

INFS2200/7903 – Relational Database Systems

School of Information Technology and Electrical Engineering (ITEE), UQ

Tutorial 1

Question 1 Below is an example database for a company:

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, 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

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

DEPT_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

WORKS_ON

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	NULL

PROJECT

Pname	Pnumber	Plocation	Dnum
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

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Consider the following view, DEPT_SUMMARY, defined on the COMPANY database in the figure above:

```
CREATE VIEW DEPT_SUMMARY (D, C, Total_S, Average_S) AS
  SELECT Dno, COUNT(*), SUM(Salary), AVG(Salary)
  FROM EMPLOYEE
  GROUP BY Dno;
```

Give the results of the following queries when applied to the view:

- A.

```
SELECT *
FROM DEPT_SUMMARY;
```
- B.

```
SELECT D, C
FROM DEPT_SUMMARY
WHERE Total_S > 100000;
```
- C.

```
SELECT D, Average_S
FROM DEPT_SUMMARY
WHERE C > (SELECT C FROM DEPT_SUMMARY WHERE D=4);
```

Question 2 Answer each of the following questions briefly. The questions are based on the following relational schema:

Emp (eid: integer, ename: string, age: integer, salary: real)

Dept (did: integer, dname: string, budget: real, managerid: integer)

Works (eid: integer, did: integer, pcttime: integer)

- A. Write an SQL statement to add John Doe as an employee with eid = 101, age = 32 and salary = 15,000.
- B. Write an SQL statement to give every employee a 10% raise of salary.
- C. Write an SQL statement to delete the Toy department.
- D. Write an SQL statement to find the manager's name and salary of IT department.
- E. Write an SQL statement to find the average salary for each department that has more than 20 employees (showing the department id, the number of employees in that department, and the average salary).
- F. Explain the conceptual evaluation strategy for your SQL statement in Q2(E).

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G. Suppose you have a view SeniorEmp defined as follows:

```
CREATE VIEW SeniorEmp (sname, sage, salary) AS
  SELECT ename, age, salary
  FROM Emp
  WHERE age > 50;
```

Explain what the system will do to process the following query:

```
SELECT sname
FROM SeniorEmp
WHERE salary > 100000;
```

H. Is the view defined above updateable? If not, explain how to modify the view definition to make it updateable.

I. Suppose you have a view AvgSalaryByAge defined as follows:

```
CREATE VIEW AvgSalaryByAge (age, avgSalary) AS
  SELECT age, AVG (salary)
  FROM Emp
  GROUP BY age;
```

Is the view defined above updateable? Explain your answer.

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Answers for Question 1 are given below:

A.

D	C	TOTAL_S	AVERAGE_S
1	1	55000	55000
5	4	133000	33250
4	3	93000	31000

B.

D	C
5	4

C.

D	AVERAGE_S
5	33250

Answers for Question 2 are given below:

- A.** INSERT INTO Emp (eid, ename, age, salary)
VALUES (101, 'John Doe', 32, 15000);
- B.** UPDATE Emp SET salary = salary * 1.1;
- C.** DELETE FROM Dept WHERE dname = 'Toy';
- D.** SELECT E.ename, E.salary
FROM Emp E, Dept D
WHERE D.managerid = E.eid AND D.dname = 'IT';
- E.** SELECT W.did, COUNT(*), AVG(E.salary)
FROM Emp E, Works W
WHERE E.eid = W.eid
GROUP BY W.did
HAVING COUNT(*) > 20;
- F.** The step-by-step conceptual evaluation strategy is as below:
1. Compute cross-product of Emp (E) and Works (W);
 2. Apply the join condition E.eid = W.eid and remove unqualified rows;
 3. Keep the columns W.did and E.salary and eliminate the other columns;
 4. Sort the table based on W.did;
 5. Calculate COUNT(*) for each group and remove groups with COUNT(*) ≤ 20;
 6. Calculate AVG(E.salary) for each remaining group.

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G. The system will do the following:

```
SELECT ename  
FROM Emp  
WHERE age > 50 AND salary > 100000;
```

H. No, it is not updateable because it does not contain the primary key of the underlying table. The following definition creates an updateable view:

```
CREATE VIEW SeniorEmp (sid, sname, sage, salary) AS  
  SELECT eid, ename, age, salary  
  FROM Emp  
  WHERE age > 50;
```

I. No, it is not updateable because it contains an aggregate function.