

MODERN DATABASE SYSTEM LAB 8
UNIVERSITY COURSE ENROLLMENT DATA ANALYTICS

NAME: PAVITHIRAN.V

ROLL.NO: 235229122

Question 1:

```
SELECT p.PNAME
FROM prof_data p
INNER JOIN dept_data d ON p.DNAME = d.DNAME
LEFT JOIN (SELECT DNAME, COUNT(*) AS NUM_PHD
           FROM major_data
           GROUP BY DNAME) m ON d.DNAME = m.DNAME
WHERE m.NUM_PHD < 50 OR m.NUM_PHD IS NULL;
```

```
SQL> SELECT p.PNAME
2  FROM prof_data p
3  INNER JOIN dept_data d ON p.DNAME = d.DNAME
4  LEFT JOIN (SELECT DNAME, COUNT(*) AS NUM_PHD
5             FROM major_data
6             GROUP BY DNAME) m ON d.DNAME = m.DNAME
7* WHERE m.NUM_PHD < 50 OR m.NUM_PHD IS NULL;
```

PNAME

```
-----
Edison, L.
Smith, S.
Walter, A.
Robinson, T.
Brown, S.
Clark, E.
Randolph, B.
Bucket, T.
Jones, J.
Brian, C.
```

Question 2:

```
SELECT SNAME
FROM student_data
WHERE GPA = (SELECT MIN(GPA) FROM student_data);
```

```
SQL> SELECT SNAME
      2 FROM student_data
[ 3* WHERE GPA = (SELECT MIN(GPA) FROM student_data);

SNAME
-----
Jetplane, Leaving 0.
```

Question 3:

```
SELECT
    s.CNO AS ClassNumber,
    s.SEC_NO AS SectionNumber,
    AVG(GPA) AS AverageGPA
FROM
    section_data s
INNER JOIN
    course_data c ON s.CNO = c.CNO
LEFT JOIN
    enroll_data e ON s.CNO = e.CNO AND s.SEC_NO = e.SEC_NO
LEFT JOIN
    student_data sd ON e.SID = sd.SID
WHERE
    c.DNAME = 'Computer Sciences'
GROUP BY
    s.CNO, s.SEC_NO
ORDER BY
    s.CNO, s.SEC_NO;
```

CLASSNUMBER	SECTIONNUMBER	AVERAGEGPA
302	1	2.999999999999998
302	2	3.0749999880790675
467	1	2.980000019073485
701	1	3.28333333134650833333333333333333
726	1	2.64117648058077541176470588235294117647

```
SELECT
    s.PNAME AS ProfessorName,
    s.SEC_NO AS SectionNumber
FROM
    section_data s
LEFT JOIN
    enroll_data e ON s.CNO = e.CNO AND s.SEC_NO = e.SEC_NO
GROUP BY
    s.PNAME, s.SEC_NO
HAVING
    COUNT(e.SID) > 6
ORDER BY
    s.SEC_NO;
```

```

SQL> SELECT
  2     s.PNAME AS ProfessorName,
  3     s.SEC_NO AS SectionNumber
  4 FROM
  5     section_data s
  6 LEFT JOIN
  7     enroll_data e ON s.CNO = e.CNO AND s.SEC_NO = e.SEC_NO
  8 GROUP BY
  9     s.PNAME, s.SEC_NO
 10 HAVING
 11     COUNT(e.SID) > 6
 12 ORDER BY
 13*    s.SEC_NO;

```

PROFESSORNAME	SECTIONNUMBER
Brian, C.	1
Brown, S.	1
Bucket, T.	1
Clark, E.	1
Edison, L.	1
Jones, J.	1
Randolph, B.	1
Robinson, T.	1
Walter, A.	1
Smith, S.	2

Question 5:

```

SELECT s.SID, st.SNAME
FROM (
    SELECT SID, RANK() OVER (ORDER BY SectionCount DESC) AS rank
    FROM (
        SELECT e.SID, COUNT(*) AS SectionCount
        FROM enroll_data e
        GROUP BY e.SID
    )
) s
JOIN student_data st ON s.SID = st.SID
WHERE s.rank = 1;

```

```

SQL> SELECT s.SID, st.SNAME
  2 FROM (
  3     SELECT SID, RANK() OVER (ORDER BY SectionCount DESC) AS rank
  4     FROM (
  5         SELECT e.SID, COUNT(*) AS SectionCount
  6         FROM enroll_data e
  7         GROUP BY e.SID
  8     )
  9 ) s
10 JOIN student_data st ON s.SID = st.SID
11* WHERE s.rank = 1;

  SID SNAME
-----
  29 Hamilton, S.

```

Question 6:

```

SELECT DISTINCT d.DNAME
FROM dept_data d
WHERE EXISTS (
    SELECT 1
    FROM major_data m
    JOIN student_data s ON m.SID = s.SID
    WHERE d.DNAME = m.DNAME AND s.AGE < 18
);

```

```

SQL> SELECT DISTINCT d.DNAME
  2 FROM dept_data d
  3 WHERE EXISTS (
  4     SELECT 1
  5     FROM major_data m
  6     JOIN student_data s ON m.SID = s.SID
  7     WHERE d.DNAME = m.DNAME AND s.AGE < 18
  8* );

  DNAME
-----
Industrial Engineering
Mathematics

```

Question 7:

```

SELECT DISTINCT s.SNAME, m.DNAME AS Major
FROM student_data s
JOIN major_data m ON s.SID = m.SID
JOIN enroll_data e ON s.SID = e.SID

```

JOIN section_data sec ON e.CNO = sec.CNO AND e.SEC_NO = sec.SEC_NO

JOIN course_data c ON sec.CNO = c.CNO

WHERE c.CNAME LIKE '%Geometry%';

```
SQL> SELECT DISTINCT s.SNAME, m.DNAME AS Major
  2 FROM student_data s
  3 JOIN major_data m ON s.SID = m.SID
  4 JOIN enroll_data e ON s.SID = e.SID
  5 JOIN section_data sec ON e.CNO = sec.CNO AND e.SEC_NO = sec.SEC_NO
  6 JOIN course_data c ON sec.CNO = c.CNO
  7* WHERE c.CNAME LIKE '%Geometry%';
```

SNAME	MAJOR
Sulfate, Barry M.	Computer Sciences
Thorton, James Q.	Computer Sciences
Mathews, John W.	Chemical Engineering
Glitch, R.	Civil Engineering
Davis, Scott P.	Mathematics
Bates, Michael L.	Mathematics
Cheong, R.	Computer Sciences
Ford, Gerald	Chemical Engineering
Atny, Mary H.	Civil Engineering
Ziebart, F.	Civil Engineering
Uoiea, Z.	Mathematics
Gooch	Computer Sciences
Austin, G.	Chemical Engineering
Zappa, F.	Mathematics
Ghandi, I.	Mathematics
Dunbar, D.	Civil Engineering
Rosemeyer, S.	Civil Engineering
Smith, L.	Computer Sciences

Question 8:

SELECT

d.DNAME AS DepartmentName,

NVL(d.NUM_PHD, 0) AS NumPhDStudents

FROM

dept_data d

LEFT JOIN

(

SELECT DISTINCT m.DNAME

FROM major_data m

JOIN enroll_data e ON m.SID = e.SID

JOIN section_data sec ON e.CNO = sec.CNO AND e.SEC_NO = sec.SEC_NO

JOIN course_data c ON sec.CNO = c.CNO

WHERE c.CNAME LIKE '%Geometry%'

) geometry_depts

ON

d.DNAME = geometry_depts.DNAME

WHERE

geometry_depts.DNAME IS NULL;

```
SQL> SELECT
  2     d.DNAME AS DepartmentName,
  3     NVL(d.NUM_PHD, 0) AS NumPhDStudents
  4 FROM
  5     dept_data d
  6 LEFT JOIN
  7     (
  8         SELECT DISTINCT m.DNAME
  9         FROM major_data m
 10        JOIN enroll_data e ON m.SID = e.SID
 11        JOIN section_data sec ON e.CNO = sec.CNO AND e.SEC_NO = sec.SEC_NO
 12        JOIN course_data c ON sec.CNO = c.CNO
 13        WHERE c.CNAME LIKE '%Geometry%'
 14     ) geometry_depts
 15 ON
 16     d.DNAME = geometry_depts.DNAME
 17 WHERE
 18*    geometry_depts.DNAME IS NULL;
```

DEPARTMENTNAME	NUMPHDSTUDENTS
Industrial Engineering	41
Sanitary Engineering	3

Question 9:

```
SELECT DISTINCT s.SNAME
FROM student_data s
WHERE s.SID IN (
    SELECT m.SID
    FROM major_data m
    JOIN enroll_data e ON m.SID = e.SID
    JOIN section_data sec ON e.CNO = sec.CNO AND e.SEC_NO = sec.SEC_NO
    JOIN course_data c ON sec.CNO = c.CNO
    WHERE m.DNAME = 'Computer Sciences'
)
AND s.SID IN (
    SELECT m.SID
    FROM major_data m
    JOIN enroll_data e ON m.SID = e.SID
    JOIN section_data sec ON e.CNO = sec.CNO AND e.SEC_NO = sec.SEC_NO
    JOIN course_data c ON sec.CNO = c.CNO
    WHERE m.DNAME = 'Mathematics'
);
```

```

SQL> SELECT DISTINCT s.SNAME
  2 FROM student_data s
  3 WHERE s.SID IN (
  4     SELECT m.SID
  5     FROM major_data m
  6     JOIN enroll_data e ON m.SID = e.SID
  7     JOIN section_data sec ON e.CNO = sec.CNO AND e.SEC_NO = sec.SEC_NO
  8     JOIN course_data c ON sec.CNO = c.CNO
  9     WHERE m.DNAME = 'Computer Sciences'
 10 )
 11 AND s.SID IN (
 12     SELECT m.SID
 13     FROM major_data m
 14     JOIN enroll_data e ON m.SID = e.SID
 15     JOIN section_data sec ON e.CNO = sec.CNO AND e.SEC_NO = sec.SEC_NO
 16     JOIN course_data c ON sec.CNO = c.CNO
 17     WHERE m.DNAME = 'Mathematics'
 18* );

SNAME
-----
Pierson, E.
Jacobs, T.

```

Question 10:

```

SELECT MAX(s.AGE) - MIN(s.AGE) AS AgeDifference
FROM student_data s
WHERE s.SID IN (
    SELECT m.SID
    FROM major_data m
    WHERE m.DNAME = 'Computer Sciences'
);

```

```

SQL> SELECT m.SID
  2 FROM major_data m
 3* WHERE m.DNAME = 'Computer Science';

no rows selected
SQL> SELECT MAX(s.AGE) - MIN(s.AGE) AS AgeDifference
  2 FROM student_data s
  3 WHERE s.SID IN (
  4     SELECT m.SID
  5     FROM major_data m
  6     WHERE m.DNAME = 'Computer Sciences'
 7* );

AGEDIFFERENCE
-----
38

```


Question 11:

```
SELECT
    d.DNAME AS DepartmentName,
    AVG(s.GPA) AS AverageGPA
FROM
    dept_data d
JOIN
    major_data m ON d.DNAME = m.DNAME
JOIN
    student_data s ON m.SID = s.SID
WHERE
    s.GPA < 1.0
GROUP BY
    d.DNAME
HAVING
    COUNT(DISTINCT m.SID) > 0;
```

```
SQL> SELECT
  2      d.DNAME AS DepartmentName,
  3      AVG(s.GPA) AS AverageGPA
  4  FROM
  5      dept_data d
  6  JOIN
  7      major_data m ON d.DNAME = m.DNAME
  8  JOIN
  9      student_data s ON m.SID = s.SID
 10  WHERE
 11      s.GPA < 1.0
 12  GROUP BY
 13      d.DNAME
 14  HAVING
 15*      COUNT(DISTINCT m.SID) > 0;
```

DEPARTMENTNAME	AVERAGEGPA
Industrial Engineering	0.350000001490116
Civil Engineering	0
Computer Sciences	0.699999988079071

Question 12:

```
SELECT s.SID, s.SNAME, s.GPA
FROM student_data s
WHERE s.SID IN (
    SELECT e.SID
    FROM enroll_data e
    WHERE e.CNO IN (
        SELECT CNO
        FROM course_data
        WHERE DNAME = 'Civil Engineering'
    )
    GROUP BY e.SID
    HAVING COUNT(DISTINCT e.CNO) = (
        SELECT COUNT(DISTINCT CNO)
        FROM course_data
        WHERE DNAME = 'Civil Engineering'
    )
);
```

```
SQL> SELECT s.SID, s.SNAME, s.GPA
  2  FROM student_data s
  3  WHERE s.SID IN (
  4      SELECT e.SID
  5      FROM enroll_data e
  6      WHERE e.CNO IN (
  7          SELECT CNO
  8          FROM course_data
  9          WHERE DNAME = 'Civil Engineering'
10  )
11  GROUP BY e.SID
12  HAVING COUNT(DISTINCT e.CNO) = (
13      SELECT COUNT(DISTINCT CNO)
14      FROM course_data
15      WHERE DNAME = 'Civil Engineering'
16  )
17* );
```

SID	SNAME	GPA
29	Hamilton, S.	2.79999995231628