CS 338 Mid-Term Exam Practice Problems on Lectures 09-11

Not for handing in

Model Solutions will be posted on Tuesday, June 23

1 Lecture 09

Topics

1. SQL: Data Manipulation Basics
   (a) SELECT ⟨ attribute list ⟩
   FROM ⟨ table list ⟩
   WHERE ⟨ condition ⟩
   (b) SELECT *
   (c) Prefixes
   (d) Aliases
   (e) FROM Two tables
   (f) No WHERE clause

Questions

1. Write a query to return all the department numbers and locations.
   Solution:

```
/* Write a query to return all the department numbers and locations. */
SELECT *
FROM DEPT_LOCATIONS
```

2. Write a query to return the name(s) of employees having dependents and who work on the 'Newbenefits' project.
   Solution:

```
/* Write a query to return the name(s) of employees having dependents a
SELECT FNAME, LNAME
FROM EMPLOYEE, DEPENDENT, PROJECT, WORKS_ON
WHERE EMPLOYEE.SSN = DEPENDENT.ESSN AND
EMPLOYEE.SSN = WORKS_ON.ESSN AND
PROJECT.PNUMBER = WORKS_ON.PNO AND
PROJECT.PNAME = 'Newbenefits';
```

2 Lecture 10

Topics

1. Extension to SELECT
   (a) DISTINCT
   (b) AS
   (c) expression

   (d) aggregated
2. Extension to FROM
   (a) Nested query
   (b) Join

Questions

1. Write a query to return all the department numbers (AS DEPT_NUM) and locations (AS DEPT_LOC).
   Solution:

```
/* Write a query to return all the department numbers (AS DEPT_NUM) and
SELECT DNUMBER AS DEPT_NUM, DLOCATION AS DEPT_LOC
FROM DEPT_LOCATIONS
```

2. Write a query to return all the distinct surnames of employees.
   Solution:

```
/* Write a query to return all the distinct surnames of employees. */
SELECT   DISTINCT LNAME
FROM                    EMPLOYEE;
```

3. Write a query to return the hours worked for each ESSN on project number 30, with the hours decreased by multiplying by 0.9 (we may have assumed that all employees are overstating their hours worked).
   Solution:

```
/* Write a query to return the hours worked for each ESSN on project nu
SELECT ESSN, HOURS * 0.9
FROM WORKS_ON
WHERE PNO = 30;
```

4. Write a query to return the total hours worked on project number 30.
   Solution:

```
/* Write a query to return the hours worked (AS TOTAL_HOURS) for each E
SELECT SUM(HOURS) AS TOTAL_HOURS
FROM WORKS_ON
WHERE PNO = 30;
```

5. Write a query to return the employee SSN(s) having an above-average salary. Use a nested subquery in the FROM clause.
   Solution:

```
/* Write a query to return the employee SSN(s) having an above-average
/* Use a nested subquery in the FROM clause. */
SELECT SSN
FROM EMPLOYEE,
(SELECT AVG(SALARY) AS AVG_SALARY
FROM EMPLOYEE) AS AVERAGE_SALARY
WHERE SALARY > AVERAGE_SALARY.AVG_SALARY;
```

6. Write a query to return the project names for all projects that belong to the 'Software' department. Use a JOIN in the FROM clause.
   Solution:

```
/* Write a query to return the project names for all projects that belo
/* Use a JOIN in the FROM clause. */
SELECT PNAME
FROM PROJECT INNER JOIN DEPARTMENT ON PROJECT.DNUM = DEPARTMENT.DNUMBER
WHERE DEPARTMENT.DNAME = 'Software';
```

3 Lecture 11

Topics

1. Extension to WHERE
   (a) Boolean and comparator
   (b) Pattern matching
   (c) Subquery
      i. Correlated, or not?

Questions

1. Write a query to return the names of employees having salaries between $50,000 and $70,000, inclusive.
   Solution:

```
/* Write a query to return the names of employees having salaries betwe
SELECT FNAME, LNAME
FROM EMPLOYEE
WHERE SALARY >= 50000 AND SALARY <= 70000;
```

2. Write a query to return the names of employees having the first character of their first names starting with H, K or N.
   Solution:

```
/* Write a query to return the names of employees having the first char
SELECT FNAME, LNAME
FROM EMPLOYEE
WHERE FNAME LIKE 'H%' OR FNAME LIKE 'K%' OR FNAME LIKE 'N%';
```

3. Write a query to return the employee SSN(s) having an above-average salary. Use a nested subquery in the WHERE clause.
   Solution:

```
/* Write a query to return the employee SSN(s) having an above-average
/* Use a nested subquery in the WHERE clause. */
SELECT SSN
FROM EMPLOYEE
WHERE SALARY > ALL (SELECT AVG(SALARY) FROM EMPLOYEE);
```

4. Is the nested subquery in the WHERE clause of the previous query correlated, or uncorrelated? Briefly justify your answer.
   Solution:
   - The subquery is not correlated.
   - The subquery is self-contained - it can stand on its own without anything from the scope of the outer query.

4 Company Database Schema

1. **DEPARTMENT**

DNAME	DNUMBER	MGRSSN	MGRSTARTDATE

2. **DEPENDENT**

ESSN	DEPENDENT_NAME	SEX	BDATE	RELATIONSHIP

3. **DEPT_LOCATIONS**

DNUMBER	DLOCATION

4. **EMPLOYEE**

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO

5. **PROJECT**

PNAME	PNUMBER	PLOCATION	DNUM

6. **WORKS_ON**

ESSN	PNO	HOURS