@Group5_Lab3

a. Retrieve the names of all employees in the department whose name is Administration

ANSWER:

Relational Algebra:

R1 ← $\sigma_{\text{DName = "Administration"}}$ (Department)

R2 ← Employee $\bowtie_{\text{DNumber = DNo}}$ R1

Res ← $\pi_{\text{FName, LName}}$ (R2)

SQL SERVER:

```sql
SELECT FName, LName
FROM Department, Employee
WHERE DNumber = DNo AND DName = 'Administration';
```

KQ:

	FName	LName
1	Jennifer	Wallace
2	Ahmad	Jabbar
3	Alicia	Zelaya

b. Retrieve the names of all employees in the departments which are located in Houston

ANSWER:

Relational Algebra:

R1 ← $\sigma_{\text{DLocation = "Houston"}}$ (DEPT_LOCATIONS)

R2 ← R1 $\bowtie_{\text{R1.DNumber = DEPARTMENT.DNumber}}$ DEPARTMENT

R3 ← R2 $\bowtie_{\text{R2.DNumer = EMPLOYEE.DNo}}$ EMPLOYEE

Res ← $\pi_{\text{FName, LName}}$ (R3)

SQL SERVER:

```sql
--b)
SELECT FName, LName
FROM Dept_locations, Department, Employee
WHERE Dept_locations.DNumber = Department.DNumber AND Department.DNumber = DNO
      AND DLocation = 'Houston';
```

KQ:

	FName	LName
1	John	Smith
2	Franklin	Wong
3	Joyce	English
4	Ramesh	Narayan
5	James	Borg

c. List the names of all employees who have a dependent with the same first name as themselves

ANSWER:

Relational Algebra:

R1 ← DEPENDENT ⋈ _{DEPENDENT.Essn = EMPLOYEE.Ssn AND Dependent_name = EMPLOYEE.FName} (EMPLOYEE)

RES ← $\pi_{\text{FName, LName}}$ (R1)

SQL SERVER:

```
SELECT FName, LName
FROM [Dependent], Employee
WHERE Essn = Ssn AND DEPENDENT_NAME = FNAME
```

KQ: Not found

d. For each project, calculate the total number of employees who work for it, and the total number of hours that these employees work for the project.

ANSWER:

Relational Algebra:

R1 ← _{PNo} $\mathcal{F}$_{COUNT Essn, SUM Hours}(WORK_ON)

R1 ← ρ _(PNo, NumEmployee, TotalHours) (R1)

R2 ← PROJECT ⋈ _{PNo = PNum} R1

RES ← $\pi_{\text{PName, PNo, NumEmployee, TotalHours}}$ (R2)

SQL SERVER:

```
--d)
SELECT PNo, Pname, NumEmployee, TotalHours
FROM Project,  (SELECT PNo, COUNT(Essn) AS NumEmployee, SUM(HOURS) AS TotalHours
                FROM Works_on, Project
                WHERE PNo = Pnumber
                GROUP BY PNo) AS R1
WHERE Pnumber = R1.PNo
```

KQ:

	PNo	Pname	NumEmployee	TotalHours
1	1	ProductX	2	52.5
2	2	ProductY	3	37.5
3	3	ProductZ	2	50
4	10	Computerization	3	55
5	20	Reorganization	3	25
6	30	Newbenefits	3	55