DBMS Lab – SESSION 3

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Q1.

```
CREATE TABLE Employees (
    SSN CHAR(9) PRIMARY KEY,
    FName VARCHAR(50) NOT NULL,
    LName VARCHAR(50) NOT NULL,
    BDate DATE,
    Address VARCHAR(100),
    Sex CHAR(1),
    Salary DECIMAL(10, 2),
    SuperSSN CHAR(9),
    DNo INT
);
CREATE TABLE Departments (
    DNumber INT PRIMARY KEY,
    DName VARCHAR(50) NOT NULL,
    MgrSSN CHAR(9),
    MgrStartDate DATE
);

CREATE TABLE DEPT_LOCATIONS
( Dnumber
Dlocation
INT
VARCHAR(15)
NOT NULL,
NOT NULL,
PRIMARY KEY (Dnumber, Dlocation),
FOREIGN KEY (Dnumber) REFERENCES Departments(Dnumber) );
CREATE TABLE PROJECT
( Pname
Pnumber
Plocation
Dnum
VARCHAR(15)
INT
VARCHAR(15),
INT
NOT NULL,
NOT NULL,
NOT NULL,
```

```
PRIMARY KEY (Pnumber),
UNIQUE (Pname),
FOREIGN KEY (Dnum) REFERENCES Departments(Dnumber) );
CREATE TABLE WORKS_ON
( Essn
Pno
Hours
CHAR(9)
INT
DECIMAL(3,1)
NOT NULL,
NOT NULL,
NOT NULL,
PRIMARY KEY (Essn, Pno),
FOREIGN KEY (Essn) REFERENCES Employees(Ssn),
FOREIGN KEY (Pno) REFERENCES PROJECT(Pnumber) );
CREATE TABLE DEPENDENT
( Essn
Dependent_name
Sex
Bdate
Relationship
CHAR(9)
VARCHAR(15)
CHAR,
DATE,
VARCHAR(8),
NOT NULL,
NOT NULL,
PRIMARY KEY (Essn, Dependent_name),
FOREIGN KEY (Essn) REFERENCES Employees(Ssn) );
```

Q2.

```
INSERT INTO Employees (SSN, FName, LName, BDate, Address, Sex, Salary, SuperSSN, DNo)
VALUES ('123456789', 'John', 'Doe', '1980-05-20', '123 Elm St', 'M', 50000, NULL, 1);

INSERT INTO Departments (DNumber, DName, MgrSSN, MgrStartDate)
VALUES (1, 'Research', '123456789', '2020-01-15');

ALTER TABLE Departments
ADD CONSTRAINT fk_mgrssn
FOREIGN KEY (MgrSSN) REFERENCES Employees(SSN);

INSERT INTO Employees (SSN, FName, LName, BDate, Address, Sex, Salary, SuperSSN, DNo)
VALUES ('987654321', 'Jane', 'Smith', '1985-07-15', '456 Oak St', 'F', 60000, '123456789', 1);

ALTER TABLE Employees
```

```
ADD CONSTRAINT fk_dno
FOREIGN KEY (DNo) REFERENCES Departments(DNumber);

UPDATE Employees
SET Salary = 55000
WHERE SSN = '123456789';

DELETE FROM Employees
WHERE SSN = '987654321';

ALTER TABLE Employees
ADD Email VARCHAR(100);



INSERT INTO Departments (DNumber, DName, MgrSSN, MgrStartDate)
VALUES (2, 'Sales', '234567890', '2018-02-20');

INSERT INTO Employees (SSN, FName, LName, BDate, Address, Sex, Salary, SuperSSN, DNo)
VALUES ('234567890', 'Alice', 'Brown', '1978-12-10', '789 Pine St', 'F', 70000, NULL, 2),
      ('345678901', 'Bob', 'White', '1990-03-25', '321 Maple St', 'M', 55000, '234567890', 2);
```

Q3.

Retrieve the names of all employees

```
SELECT FName, LName
FROM Employees;
```

Retrieve the birthdate and address of the employee named 'John Doe'

```
SELECT BDate, Address
FROM Employees
WHERE FName = 'John' AND LName = 'Doe';
```

Retrieve the names and addresses of all employees who work in department number 1

```
SELECT FName, LName, Address
FROM Employees
WHERE DNo = 1;
```

Retrieve the names of all employees who were born after January 1, 1980

```
SELECT FName, LName
FROM Employees
WHERE BDate > '1980-01-01';
```

Retrieve the department names and the names of their managers

```
SELECT DName, FName, LName
```

```
FROM Departments
JOIN Employees ON Departments.MgrSSN = Employees.SSN;
```

Retrieve the names of all employees who are supervised by 'John Doe'

```
SELECT E2.FName, E2.LName
FROM Employees E1
JOIN Employees E2 ON E1.SSN = E2.SuperSSN
WHERE E1.FName = 'John' AND E1.LName = 'Doe';
```

Retrieve the names of all employees who work on at least one project located in 'Houston'
This requires a Projects and Works_On table, but assuming you want to simulate without those tables, here's a basic equivalent:

```
SELECT DISTINCT E.FName, E.LName
FROM Employees E
JOIN Works_On W ON E.SSN = W.ESSN
JOIN Projects P ON W.PNo = P.PNumber
WHERE P.PLocation = 'Houston';
```

Retrieve the names of all employees who do not work on any project

```
SELECT FName, LName
FROM Employees E
WHERE NOT EXISTS (SELECT *
        FROM Works_On W
        WHERE E.SSN = W.ESSN);
```

Retrieve the names of employees along with the names of the departments they manage

```
SELECT E.FName, E.LName, D.DName
FROM Employees E
JOIN Departments D ON E.SSN = D.MgrSSN;
```

Retrieve the total number of employees in each department

```
SELECT DNo, COUNT(*)
FROM Employees
GROUP BY DNo;
```

Retrieve the average salary of all employees

```
SELECT AVG(Salary)
FROM Employees;
```

Retrieve the names of all departments along with the number of employees in each department

```
SELECT D.DName, COUNT(E.SSN)
```

```
FROM Departments D
LEFT JOIN Employees E ON D.DNumber = E.DNo
GROUP BY D.DName;
```

Retrieve the names and addresses of all employees who live in 'New York'

```
SELECT FName, LName, Address
FROM Employees
WHERE Address LIKE '%New York%';
```

Retrieve the names of all employees who have no supervisor

```
SELECT FName, LName
FROM Employees
WHERE SuperSSN IS NULL;
```

Retrieve the SSNs of all employees who work in the same department as 'John Doe'

```
SELECT E2.SSN
FROM Employees E1
JOIN Employees E2 ON E1.DNo = E2.DNo
WHERE E1.FName = 'John' AND E1.LName = 'Doe';
```

THANK YOU