

COMS4111 Homework 2

Yixing Chen, yc3094

(1) Print the sid and name of students who have enrolled in at least one course offered by the 'Chemical Engineering' department and at least one course offered by the 'Industrial Engineering' department.

Query:

```
SELECT S.sid,S.sname
FROM student S, enroll E
WHERE S.sid=E.sid AND E.dname='Chemical Engineering'
INTERSECT
SELECT S.sid,S.sname
FROM Student S, enroll E
WHERE S.sid=E.sid AND E.dname='Industrial Engineering'
```

Result:

SID	SNAME
49	Villa-lobos M.

(2) Print the name and age of the student(s) with the highest GPA among all students of the same age.

Query:

```
SELECT S1.sname,S1.age
FROM student S1
WHERE S1.gpa>= ALL(SELECT S2.gpa
FROM student S2
WHERE S1.age=S2.age)
```

Result:

SNAME	AGE
Pierson E.	32
Zeene Ben N.	21
Paul Mary W.	23
Borchart Sandra L.	26
Thorton James Q.	28
Carter Jimmy	56
Kissinger Henry	58
Ford Gerald	60
Baker C.	18
Liu Huihusan	29
Chao Tsechih	23
Dunbar D.	30

Natividad A.	25
Villa-lobos M.	47
Moomchi B.	32
Maximillian	98
Kool Joseph F.	35
Fred Edwin B.	80
Altenhaus Gloria	22
Mark B.	24
Barnes J.	45
Quarnty G.	20
Evert Chris	21
Smith Ike Z.	33
News Nightly	15
Jones Ivan L.	55
Longlastname A.	99
Zappa F.	16
Ghandi I.	78
Kirk J.	34
Grzlbltz Q.	43
Morgan D.	18
Davis Scott P.	19

(3)Top students per major. For each department with more than 8 students majoring in the department, print the following information about the student(s) with the highest GPA within the department: the student id, student name and GPA, and the department name the student is major in.

Query:

```

SELECT S1.sid, S1.sname, S1.gpa,M1.dname
FROM student S1, major M1
WHERE S1.sid=M1.sid AND
S1.gpa>= ALL(SELECT S2.gpa
              FROM student S2, major M2
              WHERE S2.sid=M2.sid AND M1.dname=M2.dname)
AND M1.dname IN (SELECT M3.dname
                  FROM major M3
                  GROUP BY M3.dname
                  HAVING COUNT(*)>8)

```

Result:

SID	SNAME	GPA	DNAME
32	Liu Huihusan	3.9	Chemical Engineering
15	Borchart Sandra L.	3.9	Computer Sciences
3	Zeene Ben N.	3.9	Computer Sciences
90	Zappa F.	4	Mathematics
89	Longlastname A.	4	Mathematics
48	Natividad A.	4	Civil Engineering
73	Quarnty G.	4	Industrial Engineering
67	Altenhaus Gloria	4	Industrial Engineering
64	Fred Edwin B.	4	Industrial Engineering

(4)Difficult courses. For each department offering more than 2 courses, print the department name, course number, and course average grade of each course that has an average grade that is at least 5% less than the average grade obtained by students in all courses offered by the same department.

Query:

```
SELECT E1.dname, E1.cno, AVG(E1.grade) AS Average_grade
FROM enroll E1
WHERE E1.dname IN ( SELECT C1.dname
                     FROM course C1
                     GROUP BY C1.dname
                     HAVING count(*)>2)
GROUP BY E1.dname, E1.cno
HAVING AVG(E1.grade) <= 0.95 * (SELECT AVG(E2.grade)
                                FROM enroll E2
                                WHERE E1.dname = E2.dname)
```

Result:

[illegible]

(5) Top 2 unpopular courses. Print the department name, course number, and course enrollment of each course that has an enrollment equal to the lowest or second to the lowest enrollment of all courses offered by the same department. The enrollment of a course is the sum of the enrollment of all its sections. Note: for this query, you should consider all courses, including those with zero enrollment. [Hint: You will need to use outer joins for this query; see class notes on the subject and for more the Oracle's online manual on Outer Joins and Using Outer Joins: Examples.]

Query:

```
SELECT C.dname, C.cno, COUNT(E.sid) AS Enrollment
FROM course C LEFT OUTER JOIN enroll E ON C.cno=E.cno AND C.dname=E.dname
GROUP BY C.cno, C.dname
HAVING COUNT(E.sid) =
(
    SELECT MIN(enroll1)
    FROM
    (
        SELECT C1.dname, COUNT(E1.sid) AS enroll1
        FROM course C1 LEFT OUTER JOIN enroll E1 ON C1.cno=E1.cno AND
        C1.dname=E1.dname
        GROUP BY C1.cno, C1.dname
    ) TEMP1
    WHERE TEMP1.dname=C.dname
)
UNION
SELECT C.dname, C.cno, COUNT(E.sid) AS Enrollment
FROM course C LEFT OUTER JOIN enroll E ON C.cno=E.cno AND C.dname=E.dname
GROUP BY C.cno, C.dname
HAVING COUNT(E.sid) =
(
    SELECT MIN(enroll2)
    FROM
    (
        SELECT C2.dname, COUNT(E2.sid) AS enroll2
        FROM course C2 LEFT OUTER JOIN enroll E2 ON C2.cno=E2.cno AND
        C2.dname=E2.dname
        GROUP BY C2.cno, C2.dname
    ) TEMP2
    WHERE TEMP2.dname=C.dname AND TEMP2. enroll2>
(
    SELECT MIN(enroll1)
    FROM
    (
        SELECT C1.dname, COUNT(E1.sid) AS enroll1
        FROM course C1 LEFT OUTER JOIN enroll E1 ON C1.cno=E1.cno AND
        C1.dname=E1.dname
        GROUP BY C1.cno, C1.dname
    ) TEMP1
    WHERE TEMP1.dname=C.dname
)
)
```

Result:

DNAME	CNO	ENROLLMENT
Chemical Engineering	310	7
Civil Engineering	365	8
Civil Engineering	375	9
Computer Sciences	467	10
Computer Sciences	701	12
Industrial Engineering	514	9
Mathematics	461	9
Mathematics	462	9
Sanitary Engineering	310	0
Sanitary Engineering	561	1