

Database Systems: Homework #2 Solution

1.

(a)

I supposed that this query is to find the title with the specific string 'Love', not a pattern 'L-o-v-e' in any string such as 'Lovely'. There are four possibilities that 'Love' can exist in a movie title (i.e., the middle word, the first word, the last word, and itself). Thus, I designed my SQL as follows:

```
SELECT    starName
FROM      StarsIn
WHERE     movieYear = 1980
          OR movieTitle LIKE '% Love %'
          OR movieTitle LIKE '% Love'
          OR movieTitle LIKE 'Love %'
          OR movieTitle LIKE 'Love';
```

(b)

```
SELECT    name
FROM      MovieExec
WHERE     netWorth ≥ 10,000,000
```

(c)

```
SELECT    name
FROM      MovieStar
WHERE     gender = 'M' OR address LIKE '% Malibu %'
```

2.

(a)

```
SELECT    m.name
FROM      MovieStar m, StarsIn s
WHERE     m.gender = 'M' AND
          s.movieTitle = 'Titanic' AND
          m.name = s.starName;
```

(b)

```
SELECT    s.starName
FROM      StarsIn s, Movies m
WHERE     s.movieTitle = m.title AND
          m.studioName = 'MGM' AND
          m.year = 1995;
```

(c)

```
SELECT  m.name
FROM    MovieExec m, Studio s
WHERE   m.cert# = s.presC# AND
        s.name = 'MGM';
```

(d)

```
SELECT  m1.title
FROM    Movies m1, Movies m2
WHERE   m2.title = 'Gone With the Wind' AND
        m1.length > m2.length;
```

(e)

```
SELECT  m1.name
FROM    MovieExec m1, MovieExec m2
WHERE   m2.name = 'Merv Griffin' AND
        m1.netWorth > m2.netWorth;
```

3.

(a)

```
SELECT  P1.model
FROM    Printer P1
WHERE   P1.price >= ALL
        (SELECT P2.price
         FROM    Printer P2
        ) ;

SELECT  P1.model
FROM    Printer P1
WHERE   P1.price IN
        (SELECT MAX(P2.price)
         FROM    Printer P2
        ) ;
```

(b)

```
SELECT model
FROM
    (SELECT model,
             price
     FROM   PC

     UNION

     SELECT model,
             price
     FROM   Laptop

     UNION

     SELECT model,
             price
     FROM   Printer
    ) M1
WHERE M1.price >= ALL
      (SELECT price
       FROM   PC

       UNION

       SELECT price
       FROM   Laptop

       UNION

       SELECT price
       FROM   Printer
      ) ;
```

```

SELECT  model
FROM
    (SELECT  model,
             price
    FROM      PC

    UNION

    SELECT  model,
             price
    FROM      Laptop

    UNION

    SELECT  model,
             price
    FROM      Printer
    ) M1
WHERE  M1.price IN
    (SELECT  MAX(price)
    FROM
        (SELECT  price
        FROM      PC

        UNION

        SELECT  price
        FROM      Laptop

        UNION

        SELECT  price
        FROM      Printer
        ) M2
    ) ;

```

(c)

```
SELECT  R1.maker
FROM    Product R1,
        PC P1
WHERE   R1.model=P1.model
        AND P1.ram IN
        (SELECT MIN(ram)
         FROM    PC
        )
        AND P1.speed >= ALL
        (SELECT P1.speed
         FROM    Product R1,
                 PC P1
         WHERE   R1.model=P1.model
                 AND P1.ram IN
                 (SELECT MIN(ram)
                  FROM    PC
                 )
        )
);

SELECT  R1.maker
FROM    Product R1,
        PC P1
WHERE   R1.model=P1.model
        AND P1.ram =
        (SELECT MIN(ram)
         FROM    PC
        )
        AND P1.speed IN
        (SELECT MAX(P1.speed)
         FROM    Product R1,
                 PC P1
         WHERE   R1.model=P1.model
                 AND P1.ram IN
                 (SELECT MIN(ram)
                  FROM    PC
                 )
        )
);
```

4.

(a)

Query:

```
SELECT  AVG(speed) AS AVG_speed
FROM    PC;
```

Result:

$$AVG_speed = \frac{2.66+2.10+1.42+2.80+3.20+3.20+2.20+2.20+2.00+2.80+1.86+2.80+3.06}{13}$$
$$= \frac{32.3}{13} = 2.484615384615385 \text{ (manually)}$$

<i>AVG_speed</i>
2.484615384615385

(b)

Query:

```
SELECT  AVG(u.price) AS AVG_price
FROM
    (SELECT  c.price
     FROM    Product p, PC c
     WHERE   p.model = c.model AND
             p.maker = 'D';

     UNION ALL

     SELECT  l.price
     FROM    Product p, Laptop l
     WHERE   p.model = l.model AND
             p.maker = 'D';
    ) u;
```

Result:

$$AVG_price = \frac{770+650+770}{3} = 730 \text{ (manually)}$$

<i>AVG_price</i>
730

5.

(a)

```
INSERT INTO Classes VALUES ('Vittorio Veneto', 'bb', 'Italy', 9, 15,  
41000);  
INSERT INTO Ships VALUES ('Vittorio Veneto', 'Vittorio Veneto', 1940);  
INSERT INTO Ships VALUES ('Italia', 'Vittorio Veneto', 1940);  
INSERT INTO Ships VALUES ('Roma', 'Vittorio Veneto', 1942);
```

(b)

```
DELETE FROM    Ships s  
WHERE          s.name IN  
              (SELECT  ship  
                FROM    Outcomes  
                WHERE   result = 'sunk'  
              );
```