MSAN 691
Relational Databases
Fall 2016

Instructor: Nicholas Ross

Time and Location: Th 10:00 - 12:00 529 Howard
Th 1:00 - 3:00 529 Howard

Contact Information: ncross@usfca.edu

Office Hours: Downtown campus: By appointment

Overview and Objectives

This class provides an introduction to Relational Databases with a focus on learning SQL (pronounced "Sequel"). Despite the best efforts of software engineers, understanding databases is still a key component of becoming a data analyst, as most data is stored in such repositories. Without a firm grasp of how to navigate databases and extract the data contained you will be at a disadvantage when compared to your peers.

There are a number of different SQL variants; in this class we will focus on learning PostgreSQL, which is often just called "Postgres." Much of what is covered in this class will apply to other versions of SQL, such as MySQL, RedShift or Vertica. Postgres specific topics, of which there are a few, will be called out during the class.

There is no official textbook for this class, but the following resources maybe helpful, some of which maybe found in the MSAN office:

- *Learning SQL* by Alan Beaulieu: Is an easy read and covers the basics. However it focuses much more on MySQL and doesn't cover Analytic Functions, which we will cover in this class.
- *PostgresSQL Documentation*: This is your primary resource and it is quite good.
- *Learning Postgres* by Salahaldin Juba, Achim Vannahme, and Andrey Volkov
- *PostgreSQL (2nd Edition)*: Korry Douglas

Learning Objectives

At the end of this 7 week course, students will:

- Understand data storage in Relational Databases, including comparisons to other database types.
- Write SQL queries to extract and transform data:

  - Grouping, ordering, sorting, collapsing, joins and aggregating
  - Use string, math and date functions to manipulate data contained within tables
  - Apply analytic functions to simplify queries
- Write queries to Create and Drop tables
- Use server specific functions to navigate database information tables
- Define different data types
- Identify when to properly use indexes
- Define and classify tables as being in 1st, 2nd or 3rd normal forms
- Basic efficiency: understand query performance and how to increase efficiency
- Use large-query best practices to write maintainable, easy-to-read queries

Grading

Grades are determined using the table below. As you can see, quite a bit of the grade involves being a professional. In this class, that means (a) showing up on time (b) showing up prepared, (c) contributing to class and (d) being responsible to your group when doing group work.

The most important objective of this class is learning how to write queries in SQL.

Professionalism	20%
Homework	20%
Final	60%
Total	100%

A brief note on grading: This class is short, we cover a lot of ground and I do not have a lot of time with you. Given that, the homework is done in groups and the final is done individually. The final is difficult and the expectation is that you learned how to do the homework yourself. And how to do it quickly. Historically, I've asked students to write around 40-60 queries over the 2 hour exam, which is a rate of one every two to three minutes. If you are thinking about syntax or are not sure how to write a query, you will not do well on the exam.

Odds and Ends:

- Attendance is required. Unless a student gives me prior warning, all absences are considered unexcused.

- The quickest way to reach me is via email. While I don't have any official office hours downtown, I will gladly find a time and place where we can meet if that proves necessary.
- Class participation is required. This is a big part of your grade. I expect class to include discussions. Just to make this clear and give you an even bigger incentive to pay attention and ask questions, if you catch me making a mistake, I will give you a chocolate (if you are allergic to chocolate, please let me know).
- I have generally tried to find free online resources, rather than requiring textbooks. For some topics, I will put down recommendations for resources and further reading. They are not required.
- All electronic written assignments are to be submitted in PDF format.
- Cheating is not tolerated. At all. Unless an assignment is clearly designated as group work, I expect it to be done alone. USF's honor code can be found online and I expect it to be followed. Disciplinary action will be taken against any student found violating this code.
- As a Jesuit institution committed to cura personalis - the care and education of the whole person – USF has an obligation to embody and foster the values of honesty and integrity. USF upholds the standards of honesty and integrity from all members of the academic community. All students are expected to know and adhere to the University's Honor Code. You can find the full text of the code online at www.usfca.edu/academic_integrity. The policy covers:
  - Plagiarism – intentionally or unintentionally representing the words or ideas of another person as your own; failure to properly cite references; manufacturing references.
  - Working with another person when independent work is required.
  - Submission of the same paper in more than one course without the specific permission of each instructor.
  - Submitting a paper written by another person or obtained from the internet.
  - The penalties for violation of the policy may include a failing grade on the assignment, a failing grade in the course, and/or a referral to the Academic Integrity Committee.
- If you are a student with a disability or disabling condition, or if you think you may have a disability, please contact USF Student Disability Services (SDS) at 415 422-2613 within the first week of class, or immediately upon onset of disability, to speak with a disability specialist.

  If you are determined eligible for reasonable accommodations, please meet with your disability specialist so they can arrange to have your accommodation letter sent to me, and we will discuss your needs for this course. For more information, please visit: http://www.usfca.edu/sds or call (415) 422-2613.

- All students are expected to behave in accordance with the Student Conduct Code and other University policies (see http://www.usfca.edu/fogcutter/). Open discussion and disagreement is encouraged when done respectfully and in the spirit of academic discourse. There are also a variety of behaviors that, while not against a specific University policy, may create disruption in this course. Students whose behavior is disruptive or who fail to comply with the instructor may be dismissed from the class for the remainder of the class period and may need to meet with the instructor or Dean prior to returning to the next class period. If necessary, referrals may also be made to the Student Conduct process for violations of the Student Conduct Code.

- As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a faculty member. I am required to share information regarding sexual misconduct or information about a crime that may have occurred on USFs campus with the University. Here are other resources:

  - To report any sexual misconduct, students may visit Anna Bartkowski (UC 5th floor) or see many other options by visiting our website: www.usfca.edu/student_life/safer.
  - Students may speak to someone confidentially, or report a sexual assault confidentially by contacting Counseling and Psychological Services at 415-422-6352.
  - To find out more about reporting a sexual assault at USF, visit USFs Callisto website at: www.usfca.callistocampus.org.
  - For an off-campus resource, contact San Francisco Women Against Rape (SFWAR) (415) 647-7273 (www.sfwar.org).