

## Lab #6: Midterm Review Solutions

*Name:*

Note: This worksheet is not intended to be a full review for the midterm. It is intended to provide more practice questions on some recent topics.

## SQL

1. Examine this schema for these two tables:

```
CREATE TABLE owners (  
    ownerid integer,  
    name text,  
    age integer,  
    PRIMARY KEY (userid)  
);
```

```
CREATE TABLE cats (  
    catid integer,  
    owner integer,  
    name text,  
    breed text,  
    age integer,  
    PRIMARY KEY (catid),  
    FOREIGN KEY (owner) REFERENCES owners);
```

- (a) Write a SQL query to figure out the number of cats, over the age of 10, of each breed of cat.

**Solution:**

```
SELECT COUNT(*) FROM cats GROUP BY breed  
  
WHERE age > 10;
```

- (b) Write a SQL query to figure out the ownerid/owner of the one cat owner who owns the most cats.

**Solution:**

```
SELECT owner FROM cats GROUP BY owner  
  
ORDER BY COUNT(*) DESC LIMIT 1;
```

- (c) Write a SQL query to figure out the names of all of the cat owners who have a cat named Apricot.

**Solution:**

```
SELECT o.name FROM cats c LEFT JOIN owners o  
ON c.owner = o.ownerid WHERE c.name = 'Apricot';
```

- (d) It is possible to have a cat with an owner not in the owners table.

☐ True ☒ False

**Solution:** Since the table cats has a FOREIGN KEY requirement on owner, a corresponding entry for an owner must exist.

- (e) Write a SQL query to get a random sample of 5 random Maine Coons (a cat breed).

**Solution:**

```
SELECT * FROM cats WHERE breed = 'Maine Coon'
```

```
ORDER BY RANDOM LIMIT 10;
```

- (f) Write a SQL query to create an almost identical table as `cats`, except with an additional column 'Nickname' that has the value 'Kitten' for cats less than or equal to the age of 1, 'Catto' for cats between 1 and 15, and 'Wise One' for cats older than or equal to 15.

**Solution:**

```
SELECT catid, owner, name, breed, age,
CASE
    WHEN age <= 1 THEN "Kitten"
    WHEN age >= 15 THEN "Wise One"
    ELSE "Catto"
END AS Nickname
FROM cats;
```

- (g) Write a SQL query to select all rows from the `cats` table that have cats of the top 5 most popular cat breeds.

**Solution:**

```
SELECT *
FROM cats WHERE breed in
    (SELECT breed
     FROM cats
```

```
GROUP BY breed  
  
ORDER BY COUNT(*) DESC  
  
LIMIT 5);
```

## Regular Expressions

2. Write a regular expression to extract the cat names from the strings in the following list:  
["Owner Name: John, Cat Name: Samo", "Owner Name: Josh, Cat Name: Grigometh"]

**Solution:**

```
"Cat Name: (\w+)"
```

3. What indices (inclusive) will this regular expression match with this string?

Regular expression: "<.\*>"

String: "<cat></cat>"

**Solution:** 0 to 10 because of greedy matching.

4. Use Python's `re` library to replace all instances of "cat" with "animal" in the string above (stored in variable `s`).

**Solution:**

```
re.sub("animal", "cat", string)
```

5. Complete the following grid as you would a crossword puzzle. The clues are given as regular expressions on the top and the left. Each of the nine cells should be filled with exactly one letter such that each ROW and COLUMN taken as a whole match their corresponding regular expressions. Each box should only contain one letter.

	[JUNDT]*	APA  OPI   OLK	(NA FE HE) [CV]
[DEF] [MNO]*	<u>    D    </u>	<u>    O    </u>	<u>    N    </u>
[^DJNU] P [ABC]	<u>    T    </u>	<u>    P    </u>	<u>    A    </u>
[ICAN]*	<u>    N    </u>	<u>    I    </u>	<u>    C    </u>



Good luck on the midterm!