5 Questions

Question 1. *Preliminary* [1 marks]

Find all customers of PetER with a `uname` that starts with 'A' and consists of at least 5 characters. Answer the question by creating SQL view with the schema shown below:

```
CREATE VIEW qn1 (uname) AS ;
```

where `uname` is the `uname` of the customer.

```
CREATE VIEW qn1 (uname) AS
  SELECT DISTINCT uname
  FROM   Customers
  WHERE  uname LIKE 'A____%';
;
```

Question 2. *Disjunctive condition* [1 marks]

Find all pet of `atype` 'A' or 'B' that have a `diet` type 'D1'. Answer the question by creating SQL view with the schema shown below:

```
CREATE VIEW qn2 (uname, name) AS ;
```

where `uname` is the `uname` of the pet owner and `name` is the `name` of the pet.

```
CREATE VIEW qn2 (uname, name) AS
  SELECT DISTINCT uname, name
  FROM   Pet
  WHERE  ( atype = 'A' OR atype = 'B' )
    AND  diet = 'D1'
;
```

Question 3. *Simple negation* [2 marks]

Find all customers that are not simultaneously both a pet owner and a care taker. Answer the question by creating SQL view with the schema shown below:

```
CREATE VIEW qn3 (uname) AS ;
```

where `uname` is the `uname` of the customer.

```
CREATE VIEW qn3 (uname) AS
  ( SELECT uname FROM PetOwner EXCEPT SELECT uname FROM CareTaker )
  UNION
  ( SELECT uname FROM CareTaker EXCEPT SELECT uname FROM PetOwner )
;
```

Question 4. *Single-table selection* [2 marks]

Find all pet owner who has won at least one bid for an availability of the care taker but has not given any `rating` for that bid. Answer the question by creating SQL view with the schema shown below:

```
CREATE VIEW qn4 (uname) AS ;
```

where `uname` is the `uname` of the pet owner.

```
CREATE VIEW qn4 (uname) AS
```

```
  SELECT DISTINCT pouname
  FROM   Bid
  WHERE  is_win = TRUE
    AND  rating IS NULL;
;
```

Question 5. *Multi-table selection* [2 marks]

Find all pairs of pet owners (P1, P2) that both have at least own one pet of the same `atype` and P1.`name` < P2.`name`. Exclude any pet owner that do not own any pet. Answer the question by creating SQL view with the schema shown below:

```
CREATE VIEW qn5 (p1uname, p2uname) AS ;
```

where `p1uname` is the `uname` of P1 and `p2uname` is the `uname` of P2.

```
CREATE VIEW qn5 (p1uname, p2uname) AS
  SELECT DISTINCT P1.uname, P2.uname
  FROM   Pet P1, Pet P2
  WHERE  P1.uname < P2.uname
    AND  P1.atype = P2.atype
;
```

Question 6. *Group-by* [2 marks]

For each worker W, find the number of distinct workers besides W that work in at least one same office as W. In other words, if W is the only worker working in an office O, then the number should be `0`. Answer the question by creating SQL view with the schema shown below:

```
CREATE VIEW qn6 (uname, num) AS ;
```

where `uname` is the `uname` of W and `num` is the number of workers besides W that work in the same office as W.

```
CREATE VIEW qn6 (uname, num) AS
  SELECT   W1.uname, COUNT(DISTINCT (W1.uname, W2.uname))-1
  FROM     Work W1, Work W2
  WHERE    W1.area = W2.area
  GROUP BY W1.uname
;
/* The trick here is to subtract 1 because (X,X) will be in the join
   Alternatively, use LEFT JOIN */
```

Question 7. *Business analysis* [2 marks]

We say that a pet owner is *obsessed* with a care taker if the pet owner has bid for all the availability of the care taker. For each pet owner, find all the care taker the pet owner is obsessed with. Exclude pet owner without any associated care taker. Answer your question by creating SQL view with the schema shown below:

```
CREATE VIEW qn7 (pouname, ctuname) AS ;
```

where `pouname` is the `uname` of the pet owner and `ctuname` is the `uname` of the care taker.

```
CREATE VIEW qn7 (ctuname, pouname) AS
  SELECT DISTINCT B0.pouname, B0.ctuname
  FROM   Bid B0
```

```
  WHERE  NOT EXISTS (
    SELECT 1 FROM Availability A
    WHERE  B0.ctuname = A.uname
      AND  NOT EXISTS (
        SELECT 1 FROM Bid B
        WHERE  A.uname  = B.ctuname
          AND  A.s_date = B.s_date
          AND  A.s_time = B.s_time
          AND  A.e_time = B.e_time
          AND  B0.pouname = B.pouname
    )
  )
;
```

Question 8. *Business analysis* [3 marks]

We say that a worker W is a *director* if the worker satisfies all of the following:

- W manages an office
- The office that W managed, has at least 3 workers that are also managers
- W does not work in any office that is managed by other workers besides W

Find all the director of PetER. Answer the question by creating SQL view with the schema shown below:

```
CREATE VIEW qn8 (uname, area) AS ;
```

where `uname` is the `uname` of the director and `area` is the area of the office the director manages.

```
CREATE VIEW qn8 (uname, area) AS
  WITH HasNoManager AS (
    SELECT O.uname                          -- managers
    FROM   Offices O
    EXCEPT
    SELECT W.uname                          -- workers that work in offices managed by other workers
    FROM   Work W
    WHERE  EXISTS (
      SELECT 1
      FROM   Offices O
      WHERE  O.uname <> W.uname
        AND  W.area = O.area
    )
  )
  SELECT M.uname, O1.area
  FROM   HasNoManager M NATURAL JOIN Offices O1
  WHERE  (
    SELECT COUNT(*)
    FROM   Offices O2, Work W
    WHERE  O2.uname =  W.uname
      AND  O2.uname <> M.uname
      AND  W.area   =  O1.area
  ) >= 3
;
```

NOTE: The `HasNoManager` is to figure out which manager has no manager. From here, the other conditions are easily derived.