CS 122A: Introduction to Data Management – Winter 2017

Homework 5: Structured Query Language (SQL) □(100 points)

Due Date: **Tuesday, Feb 21 (5:00 PM)**

Submission

All HW assignments should contain both your student ID and your name and must be submitted online, formatted in SQL script form per the instructions provided on Piazza, through the associated dropbox on EEE. See the table below for the HW submission opportunities. Note that after 5 PM on Thursday no further HW submissions will be accepted. (We will be releasing the solution at that time.) Please strive to get all your work in on time! If possible, try to save the one dropped assignment for the end of the term when you are most likely to want/need it.

Date / Time	Grade Implications
Tuesday, Feb 21 (5:00 PM)	Full credit will be available
Wednesday, Feb 22 (5:00PM)	20 points will be deducted
Thursday, Feb 23 (5:00 PM)	40 points will be deducted

Structured Query Language (SQL) [100 pts]

Congratulations! TopicalBirds is happy with your database design work and the expertise that you've demonstrated based on the relational algebra and calculus. Now it's time to get real – it's time to use MySQL and its implementation of the SQL query language to write a number of queries that they envision needing for their planned applications.

Schema, Data, and Tools

TopicalBirds is happy using the relations resulting from HW #2. You can refer to the provided solution to remind yourself of their schemas. You will also be able to see the relations' schemas in MySQL Workbench when you are using it for this assignment. A new sample data set will be provided for you to use in testing your queries. More information about how to load the schema and associated sample data – and how to enter and run queries – can be found in the instructions linked from HW #5's entry on the course wiki page. You are to use MySQL for all of the queries in this assignment and turn in the queries and results per the provided instructions.

Write the following queries in SQL against the TopicalBirds.com test relations. Show the result of each query that you wrote where requested to do so. Please note that you will not get points for providing the result of a query on this assignment if your SQL query is syntactically incorrect (i.e., if it doesn't execute). Since you have a "live" system at your disposal, this should not be an issue – you will be able to run all of your queries that way. (For the last two problems, you may find one or more of the following hints helpful: (i) Given two date or time values, you can use the timediff(val2, val1) function to calculate the duration between them. (ii) To limit the number of results returned by a query, you can use the LIMIT clause in SQL. (iii) You can put a subquery in the FROM clause of a query and treat it (in the outer query) as though it were a stored table.)

1. [10pts] Print the name, gender, and birthdate of birds who live on "Alicia Pass" street.

a) [7pts] SQL Query:

```
SELECT first_name,last_name, gender, birthdate
FROM   Bird, User
WHERE address_street = 'Alicia Pass'
AND    User.tag = Bird.btag;
```

b) [3pts] Result:

first_name	last_name	gender	birthdate
Elizabeth	Smith	F	1972-09-14

2. [10pts] Print the contact information (email and complete address) for users who have uttered at least one highly positive chirp (i.e., at least one chirp with a sentiment of 1.0).

a) [7pts] SQL Query:

```
SELECT email, address_number, address_street, address_city, address_state,
address_country, address_mailcode
FROM   User
WHERE EXISTS  (
                SELECT *
                FROM   Chirp as c
                WHERE c.sentiment = 1
                AND    btag = User.tag);
```

b) [3pts] Result:

email	address_number	address_street	address_city	address_state	address_country	address_mailcode
austin73@moreno-wright.org	4446	Denise Center Apt. 706	South Pamelatown	NE	BE	86735
colemancraig@walker.com	44553	Mary Forges	Alexandermouth	KS	AU	28434
dfowler@brady.com	2092	James Isle	Edwardshire	WI	CG	40868
edsheeran@cortez-clark.com	3415	Dustin Falls Apt. 959	East Jennifer	FL	GB	39340
HillaryClinton@schmitt-lynch.info	68177	Brent Pike Apt. 366	Ashleyborough	AL	BT	19677
judy60@oliver.net	321	Willis Cape	East Christopher	FL	BB	63957
natalie49@jimenez.biz	9595	Gregory Station	Mooneymouth	VI	DE	53748
realDonaldTrump@gibson.info	9816	Adam Key Suite 518	Youngview	NC	KZ	13092

3. [10pts] Print the tag and name of the bird that uttered the most positive chirp about the topic 'battery'.

a) [7pts] SQL Query:

```
SELECT c1.btag,first_name,last_name

FROM   Chirp as c1,About,Topic,bird

WHERE c1.btag = About.btag
        AND c1.btag = bird.btag
        AND c1.cno = About.cno
        AND About.id = Topic.id
        AND Topic.name = 'battery'
        AND NOT EXISTS (
                SELECT *
                FROM Chirp as c2,About,Topic
                WHERE c2.btag = About.btag
                AND c2.cno = About.cno
                AND About.id = Topic.id
                AND Topic.name = 'battery'
                AND c2.sentiment > c1.sentiment
        );
```

b) [3pts] Result:

btag	first_name	last_name
laura43	Elizabeth	Smith

4. [10pts] Print the tag, gender, and birthdate of those birds who have chirped about either of the topics “Surface” or “Kindle”.

a) [7pts] SQL Query:

```
SELECT  Bird.btag, Bird.gender, Bird.birthdate
FROM   (
        SELECT  DISTINCT Chirp.btag
        FROM   Chirp, About, Topic
        WHERE Topic.name = 'Surface'
        AND     About.id = Topic.id
        AND     Chirp.cno = About.cno
        AND     Chirp.btag = About.btag
        UNION
        SELECT DISTINCT Chirp.btag
        FROM   Chirp, About, Topic
        WHERE Topic.name = 'Kindle'
        AND     About.id = Topic.id
        AND     Chirp.cno = About.cno
        AND     Chirp.btag = About.btag) O2, Bird
WHERE Bird.btag = O2.btag;
```

b) [3pts] Result:

btag	gender	birthdate
austin73	M	1964-12-16
bentonmichael	F	1978-06-11
bishopcheyenne	F	1986-12-11
bnavarro	M	1950-08-24
colemancraig	M	1973-03-19
dfowler	M	1981-06-17
jessewilson	M	1969-12-21
judy60	F	1976-02-08
larry82	M	1964-09-20
laura43	F	1972-09-14
margaret47	M	1994-06-18
natalie49	M	1969-12-21
qsanchez	F	1968-08-16
thenry	F	1961-12-25
uatkinson	M	1971-12-03
vchang	M	1969-05-06

5. [10pts] Print the tag, gender, and birthdate of those birds who have chirped about both of the topics “iPhone” and “gadget”.

a) [7pts] SQL Query:

```
SELECT Bird.btag, Bird.gender, Bird.birthdate
FROM   (
       SELECT DISTINCT Chirp.btag
       FROM   Chirp, About, Topic
       WHERE Topic.name = 'iPhone'
       AND    About.id = Topic.id
       AND    Chirp.cno = About.cno
       AND    Chirp.btag = About.btag ) O1,
       (
       SELECT DISTINCT Chirp.btag
       FROM   Chirp, About, Topic
       WHERE Topic.name = 'gadget'
       AND    About.id = Topic.id
       AND    Chirp.cno = About.cno
       AND    Chirp.btag = About.btag ) O2, Bird
WHERE O1.btag = O2.btag
       AND Bird.btag = O1.btag;
```

b) [3pts] Result:

btag	gender	birthdate
bentonmichael	F	1978-06-11
jessewilson	M	1969-12-21
judy60	F	1976-02-08
kaisercurtis	F	1987-12-10
laura43	F	1972-09-14
margaret47	M	1994-06-18
natalie49	M	1969-12-21
qsanchez	F	1968-08-16
swansonvalerie	M	1995-03-16
swolf	M	1975-03-08
thenry	F	1961-12-25
uatkinson	M	1971-12-03
vchang	M	1969-05-06

6. [10pts] Print the tags and business names of watchers who own no ads but are listening for chirps from at least one male bird.

a) [7pts] SQL Query:

```
SELECT wtag,bname
FROM   Watcher
WHERE Watcher.wtag
NOT IN (SELECT wtag FROM Ad)
AND Watcher.wtag IN (
                        SELECT BirdListen.tag
                        FROM   BirdListen, Bird
                        WHERE BirdListen.btag = Bird.btag
                        AND    Bird.gender='M');
```

b) [3pts] Result:

wtag	bname
anthonylang	Hayes-Keller
hjones	Atkinson. Jacobson and Lawrence

7. [10pts] Compute and print the number of topics that appear to be more interesting than the topic "Sprint" – i.e., topics with at least one user-specified interest level that's higher than any of those for the topic "Sprint".

a) [7pts] SQL Query:

```
SELECT COUNT(DISTINCT i1.id)
FROM   Interest as i1
WHERE i1.level > ALL(
                        SELECT i2.level
                        FROM Topic as t2, Interest as i2
                        WHERE t2.id = i2.id
                        AND t2.name = 'Sprint');
```

b) [3pts] Result:

COUNT(DISTINCT i1.id)
13

8. [10pts] To help in identifying potential Russian bot-birds, print the tags and email addresses of those birds who have done nothing but parrot chirps from bird “realDonaldTrump” (i.e., birds all of whose chirps are parroted Trump chirps).

a) [7pts] SQL Query:

```
SELECT btag, email
FROM   Bird, User
WHERE Bird.btag = User.tag
AND NOT EXISTS(
                SELECT *
                FROM Chirp
                WHERE Bird.btag = Chirp.btag
                AND Chirp.parrots_btag IS NULL)
AND NOT EXISTS(
                SELECT *
                FROM Chirp
                WHERE Bird.btag = Chirp.btag
                AND Chirp.parrots_btag != 'realDonaldTrump');
```

b) [3pts] Result:

btag	email
jessewilson	jessewilson@garcia.com
swolf	swolf@fuller-lester.com

9. [10pts] Print the maximum watcher fee among watchers who have specified the highest possible level of interest (i.e., level 5) in two or more different topics.

a) [7pts] SQL Query:

```
SELECT MAX(fee)
FROM   Watcher
WHERE Watcher.wtag IN (
                        SELECT tag
                        FROM Interest
                        WHERE Interest.level = 5
                        GROUP BY tag HAVING count(*) > 1);
```

b) [3pts] Result:

MAX(fee)
474.00

10. [10pts] Find the 5 biggest parrots (i.e., the top 5 birds based on their parroted chirp counts) and print their bird tags and the associated parrot counts in descending order.

a) [7pts] SQL Query:

```
SELECT c.btag, count(*) as count
FROM Chirp c WHERE c.parrots_btag IS NOT NULL
GROUP BY c.btag
ORDER BY count DESC
LIMIT 5;
```

b) [3pts] Result:

btag	count
jessewilson	6
swolf	6
austin73	6
judy60	6
bishopcheyenne	5

11. [10pts *EXTRA CREDIT*] Find the 5 quickest acts of parroting (i.e., the top 5 cases of parroting based on the shortness of the time delay between the appearance of a chirp and the parroting of that chirp) and print the associated time delays, the chirper and parrot bird tags and chirp numbers, and also the chirp text, in ascending time delay order.

a) [7pts] SQL Query:

```
SELECT O1.chirper, O1.btag, O1.cno, O1.text, TIMEDIFF(parrot_date,send_date) +
        TIMEDIFF(parrot_time, send_time) as RESPONSE
FROM   (
        SELECT c1.date as send_date, c1.time as send_time, c2.date as
                parrot_date, c2.parrots_btag, as chirper, c2.time as parrot_time, c2.btag as
btag,
                c2.cno as cno, c2.text as text
        FROM   Chirp as c1, Chirp as c2
        WHERE c1.cno = c2.parrots_cno
        AND    c1.btag = c2.parrots_btag) O1
ORDER BY RESPONSE
LIMIT 5;
```

b) [3pts] Result:

chirper	btag	cno	text	RESPONSE
realDonaldTrump	jessewilson	5	Trying to connect from San Francisc...	40711
dfowler	laura43	3	Using iPhone today. hate its size. it is ...	96559
realDonaldTrump	jessewilson	4	Using Surface this morning. love its si...	106645
edsheeran	qsanchez	8	Making call from New York. dislike T-M...	157565
realDonaldTrump	jessewilson	3	Playing with iPhone tonight. dislike th...	177370