | Franklin  | Wong   |
| Franklin | Wong     | James     | Borg   |
| Joyce    | English  | Franklin  | Wong   |
| Ramesh   | Narayan  | Franklin  | Wong   |
| Jennifer | Smith    | James     | Borg   |
| Ahmad    | Jabbar   | Jennifer  | Smith  |
| Alicia   | Zelaya   | Jennifer  | Smith  |
+----------+----------+-----------+--------+
```

```sql
SELECT E.Fname, E.LName, E.Addr FROM Employee AS E, DEPARTMENT AS D WHERE
D.Dname = 'Research' AND D.Dnumber = E.Dno;
```

```
+----------+----------+----------------------------+
| Fname    | LName    | Addr                       |
+----------+----------+----------------------------+
| John     | Smith    | 731 Fondren, Houston, TX   |
| Franklin | Wong     | 38 Voss, Houston, TX       |
| Joyce    | English  | 5631 Rice, Houston, TX     |
| Ramesh   | Narayan  | 975 Fire Oak, Houston, TX  |
+----------+----------+----------------------------+
```

```sql
SELECT Ssn FROM Employee;
```

```
+-----------+
| Ssn       |
+-----------+
| 123456789 |
| 333445555 |
| 453453453 |
| 666884444 |
| 888665555 |
| 987654321 |
| 987987987 |
| 999887777 |
+-----------+
```

```sql
SELECT Ssn, Dname FROM Employee, DEPARTMENT;
```

```
+-----------+--------------+
| Ssn       | Dname        |
+-----------+--------------+
| 123456789 | Research     |
| 123456789 | Headquarters |
| 123456789 | Adminstrators|
| 333445555 | Research     |
| 333445555 | Headquarters |
| 333445555 | Adminstrators|
| 453453453 | Research     |
| 453453453 | Headquarters |
| 453453453 | Adminstrators|
| 666884444 | Research     |
| 666884444 | Headquarters |
| 666884444 | Adminstrators|
| 888665555 | Research     |
| 888665555 | Headquarters |
| 888665555 | Adminstrators|
| 987654321 | Research     |
| 987654321 | Headquarters |
| 987654321 | Adminstrators|
| 987987987 | Research     |
| 987987987 | Headquarters |
| 987987987 | Adminstrators|
| 999887777 | Research     |
| 999887777 | Headquarters |
| 999887777 | Adminstrators|
+-----------+--------------+
```

```sql
SELECT * FROM DEPARTMENT WHERE Dnumber = 5;
```

```
+----------+---------+-----------+----------------+
| Dname    | Dnumber | Mgr_ssn   | Mgr_start_date |
+----------+---------+-----------+----------------+
| Research |       5 | 333445555 | 1989-05-22     |
+----------+---------+-----------+----------------+
```

```sql
SELECT * FROM Employee, DEPARTMENT WHERE Dname = 'Research' AND Dno =
Dnumber;
```

```
+----------+-------+---------+-----------+------------+-----------------------+-----+----------+-----------+-----+----------+---------+-----------+----------------+
| Fname    | Minit | Lname   | Ssn       | Bdate      | Addr                  | Sex | Salary   | Super_ssn | Dno | Dname    | Dnumber | Mgr_ssn   | Mgr_start_date |
+----------+-------+---------+-----------+------------+-----------------------+-----+----------+-----------+-----+----------+---------+-----------+----------------+
| John     | B     | Smith   | 123456789 | 1965-12-08 | 731 Fondren, Houston, TX | M | 30000.00 | 333445555 | 5 | Research |       5 | 333445555 | 1989-05-22     |
| Franklin | T     | Wong    | 333445555 | 1955-12-08 | 38 Voss, Houston, TX  | M   | 40000.00 | 888665555 | 5 | Research |       5 | 333445555 | 1989-05-22     |
| Joyce    | A     | English | 453453453 | 1972-07-31 | 5631 Rice, Houston, TX | F  | 25000.00 | 333445555 | 5 | Research |       5 | 333445555 | 1989-05-22     |
| Ramesh   | K     | Narayan | 666884444 | 1962-09-12 | 975 Fire Oak, Houston, TX | M | 38000.00 | 333445555 | 5 | Research |       5 | 333445555 | 1989-05-22     |
+----------+-------+---------+-----------+------------+-----------------------+-----+----------+-----------+-----+----------+---------+-----------+----------------+
```