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Q.1

(a) SQL query:
SELECT s-id, s-name FROM student
WHERE department = 'CS' AND cgpa > 3.0;

(b) SQL query:
SELECT club.c-id, club.c-name FROM student
NATURAL JOIN membership
NATURAL JOIN club
WHERE cgpa > 2.0;

(c) SQL query:
SELECT club.c-id, club.c-name, COUNT(*) as cnt FROM club
NATURAL JOIN membership
GROUP BY club.c-id, club.c-name
HAVING COUNT(*) > 100;

(d) SQL query:
WITH temp1 AS (
    SELECT c-id, COUNT(*) as cnt FROM membership
    GROUP BY c-id
), temp2 AS (
    SELECT MAX(cnt) as cnt FROM temp1
)
SELECT club.c-id, club.c-name FROM temp2
NATURAL JOIN temp1
NATURAL JOIN club;

Q.2

(a) SQL query:
SELECT Students.TCK, Students.sname
FROM Students
INNER JOIN Grades ON Students.TCK = Grades.TCK
INNER JOIN Courses ON Grades.cid = Courses.cid
WHERE Courses.cdept = 'CS' AND Courses.credit = 4 AND Grades.grade > 90;

(b) SQL query:
SELECT Students.TCK, Students.sname
FROM Students
LEFT JOIN Grades ON Students.TCK = Grades.TCK
LEFT JOIN Courses ON Grades.cid = Courses.cid
WHERE Students.sdept = 'CS' AND Students.cgpa > 3.5 AND Courses.cid IS NULL OR
Courses.cdept != 'EE';

(c) SQL query:
SELECT TCK, sname
FROM Students
WHERE sdept = 'CS' AND cgpa = (SELECT MAX(cgpa) FROM Students WHERE sdept = 'CS');

(d) SQL query:
SELECT Courses.cid, Courses.cname
FROM Courses
INNER JOIN Grades ON Courses.cid = Grades.cid
INNER JOIN Students ON Grades.TCK = Students.TCK
WHERE Courses.cdept = 'CS'
GROUP BY Courses.cid, Courses.cname
HAVING COUNT(DISTINCT Students.sdept) >= 5;

(e) SQL query:
SELECT TCK, sname
FROM Students
INNER JOIN Grades ON Students.TCK = Grades.TCK
WHERE Grades.grade = 100
GROUP BY TCK, sname
HAVING COUNT(*) >= 5;

(f) SQL query:
SELECT Courses.cdept, Courses.cid, AVG(Grades.grade)
FROM Courses
LEFT JOIN Grades ON Courses.cid = Grades.cid
GROUP BY Courses.cdept, Courses.cid
ORDER BY Courses.cdept;

(g) SQL query:
SELECT Courses.cdept, Courses.cid
FROM Courses
LEFT JOIN Grades ON Courses.cid = Grades.cid
GROUP BY Courses.cdept, Courses.cid
HAVING AVG(Grades.grade) = (
  SELECT MAX(avg_grade)
  FROM (
    SELECT Courses.cdept, Courses.cid, AVG(Grades.grade) as avg_grade
    FROM Courses
    LEFT JOIN Grades ON Courses.cid = Grades.cid
    GROUP BY Courses.cdept, Courses.cid
) AS temp

```
    WHERE temp.cdept = Courses.cdept
)
ORDER BY Courses.cdept;
```

(h) SQL query:
```
SELECT Students.TCK, Students.sname
FROM Students
WHERE Students.cgpa > (
  SELECT AVG(cgpa)
  FROM Students
  WHERE sdept = Students.sdept
);
```

(i) SQL query:
```
SELECT TCK, sname
FROM Students
WHERE cgpa = (
  SELECT MAX(cgpa)
  FROM Students
  WHERE sdept = Students.sdept
)
ORDER BY sdept;
```

(j) SQL query:
```
SELECT DISTINCT s1.TCK, s2.TCK
FROM Students s1, Students s2
INNER JOIN Grades g1 ON s1.TCK = g1.TCK
INNER JOIN Grades g2 ON s2.TCK = g2.TCK
WHERE s1.TCK < s2.TCK AND g1.cid = g2.cid AND s1.sdept != s2.sdept
GROUP BY s1.TCK, s2.TCK
HAVING COUNT(*) >= 10;
```