CS 3380 Lab Assignment 4

1 Directions and Submission Instructions

This assignment must be completed by **Sunday, February 22nd at 11:59 PM**. You must upload your PHP code to Blackboard. The uploaded file should be named `lab4.php`. Your code must also be hosted on your Babbage account. Your lab 4 submission should be reachable and functional through the following URL:

`http://babbage.cs.missouri.edu/~<pawprint>/cs3380/lab4/lab4.php`

If that URL does not work you will lose points. When submitting your lab4.php file via Blackboard, please include your URL in the submission comments. (This greatly helps the TAs during grading.) Late submissions, either for the files or the URL, will not be accepted.

You **should not** submit the `lab5data.sql` file.

2 Goals

- Creating SQL views
- Writing queries with sub-queries
- Using built-in SQL functions
- Writing queries with the SQL set operators
- Writing statements that have a `WITH` clause

3 Tasks

3.1 Download

Begin by downloading a SQL file needed for this assignment by executing the following commands in your terminal:

```
mkdir -p ~/cs3380/lab4
cd ~/cs3380/lab4
wget http://babbage.cs.missouri.edu/~klaricm/ss15/cs3380/lab4/lab4data.sql
```

Note that you might not be able to copy-paste the above commands. You may need to type them manually into your terminal.

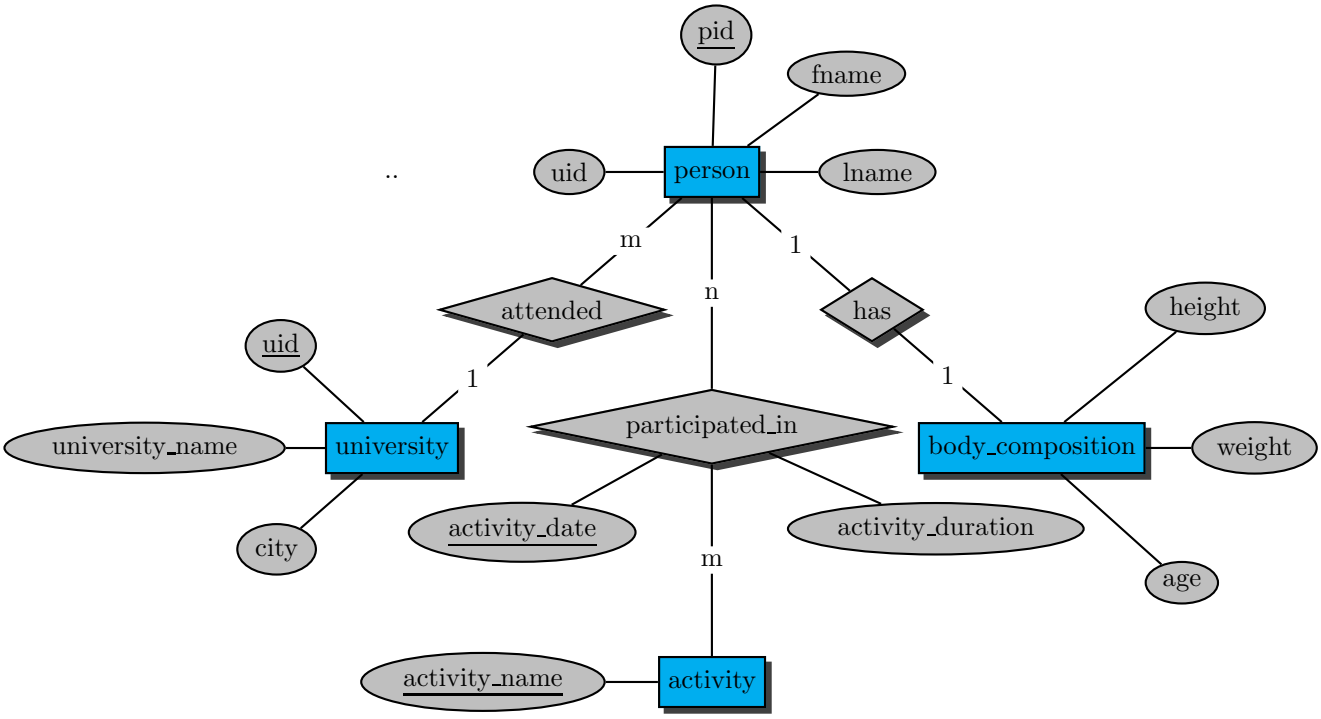
Next, run the `psql` command to login to your database. Then issue the command `\i lab4data.sql` to run the commands contained within the SQL file.

3.2 Inspect the Data

The `lab4data.sql` file will create five tables within the `lab4` schema. Recall, to write SQL queries that reference tables held within schemas simply qualifying the table name with the schema name. A simple example follows.

```
SELECT * FROM lab4.university;
```

This dataset stores (fictional) information about students that took part in a study on body composition and activity from a variety of universities. An ERD for this dataset follows.



3.3 Implementation

You will be responsible for creating a PHP script that allows a user to execute one of the following 9 queries by selecting from a drop down box and clicking a button. The code should connect to the database and execute the appropriate query based on what is selected in the drop down box.

Be smart about how you code this. It should not take a large amount of PHP code to complete this assignment. For example, my code for this assignment is around 125 lines. You could write a PHP function that accepts an string containing a SQL statement, execute it and write out the HTML table. Your PHP page must show the number of records returned and a table of query results for the following 9 queries.

Hint: If you haven't caught on already, you should recycle your PHP code from lab 3.

3.3.1 Create a View: Part 1

Create a view that shows the person's id (pid), first name (fname) and last name (lname) for all people who have a body weight above 140. This view should be named "weight" (without the quotes). You must use an `INNER JOIN` in the views query. Your PHP page should then query the view (i.e. `SELECT * FROM lab4.weight`). *(8 rows)*

3.3.2 Create a View: Part 2

Create a view that returns the first name (fname), last name (lname) and BMI for people with a weight above 150. This view should be named "BMI". You must use an `INNER JOIN` and you must reference the "weight" view created in 3.3.1. BMI is calculated as

$$703 \cdot \frac{weight}{height^2} \tag{1}$$

In this view, round the BMI value to the nearest whole number. For example, a person with a height of 71 inches and weight of 145 lbs would have a BMI of 20.2 which would be rounded to 20. Use an SQL function

to achieve this rounded result. Your PHP page should then query the view (i.e. `SELECT * FROM lab4.bmi`). *(12 rows)*

3.3.3 Using `EXISTS`

Write a query that shows returns the name and city of the university that has no people in database that are associated with it. Your query **must** use `EXISTS` to achieve. *(2 rows)*

3.3.4 Using `IN`

Write a query that returns only the uid value for all universities in the city Columbia. Then use that query with an `IN` sub-query expression to retrieve the first and last names for all people that go to school in Columbia. *(4 rows)*

3.3.5 Using `NOT IN`

Write a query that returns all of the activities with records in the `participated_in` table. Then use that query with a `NOT IN` sub-query expression to retrieve the activities that are not played by any player in the database. *(2 rows)*

3.3.6 Using `UNION`

Write a query that returns the pid of all people listed in `participated_in` that participate in 'running'. Then modify your query to use `UNION` to return all people who run or play racquetball. You **must** use the `UNION` operator to accomplish this. You **cannot** use `OR`. *(5 Rows)*

3.3.7 Using `INTERSECTS`

Write a query that returns the first and last name of all people listed in `body_composition` table who are older than 30 years old. Then modify your query to use `INTERSECTS` to return all people who are older than 30 and are taller than 65 inches. You **must** use the `INTERSECTS` operator to accomplish this. You **cannot** use `AND`. *(3 rows)*

3.3.8 Using `ORDER BY`

Write a query that returns peoples first and last names weight, height, and age. Records should be ordered first by height in descending (Z-to-A order), then by weight in ascending order, and finally by the person's last name in ascending order. *(12 rows)*

3.3.9 Using a `WITH` clause

Write a query using `WITH` that:

1. First returns the person's id (pid), first name (fname) and last name (lname) from all people who are from the people who go to the University of Missouri Columbia as the `WITH` clause of the query, and
2. then use that common table expression (CTE) to combine the result with the `body_composition` table via an inner join to get the body compositions for people who attend the University of Missouri Columbia.

(2 rows)

4 Comparison

You can compare your version with a working copy found at:
`http://babbage.cs.missouri.edu/~klaricm/ss15/cs3380/lab4/lab4.php`