Introduction to Databases (Spring 2020)

Homework #2 (60 Pts, April 29, 2020)

Student ID 2016312761

Name 여혁수

Suppose that the *emp* and *dept* tables are represented as follows.

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
7369	SMITH	CLERK	7902	80/12/17	800		20
7499	ALLEN	SALESMAN	7698	81/02/20	1600	300	30
7521	WARD	SALESMAN	7698	81/02/22	1250	500	30
7566	JONES	MANAGER	7839	81/04/02	2975		20
7654	MARTIN	SALESMAN	7698	81/09/28	1250	1400	30
7698	BLAKE	MANAGER	7839	81/05/01	2850		30
7782	CLARK	MANAGER	7839	81/06/09	2450		10
7788	SCOTT	ANALYST	7566	87/04/19	3000		20
7839	KING	PRESIDENT		81/11/17	5000		10
7844	TURNER	SALESMAN	7698	81/09/08	1500	0	30
7876	ADAMS	CLERK	7788	87/05/23	1100		20
7900	JAMES	CLERK	7698	81/12/03	950		30
7902	FORD	ANALYST	7566	81/12/03	3000		20
7934	MILLER	CLERK	7782	82/01/23	1300		10

DEPTNO	DNAME	LOC
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON

(1) [**5 pts**] Find the employee number and the name of employees whose name have ‘a’ and ‘m’ in any position. Note that ‘a’ should appear before ‘m’.

(번역: 이름에 ‘a’와 ‘m’을 포함하고 있는 사원들의 번호와 이름을 찾으시오. ‘a’가 ‘m’보다 먼저 나타낸다.)

Answer:

```
SELECT empno, ename

FROM   emp

WHERE    ename LIKE '%a%m%';
```

Result:

empno	ename
7876	ADAMS
7900	JAMES

(2) [**5 pts**] Find the number of employees who have unknown commission values. Note that use NULL clause.

(번역: NULL 를 이용하여 commission 값이 존재하지 않는 사원 수를 찾으시오.)

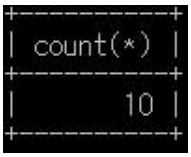
Answer:

```
SELECT        count(*)

FROM  emp

WHERE       comm is NULL;
```

Result:



count(*)
10

(3) [**5 pts**] Find the name of departments and the number of employees where at least three employees are working in the department.

(번역:최소 3 명의 사원이 존재하는 부서의 이름과 해당 부서에 소속된 사원 수를 찾으시오.)

Answer:

```
SELECT  d.dname, count(e.ename)

FROM  emp e, dept d

WHERE  e.deptno = d.deptno
```

```
GROUP BY    e.deptno

HAVING              count(e.ename)>=3;
```

Result:

dname	count(*)
RESEARCH	5
SALES	6
ACCOUNTING	3

(4) [**5 pts**] Find the name of employees and their salaries who work at 'DALLAS'. Note that you use INNER JOIN clause.

(번역: DALLAS 에 근무하는 사원의 이름과 급여를 찾으시오.)

Answer:

```
SELECT    ename, sal

FROM     emp e

INNER JOIN   dept d     ON      d.deptno=e.deptno


WHERE      d.loc='dallas';
```

Result:

ename	sal
SMITH	800.00
JONES	2975.00
SCOTT	3000.00
ADAMS	1100.00
FORD	3000.00

(5) [**8 pts**] Find the **highest** salary in each department and sort them in decreasing order by their salaries. Note that you use LEFT JOIN clause.

(번역: LEFT JOIN 을 사용하여 각 부서별 가장 높은 급여를 찾고, 이를 내림차순으로 정렬하시오.)

Answer:

```
SELECT    dname, MAX(sal) as max_sal

FROM      dept d

LEFT JOIN    emp e       ON     d.deptno=e.deptno

GROUP BY     d.deptno


ORDER BY   max_sal DESC ;
```

Result:

dname	max_sal
ACCOUNTING	5000.00
RESEARCH	3000.00
SALES	2850.00
OPERATIONS	NULL

(6) [8 pts] Find the name of the employee who is **senior** to their managers (MGR) [senior is defined as being hired earlier].

(번역: 자신의 manager 보다 고용일자가 더 앞선 사원의 이름을 찾으시오.)

Answer:

```
SELECT ename

FROM  emp e

WHERE   e.hiredate<    ( SELECT  m.hiredate
FROM  emp  m

                        WHERE  e.mgr=m.empno      );
```

Result:

ename
SMITH
ALLEN
WARD
JONES
BLAKE
CLARK

(7) [**8 pts**] Find the employee number and the name of employees who **DO NOT** manage other employees. Note that use NOT EXISTS clause.

(번역: NOT EXISTS 를 이용하여 부하사원이 없는 사원들의 이름과 번호를 찾으시오.)

Answer:

```
SELECT  m.empno, m.ename

FROM  emp m

WHERE  NOT EXISTS (SELECT *

        FROM emp e

      WHERE  m.empno=e.mgr      );
```

Result:

empno	ename
7369	SMITH
7499	ALLEN
7521	WARD
7654	MARTIN
7844	TURNER
7876	ADAMS
7900	JAMES
7934	MILLER

(8) [**8 pts**] Find the department number whose average salary for the department is **less than** the average of all employees. Note that use a nested query for HAVING clause.

(번역: 부서의 평균이 모든 사원들의 평균 급여보다 작은 부서의 번호와 해당 부서의 평균 급여를 찾으시 오.)

Answer:

```
SELECT  deptno, avg(sal)

FROM emp

GROUP BY deptno

HAVING  avg(sal)  (SELECT  avg(sal)  from emp);
```

Result:

deptno	avg(sal)
30	1566.666667

(9) [**8 pts**] Find the **average** salaries of employees managed by each supervisor.

(번역: 사원 별 **직속** 부하 사원의 평균 급여를 찾으시오.)

Answer:

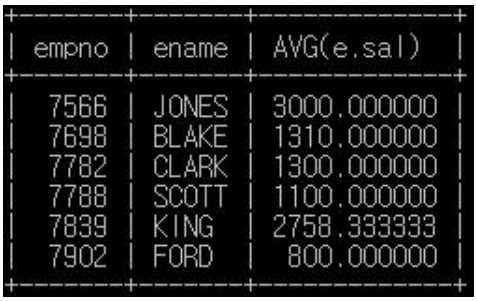
```
SELECT m.empno, m.ename, AVG(e.sal)

FROM emp e, emp m

WHERE  e.mgr=m.empno
```

```
GROUP BY   m.empno;
```

Result:



empno	ename	AVG(e.sal)
7566	JONES	3000.000000
7698	BLAKE	1310.000000
7782	CLARK	1300.000000
7788	SCOTT	1100.000000
7839	KING	2758.333333
7902	FORD	800.000000