CS143 Winter 2020
TR 4pm--5:50pm
Haines A2

Instructor: **Carlo Zaniolo**

Syllabus

Main Goals

- The goal of CS143 is to introduce students to relational database management systems and teach them how to use them in key applications.

- Students are expected to become proficient in SQL, since this is the standard language used for creating, querying and modifying the relational databases.

- Students are also expected to master the technology supporting Relational Database Systems, including:

  1. relational algebra, disk and file systems, indexes, query optimization, and transactions, for traditional and parallel machines, and

  2. including, relational design principles (functional dependency and normal forms), and the entity-relationship database design.

Infobox

Instructor

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- **Office hours   Monday 3-5 PM**

TAs

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FINAL: Monday March 16, 3:00 --6:00pm

Prerequisites

- CS111 is required and this prerequisite is strictly enforced.

- CS143 is intended for students with a robust CS background. That means proficiency in programming and working knowledge of basic Computer Science theory.

- you should feel comfortable with the basic data structures and algorithms in Computer Science (e.g., hash table, graphs, trees, sorting algorithms, set theory) ,

- CS180 (Algorithms), and CS131 (Programming Languages) are expected but not absolutely required.

Programming for the two Projects

The First programming project will use

1. MYSQL DBMS
2. Simple Java and in particular JDBC. We will assume students know Java or are able to learn it during the quarter(easy to learn for the students familiar with C++).
3. We assume that students are familiar with the UNIX command line interface.
4. No any prior experience with DBs is required

The second project: extending Apache Spark with External Hashing.

➢ Apache Spark is a cluster-computing platform with implicit data-parallelism and fault tolerance

➢ For that you will use SCALA: a general purpose programming language that compiles to Java bytecode, so that runs on a Java virtual machine.

Textbooks

Required for the course:

- **Database System Concepts** (6th Ed.),Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, McGraw-Hill Science/Engineering/Math.

The following books are useful for consultation ---however they are not required for the course:

- A Complete Guide to DB2 Universal Database,by Don D. Chamberlain,
- Morgan Kaufmann Publishers
- Database Systems: The Complete Book,by Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer D. Widom Publisher: Prentice Hall
- A Guide to SQL Standard,by Chris J. Date, with Hugh Darwin, Publisher: Addison-Wesley

Grading

The final grade will be assigned on the curve on the basis of a total score computed as follows:

- **Homework: 6%**
- **Project-1: 19%**
- **Midterm exam: 26%**
- **Project-2: 19%**
- **Final exam: 30%**

CS143. Winter 2020: Topics and Schedule

This is the tentative schedule that may change over time depending on the materials covered in each class.
Please come back to this page regularly in order to see the most up-to-date schedule.

Week	Chapters (6th ed.)	Lecture Topic	Assignments	NOTES
Week1	1.1-1.6, 6.1-6.1.3.3	Introduction Relational Model and Relational Algebra	Homework-1 due Jan 15	Model
Week1	2.1-2.6	From Relational Model to SQL	Project 1 assigned	Algebra
Week2	3.1-6	SQL Queries		
Week2	3.6-9	SQL Updates & constraints	Homework-2 due Jan 22	SQL
Weel3	4.1, 4.2, 4.3, 4.4, 4.6, 5.1-5.1.1, 5.1.3, 5.3, 5.6	Privileges, trggers JDBC, OLAPs	Homework-3 due Jan 29	Constraints
Weel4	11.1-4, 11.5.1-2, 11.6-8, 11.10	Secondary Storage and Indexing	Homework-4 due Febr 5	
Week5	12.5-12.5.3	Join Computation	Project 1 turnin	Midterm Sample
Week6	12.5.3-12.6	**February 11: Midterm**	Project 2	

CS143. Winter 2020: Topics and Schedule

Week6	12.5.3-12.6	**February 11: Midterm** Query Evaluation & Optimization	Project 2 assigned	
Week7	7.1-7.7.7.8-7.10 8.1-8.4	ER Model and DB Schema Design FDs and Normal Forms	Homework-5	Notes on Joins PPT. PDF
Week8	8.5-8.8	Relational Schemas Analysis & Design		
Week9	15.1, 15.2 16.1-16.4	Transactions: Concurrency Control and Recovery		Notes on 2PL PPT. PDF
Week10		Advanced Topics	Homework-6	
Week 11	Final Exam	Monday, March 19: 3:00--6:00pm		