1.

(a) List all courses (and course details) for which Professor John Tan has been qualified.

```
SELECT Course.CourseID, CourseName
FROM Lecturer, IsQualified, Course
WHERE Lecturer.LecturerID = IsQualified.LecturerID
AND Course.CourseID = IsQualified.CourseID
AND LecturerName = 'John Tan';
```

(b) Find the IDs of any lecturers who are qualified to teach ISM3113 but not qualified to teach ISM3114.

For example, if IsQualified table has the following data:

LecturerID	CourseID	DateQualified
1001	ISM3113	01-JAN-2000
1001	ISM3114	03-JAN-2000
1002	ISM3113	11-JAN-2000
1003	ISM3113	21-JAN-2000
1003	ISM3114	21-JAN-2000
1004	ISM3114	23-FEB-2001
1005	ABS2001	23-FEB-2001

A correct SQL should return LecturerID 1002.

Will the following SQL work?

```
SELECT LecturerID
FROM IsQualified
WHERE CourseID = 'ISM3113'
AND CourseID != 'ISM3114';
```

The above SQL will return lecturer IDs 1001, 1002 and 1003, since rows 1, 3 and 4 satisfy the condition in the “WHERE” clause.

How about this:

```
SELECT DISTINCT LecturerID
FROM IsQualified
WHERE CourseID = 'ISM3113'
AND LecturerID IN
    (SELECT DISTINCT LecturerID
    FROM IsQualified
    WHERE CourseID != 'ISM3114');
```

The sub-query will return lecturer IDs 1001, 1002, 1003, and 1005 (rows 1, 3, 4, and 7). The outer query will then return lecturer IDs 1001, 1002, and 1003.

A correct SQL is:

```
SELECT DISTINCT LecturerID
FROM IsQualified
WHERE CourseID = 'ISM3113'
AND LecturerID NOT IN
      (SELECT DISTINCT LecturerID
      FROM IsQualified
      WHERE CourseID = 'ISM3114');
```

The sub-query will return lecturer IDs 1001, 1003 and 1004 (rows 2, 5 and 6). The outer query will then return lecturer ID 1002 (1001 and 1003 being excluded by the sub-query result).

(c) Find out how many students are enrolled in course ISM3113 during semester I-98.

```
SELECT COUNT (DISTINCT StudentID)
FROM Tutorial, IsRegistered
WHERE Tutorial.TutorialID= IsRegistered.TutorialID
AND CourseID = 'ISM3113'
AND Semester = 'I-98';
```

(d) Find out which students were not enrolled in any courses during semester I-98. Show their IDs and names.

Will the following SQL work?

```
SELECT StudentID, StudentName
FROM Student
WHERE StudentID IN
      (SELECT DISTINCT StudentID
      FROM IsRegistered
      WHERE Semester !=  'I-98');
```

It would output all students who have registered in any semester(s) other than I-98, no matter they registered in I-98 or not. In addition, it does not include students who were not registered in any semesters.

A correct SQL is:

```
SELECT StudentID, StudentName
FROM Student
WHERE StudentID NOT IN
      (SELECT DISTINCT StudentID
      FROM IsRegistered
      WHERE Semester= 'I-98');
```

2.

(a.1) Create a view RReader to include those readers (reader IDs and names) who have a rating 2 or less *and* those who have reserved more than two different books.

```
CREATE VIEW RReader AS
    SELECT ReaderID, ReaderName
    FROM Reader
    WHERE Rating <= 2
    OR  ReaderID IN
        (SELECT DISTINCT ReaderID
        FROM Reserve
        GROUP BY ReaderID
        HAVING COUNT(DISTINCT BookNO) > 2);
```

(a.2) Create a view RReader to include those readers (reader IDs and names) who have a rating 2 or less and ~~those readers who~~ have reserved more than two different books.

```
CREATE VIEW RReader AS
    SELECT ReaderID, ReaderName
    FROM Reader
    WHERE Rating <= 2
    AND ReaderID IN
        (SELECT DISTINCT ReaderID
        FROM Reserve
        GROUP BY ReaderID
        HAVING COUNT(DISTINCT BookNO) > 2);
```

(b) Add a new column Author to the Book table.

```
ALTER TABLE Book
    ADD Author CHAR(30) NOT NULL;
```

(c) Insert the following records in the Reserve table:
On 1-Mar-02, Reader R1 reserved books B5 and B6.

```
INSERT INTO Reserve VALUES ('R1', 'B5', '01-Mar-02');
INSERT INTO Reserve VALUES ('R1', 'B6', '01-Mar-02');
```

(d.1) List the IDs of the readers who have reserved a blue book.

```
SELECT DISTINCT ReaderID
FROM Reserve, Book
WHERE Reserve.BookNO = Book.BookNO
AND Color = 'Blue';
```

(d.2) List the names of the readers who have reserved a blue book.

```
SELECT DISTINCT (Reader.ReaderID, ReaderName)
FROM Reader, Reserve, Book
WHERE Reader.ReaderID=Reserve.ReaderID
AND Reserve.BookNO = Book.BookNO
AND Color = 'Blue';
```

(e1) Find the number of blue books.

```
SELECT COUNT BookNO
FROM Book
WHERE Color = ‘Blue’;
```

(e2) For each book, find the number of reservations for this book.

```
SELECT BookNO, COUNT(*)
FROM Reserve
GROUP BY BookNO;
```

(e3) For each blue book, find the number of reservations for this book.

```
SELECT Reserve.BookNO, COUNT(*)
FROM Reserve, Book
WHERE Reserve.BookNO = Book.BookNO
AND Color = ‘Blue’
GROUP BY Reserve.BookNO;
```

(f) Find the names and ratings of persons who have reserved two or more (different) books on the same date.

```
SELECT Date, Reader.ReaderID, ReaderName, Rating,
      COUNT (DISTINCT BookNO)
FROM Reader, Reserve
WHERE Reader.ReaderID= Reserve.ReaderID
GROUP BY Date, Reader.ReaderID
HAVING COUNT (DISTINCT BookNO) >=2;
```

(g1) Find the names of readers who have reserved a blue or a black book.

```
SELECT DISTINCT (Reader.ReaderID, ReaderName)
FROM Reader, Reserve, Book
WHERE Reader.ReaderID = Reserve.ReaderID
AND Book.BookNO = Reserve.BookNO
AND (Color ='Blue' OR Color='Black');
```

[alternatively, Color IN ('Blue', 'Black')]

(g2) Find the names of readers who have reserved both a blue and a black book.

```
SELECT DISTINCT (Reader.ReaderID, ReaderName)
FROM Reader, Reserve, Book
WHERE Reader.ReaderID = Reserve.ReaderID
AND Book.BookNo = Reserve.BookNo
AND Color = 'Black'
AND Reader.ReaderID IN
      (SELECT DISTINCT ReaderID
      FROM Reserve, Book
      WHERE Book.BookNo = Reserve.BookNo
      AND Color = 'Blue' );
```

Alternatively

```
SELECT ReaderName, Reader.ReaderID,
      COUNT (DISTINCT Color)
FROM Reader, Reserve, Book
```

```
WHERE Reader.ReaderID = Reserve.ReaderID
AND Book.BookNo = Reserve.BookNo
AND Color IN ('Black', 'Blue')
GROUP BY Reader.ReaderID
HAVING (COUNT (DISTINCT Color) = 2);
```

(h) Remove those reserve records older than 31-Jan-02.

```
DELETE FROM Reserve
WHERE Date < ‘31-Jan-02’;
```

(i) Update Author column to ‘**’ for those books reserved from 1-Jan-02 to 31-Dec-02.**

```
UPDATE Book SET Author = '****'
WHERE BookNO IN
      (SELECT BookNO
      FROM Reserve
      WHERE Date BETWEEN '01-Jan-02' AND '31-Dec-02');
```