SQL
Solutions to Exercise of Simple SQL Queries

Exercise for Simple SQL Queries

- **Schema**
  - Student (snum: integer, sname: string, major: string, level: string, age: integer)
  - Class (cname: string, meets_at: string, room: string, fid: integer)
  - Enrolled (snum: integer, cname: string)
  - Faculty (fid: integer, fname: string, deptid: integer)

Simple Projection/Selection

- **Q1: Find the department ID of the faculty member named *Adam Smith.***
- **Q2: Find the names of all junior students (level='JR') and older than 20**

Q1:
```
SELECT deptid
FROM Faculty
WHERE fname = 'Adam Smith';
```

What if only unique names are needed for output?

Q2:
```
SELECT S.sname
FROM Student S
WHERE S.level = 'JR' AND S.age>20;
```

Simple Projection/Selection

- **Q3: Find the classes that have at least one enrollment.**

Q3: SELECT **cname**
FROM Enrolled;

Join

- **Q4: Find names and majors of students who have enrolled in at least one class.**
- **Q5: Find names of students who have enrolled in at least two classes.**

Q4: SELECT S.sname, S.major
FROM Student S, Enrolled E
WHERE S.snum = E.snum;

Q5: SELECT **S.sname**
FROM Student S, Enrolled E1, Enrolled E2
WHERE E1.snum = E2.snum AND
E1.cnum <> E2.cnum AND S.snum = E1.snum;

(Note: S.snum = E2.snum is redundant due to S.snum = E1.sum and E1.snum = E2.snum in WHERE clause)

Join

- **Q6: Find distinct names of all Juniors (*level = JR) enrolled in a* class taught by *Adam Smith.***

```
Q6: SELECT DISTINCT S.sname
    FROM Student S, Class C, Enrolled E, Faculty F
    WHERE S.snum = E.snum
          AND E.cname = C.name
          AND C.fid = F.fid
          AND F.fname = 'Adam Smith'
          AND S.level = 'JR';
```

Set Operations

- **Q7: Find the distinct names of all students who have enrolled in both CS442 and CS392.**

Q7 Sol#1 (use set operations):

SELECT DISTINCT S.sname
FROM Student S, Enrolled E
WHERE S.snum = *E.snum AND E.cnum = 'CS442'*
INTERSECT
SELECT DISTINCT S2.sname
FROM Student S2, Enrolled E2
WHERE S2.snum = *E2.snum AND E2.cnum = 'CS392'*

Set Operations

- **Q7: Find the distinct names of all students who have enrolled in both CS442 and CS392.**

Q7 Sol#2 (without using set operations):

```
SELECT DISTINCT S.sname
FROM Student S, Enrolled E1, Enrolled E2
WHERE S.snum = E1.snum
        AND E1.snum = E2.snum
        AND E1.cnum = 'CS442'
        AND E2.cnum = 'CS392';
```