

TD WS1 Guideline: SQL Queries

PHASE 1: CREATE DATABASE

1. Put CSV file to the right location

- Download the two CSV files from the TD WS1 Folder

For Windows Users:

- Go to C: → Program Files → PostgreSQL → 11 → bin
- Create a folder name "**Database**"
- Add csv file "**student_form.csv**" in this folder

For MAC Users :

- Go to Macintosh HD → Library → PostgreSQL → 11 → bin
- Create a folder name "**Database**"
- Add csv file "**student_form.csv**" in this folder

2. Create a Database in PostgreSQL

- Fire up PgAdmin
- On the left menu bar, click on "Server" to open the options.
- Right click on "Database" → Click **Create → Database**
- Name the Database anything you want, but we decided to go with "**TDworkshop**"

3. Create Two Tables: Student Form and Food Truck

- Now you need to create two tables
 - One for storing the data from the Google form that you filled out
 - One for storing the data on Temple Foodtruck

Student Form Table

```
CREATE TABLE student_form (  
    timestamp varchar(25) NOT NULL,  
    tuid varchar(10) PRIMARY KEY NOT NULL,  
    first_name varchar(25) NOT NULL,  
    last_name varchar(25) NOT NULL,  
    age_range varchar(25) NOT NULL,  
    major varchar(50) NOT NULL,  
    second_major varchar(50),  
    minor varchar(25) NOT NULL,  
    class_rank varchar(25) NOT NULL,  
    international_student varchar(5) NOT NULL,  
    tth_class varchar(5) NOT NULL,  
    online_class varchar(5) NOT NULL,  
    night_class varchar(5) NOT NULL,  
    AIS_active varchar(25) NOT NULL,  
    study_place varchar(50) NOT NULL,  
    food_truck varchar(50) NOT NULL,  
    owl_bird varchar(25) NOT NULL,  
    coffee_tea varchar(25) NOT NULL,  
    philly_cheesteak varchar(25) NOT NULL,  
    study_hour integer NOT NULL,  
    social_hour integer NOT NULL,  
    sleep_hour varchar(25) NOT NULL  
);
```

Food Truck Table

Try it yourself!

```
CREATE TABLE food_truck(  
    foodtruck_id varchar(5) PRIMARY KEY NOT NULL,  
    foodtruck_name varchar(200) NOT NULL,  
    address varchar(500),  
    zipcode integer,  
    description varchar(400),  
    phone varchar(15),  
    open_hour varchar(200)
```

```
);
```

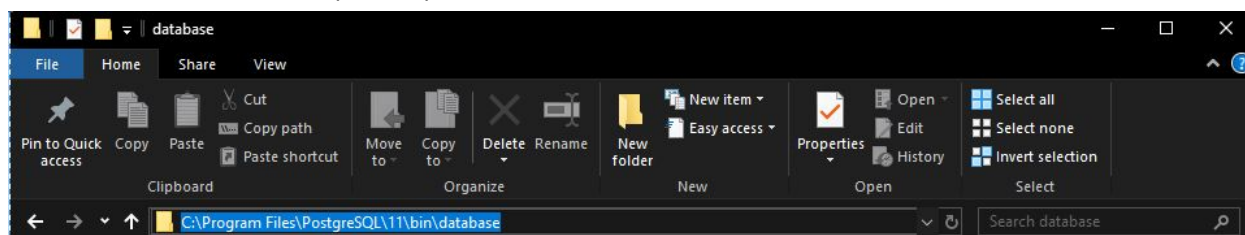
4. Add CSV Files to Our Tables

- Before we add files to PostgreSQL, make sure you have the two csv files in the right location in order for them to work.
- Also make sure that you name the files correctly.

For Windows Users:

```
1) Insert values to the student_form table  
COPY student_form from 'C:\Program  
Files\PostgreSQL\11\bin\Database\student_form.csv' DELIMITERS ',' CSV;  
  
2) Insert values to the food_truck table  
COPY food_truck from 'C:\Program  
Files\PostgreSQL\11\bin\Database\food_truck.csv' DELIMITERS ',' CSV;
```

- For the path, either “\” or “/” is fine.
- To get the path of the file, click on the box with the path
- Press Ctrl+C. To paste press Ctrl+V



For MAC Users :

```
1) Insert values to the student_form table  
COPY student_form from  
'/Library/PostgreSQL/11/bin/database/student_form.csv' DELIMITERS ',' CSV;  
  
2) Insert values to the food_truck table  
COPY food_truck from '/Library/PostgreSQL/11/bin/database/food_truck.csv'  
DELIMITERS ',' CSV;
```

- If you have a different path name, see the instructions below to get the path name.

- To get the path name, click on the file → Click on **Edit** (top menu bar) → Press down **Option** key to see the “Copy student_form as Pathname”

PHASE 2: MANIPULATE DATABASE

SQL Statements

1. QUERYING DATA

SELECT - is used to select data from a database.

Try to get every value in student_form table!

```
SELECT * FROM student_form;
```

SELECT DISTINCT - is used to return only distinct (different) values.

Question: Which are the food trucks that students choose from the list of 40+ food trucks?

Try it yourself first!

```
SELECT DISTINCT food_truck FROM student_form
```

2. FILTERING DATA

WHERE - filters rows based on a specified condition.

Question: Display only senior students from student_form table.

Try it yourself first!

```
SELECT first_name, last_name  
FROM student_form  
WHERE class_rank ='Senior';
```

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Date: Saturday, September 28, 11-1pm

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LIMIT - gets a subset of rows generated by a query.

Question: What are the top five study places?

```
SELECT study_place, COUNT(*)  
FROM student_form  
GROUP BY study_place  
ORDER BY COUNT(*) DESC  
LIMIT 5;
```

OFFSET & FETCH - retrieve a portion of rows returned by a query.

Question: Select the 6th to the 10th food trucks in the list

```
SELECT foodtruck_id, foodtruck_name  
FROM food_truck  
OFFSET 5 ROWS  
FETCH FIRST 5 ROWS ONLY;
```

Question: Now try to select the 11th to the 20th food trucks in the list

Try it yourself first!

BETWEEN - selects data that is a range of values.

Question: Show students that spend between 5 to 8 hours to study.

Try it yourself first!

```
SELECT first_name, last_name, study_hour  
FROM student_form  
WHERE study_hour BETWEEN 5 AND 8;
```

IS NULL - checks if a value is null or not.

Question: Which food trucks do not have phone number? How many of them are there?

Try it yourself first!

```
SELECT foodtruck_name, phone
```

```
FROM food_truck  
WHERE phone IS NULL;
```

then there is another way to do it...

```
SELECT COUNT(foodtruck_name)  
FROM food_truck  
WHERE phone IS NULL;
```

Question: Which food trucks do not have phone number **OR** do not have open hours? (HINT: use **OR** in your queries)

Try it yourself first!

```
SELECT COUNT(foodtruck_name)  
FROM food_truck  
WHERE phone IS NULL OR open_hour IS NULL;
```

Question: Which food trucks do not have both phone number **AND** open hours? (HINT: use **AND** in your queries)

Try it yourself first!

```
SELECT COUNT(foodtruck_name)  
FROM food_truck  
WHERE phone IS NULL AND open_hour IS NULL;
```

LIKE - filters data based on pattern matching.

Question: Which food trucks start with letter 'T'?

```
SELECT foodtruck_name  
FROM food_truck  
WHERE foodtruck_name LIKE 'T%';
```

Question: Which food trucks end with the letter 'a'? (a is lowercase)

Try it yourself first!

```
SELECT foodtruck_name  
FROM food_truck  
WHERE foodtruck_name LIKE '%a';
```

Question: Which food trucks have "o" in any position?

```
SELECT foodtruck_name  
FROM food_truck
```

```
WHERE foodtruck_name LIKE '%o%';
```

3. GROUPING DATA

GROUP BY - divides rows into groups and applies an aggregate function on each.

Question: How many students are tea person/coffee lover have an online class this semester?

```
SELECT COUNT(*)  
FROM student_form  
WHERE online_class = 'Yes' AND  
coffee_tea = 'Teahee'  
GROUP BY coffee_tea;
```

Question: How many international students in each class?

Try it yourself first!

```
SELECT class_rank, COUNT(*)  
FROM student_form  
WHERE international_student = 'Yes'  
GROUP BY class_rank;
```

Question: How many juniors having TTH class

Try it yourself first!

```
SELECT class_rank, COUNT(class_rank)  
FROM student_form  
WHERE class_rank = 'Junior'  
AND tth_class = 'Yes'  
GROUP BY class_rank;
```

Or here is another way to do it....

```
SELECT class_rank, COUNT(class_rank), tth_class  
FROM student_form  
WHERE class_rank = 'Junior'  
AND tth_class = 'Yes'  
GROUP BY class_rank, tth_class;
```

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HAVING - applies the condition for groups.

Question: Show the students that study less than 10 hours

Try it yourself first!

```
SELECT tuid, study_hour
FROM student_form
GROUP BY tuid, study_hour
HAVING study_hour < 10;
```

ORDER BY - ASC and DESC - guides you on how to sort the result set returned from a query. (ASC = Ascending, DESC = Descending)

Question: Which class has the least amount of students? (HINT: Use GROUP BY and use ORDER BY ASC)

Try it yourself first!

```
SELECT class_rank, COUNT(class_rank)
FROM student_form
GROUP BY class_rank
ORDER BY COUNT(class_rank) ASC;
```

Or here is another way by adding **LIMIT** statement

```
SELECT class_rank, COUNT(class_rank)
FROM student_form
GROUP BY class_rank
ORDER BY COUNT(class_rank) ASC
LIMIT 1;
```

Question: Which class has the most amount of students?

Try it yourself first! (skip this due to time!)

4. AGGREGATE FUNCTIONS

AVG() - allows you to calculate the average value of a numeric column.
and **ROUND(X, 2)** - used to return the value after rounded a number upto a specific decimal places, provided in the argument.

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Question: Which class has study the most hours, on average?

```
SELECT class_rank, TO_CHAR(  
    AVG(study_hour),  
    '00.00'  
)  
FROM student_form  
GROUP BY class_rank;
```

*Note that we used **to_char()** function to convert the result into a formatted string.

Question: What is the **rounded** average hour that students spend studying and using social media?)

```
SELECT class_rank, ROUND(AVG(study_hour)), ROUND(AVG(social_hour))  
FROM student_form  
GROUP BY class_rank;
```

Or

To name that tables:

```
SELECT class_rank, ROUND(AVG(hour_study)) AS study_hour,  
    ROUND(AVG(hour_socialmedia)) AS social_hour  
FROM student_form  
GROUP BY class_rank;
```

COUNT() - count the number of rows in a table.

For class_rank

Question: How many students are in each class?

Try it yourself first!

```
SELECT class_rank, COUNT(class_rank)  
FROM student_form  
GROUP BY class_rank;
```

Question: How many students are sophomores? (HINT: Similar to the previous question, but now add in WHERE clause!)

Try it yourself first!

```
SELECT class_rank, COUNT(class_rank)
```

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```
FROM student_form
WHERE class_rank = 'Sophomore'
GROUP BY class_rank;
```

MAX() - get the maximum value of a set.

```
Question: What is the maximum hour spent for studying from each class?
SELECT class_rank, MAX(study_hour)
FROM student_form
GROUP BY class_rank;
```

MIN() - get the minimum value of a set.

```
Question: What is the minimum hour spent for social media from each
class?
Try it yourself first! Very similar to the previous one!

SELECT class_rank, MIN(social_hour)
FROM student_form
GROUP BY class_rank;
```

ALIAS

Column Alias: **AS**

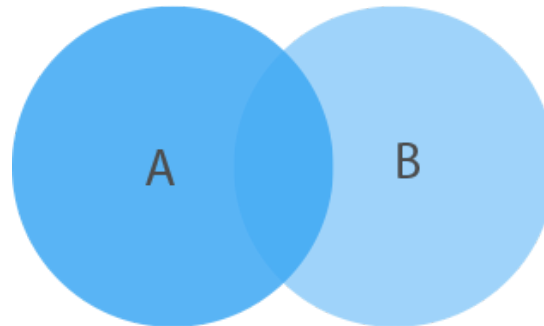
```
Question: Show the full name and class rank of each student

SELECT first_name || ' ' || last_name AS full_name, class_rank
FROM student_form;
```

PHASE 3: IMPROVE DATABASE

JOINING MULTIPLE TABLES

LEFT JOIN



PostgreSQL LEFT JOIN

Question: Join the description and open_hours columns from food_truck table to the student_form table (choose 3 columns first_name, study_place, and food_truck)

```
SELECT
  student_form.first_name,
  student_form.study_place,
  student_form.food_truck,
  food_truck.description,
  food_truck.open_hour
FROM
  student_form
LEFT JOIN food_truck ON student_form.food_truck =
  food_truck.foodtruck_name;
```

CHANGE VALUES

Look at rows 25 (Amy Dinh), 44 (Jessica Ladzenski), and 48 (Wyatt Zimmerman), do you notice any differences?

Now, let's change these values to the correct form using this statement:

```
UPDATE table
SET   column1 = value1,
      column2 = value2 ,...
WHERE
  condition;
```

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ADD MORE VALUES

INSERT INTO - allows you to insert one or more rows into a table at a time.

Question: Nhi hasn't filled in the form, add her information in!

```
INSERT INTO student_form(timestamp,tuid,first_name,last_name,
age_range, major, second_major, minor, class_rank, international_student,
tth_class, online_class, night_class, ais_active, study_place, food_truck,
owl_bird, coffee_tea, philly_cheesteak, study_hour, social_hour, sleep_hour)
VALUES ('9/28/2019 12:00:00','TUG58846','Nhi', 'Nguyen', 'Above 21 years old',
'Management Information Systems', 'I dont have a second major', 'No',
'Senior', 'Yes', 'Yes', 'No', 'Yes', 'Yes', 'Charles Library', 'Cha Cha', 'Night Owl',
'Teahee', 'Yes, many times',4,2, '9-12 hours');
```

Now try to search for Nhi using tuid to make sure we put the values in the table

```
SELECT * FROM student_form
Where tuid='TUG58846';
```

DELETE - delete data from a table

Question: Delete Nhi's values from the table

```
DELETE FROM student_form
WHERE tuid = 'TUG58846';
```

ALTER TABLE DROP COLUMN - drop columns from table

Question: Drop column zipcode from the food_truck table
ALTER TABLE food_truck DROP COLUMN zipcode;

LEARNING RESOURCES

- 1) PostgreSQL 11 in 7 days - Online Learning videos
 - o Can access using Temple library
 - o <https://librarysearch.temple.edu/journals/991037042191803811>
- 2) PostgreSQL Basic Functions
 - o Can access through PostgreSQL main website
 - o <http://www.postgresqltutorial.com/>
- 3) PostgreSQL practice exercises and tutorial
 - o Can access through PostgreSQL website
 - o <http://www.postgresqltutorial.com/postgresql-sample-database/>

GIVE US YOUR FEEDBACK!

- Please use this link <http://bit.ly/TDISAT> to submit the attendance and feedback form for this Saturday Workshop.
- Thank you for joining Nathaly and Nhi today! Have a great weekend :)