Northeastern University
College of Computer and Information Science

(http://www.ccis.neu.edu)

CS5200
Fall 2017
Section 2
Database Management Systems

MEETING

Time	Tuesdays 6-9pm
Location	Shillman Hall 420 (https://www.northeastern.edu/campusmap/map/qad4.html)

INSTRUCTION TEAM

Nate Derbinsky

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Office Hours	WVH 208, Tuesdays/Thursdays 5-5:45pm

Bansal Shah (Teaching Assistant)

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Office Hours	WVH 462, Fridays 5-7pm (on 9/29: Shillman 415)

Hemanth Shetty (Teaching Assistant)

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Office Hours	Nightingale 132, Wednesday 3-5pm

Ushang Thakker (Teaching Assistant)

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Office Hours	Nightingale 132, Mondays 6-8pm (starting 9/18)

COURSE GOALS

This course introduces relational database management systems as a class of software systems and prepares students to be sophisticated users of database management systems...

Lectures	will focus on developing a conceptual understanding of database design & usage, as well as DBMS implementation.
Homework	will ask students to apply their conceptual knowledge via problems and code implementation.
Team Project	will allow students to collaboratively complete a database application from start to finish, including design & creation/optimization within a DBMS, as well as a programmatic user-interface.

EVALUATION

The final grade for this course will be weighted as follows...

- Homework (~5): 40%
- Exams (3): 40%

- Project: 20%
- Participation (bonus): 10%

Final grades will be assigned based on the following scale...

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 A
92 – 100
 A−
90 – <92
 B+
87 – <90
 B
82 – <87
 B−
80 – <82
 C+
77 – <80
 C
72 – <77
 C−
70 – <72
 F
<70
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Make-Up Policy

All assignments have a specific due date and time. Submissions will be accepted *up to one day* after the deadline with a 50% penalty. The assignment will be graded and returned as normal, but the grade will be recorded as half of what was earned. For example, an on-time submission might receive a grade of 90 points. The same assignment submitted after the deadline would receive 45 points (90 x 0.5).

Students who miss scheduled exams will not, as a matter of course, be able to make up those exams. If there is a legitimate reason why a student will not be able to complete an assignment on time or not be present for an exam, then they should contact the instructor beforehand. Under extreme circumstances, as decided on a case-by-case basis by the instructor, students may be allowed to make up assignments or exams without first informing the instructor.

Homework

Submissions will be made via Blackboard (https://blackboard.neu.edu) as a single ZIP file. Any written work (e.g. math problems, reports) is to be included as a PDF (preferably in LaTeX). Code is expected to be professional and properly documented; any required data files/libraries must be included.

This class has very strict standards for borrowing code: if you borrow anything for use in your homework/project, you must have a citation. A good guideline is that if you take more than three lines of code from some source, you must include the information on where it came from. A URL or a notation (e.g., "MATLAB help files") is fine. If it is an entire function, note it at the beginning of the code segment and include any original credit information. Provide a qualitative description of what you used, and what you changed/contributed. **If you have a question about what is considered a violation of this policy, ASK!**

The university's academic integrity policy discusses actions regarded as violations and consequences for students: http://www.northeastern.edu/osccr/academic-integrity (http://www.northeastern.edu/osccr/academic-integrity)

Project

The goal of the project is to gain hands-on experience with developing a full database application from the ground up. The project should be conducted in groups of 3-4 people. Completion of the project will include milestones in the schedule below.

Peer Evaluation

Group projects are sometimes looked upon as being "unfair." To combat contribution inequity, each team member's perception of the quantity of work that s/he performed and that of each team member will be analyzed against the perceptions of the team member(s). Through this process, hopefully equity will be achieved.

Each team member will submit a report rating the relative contributions of each team member (including her/himself) using a single number, as well as optional commentary. The aggregate rating for each student will determine the grade that individual receives, relative to the group grade. In order for this process to work effectively there is the need for each group member to be honest and objective; these ratings and comments will be kept confidential.

SCHEDULE

Note: This schedule is subject to change and will be adjusted as needed throughout the semester.

Day	Topics	Reading	Due (default=M@5pm, late=T@5PM)

	No class first week		
Sep 12	Course/Syllabus, DBMS/Architecture (ssl/lectures/lecture_01_intro.pdf) • Install software (ssl/misc/software.pdf) (XAMPP (https://www.apachefriends.org/download.html), DB Browser (http://sqlitebrowser.org), MongoDB (https://www.mongodb.com/download-center?jmp=homepage#community), LaTeX (https://www.latex-project.org/get/)) • Install dataset (Chinook (https://github.com/lerocha/chinook-database))	1, 2	
Sep 19	Relational Data Model, Relational Algebra, SQL (SELECT) • Introduce DB Browser, sqldiff	5, 6, 8, Codd (ssl/readings/codd.pdf)	
Sep 26	SQL cont'd (INSERT, UPDATE, DELETE; DDL+), Programming • Programming examples • Create a DB from scratch	6, 7, 8, 10, Boyce (ssl/readings/boyce.pdf)	HW::SQL.1 (SELECT, RA)
Oct 3	Exam Review, NoSQL Overview • MongoDB tutorial/application	24	HW::SQL.2 (SELECT, JDBC)
Oct 10	Exam 1 (Test, Debrief)		
Oct 17	Conceptual Modeling/ER Diagrams • Practice ERD	3, 4	
Oct 24	Logical Design/Mapping ERD, Normalization	9, 14	HW::ERD
Oct 31	Exam Review, Web Development Intro • PHP, Python Walkthroughs & Resources	11	HW::Logical (Mapping, Normalization)
Nov 7	Exam 2 (Test, Debrief)		
Nov 14	Indexing, Physical Design • Introduce indexing HW • Project worktime	17, 18	PRJ::Milestone.1 (ERD, Mapping)
Nov 21	Transactions, Concurrency • Project worktime	20, 21	HW::Indexing
Nov 28	Recovery, Security • Project worktime	22, 30	PRJ::Milestone.2 (Data, Queries)
Dec 5	Exam Review • Project worktime		HW::TCRS
Nov 21	Exam 3 (Test, Debrief)		PRJ::Final

Reading Materials

Students are expected to read the materials in preparation of each lecture.

- Textbook
  - Elmasri, Ramez and Navathe, Shamkant. *Fundamentals of Database Systems*, 7th ed. Addison-Wesley, 2016 (ISBN-13: 978-0133970777) [publisher (https://www.pearson.com/us/higher-education/program/Elmasri-Fundamentals-of-Database-Systems-7th-Edition/PGM189052.html)] [amazon (https://www.amazon.com/Fundamentals-Database-Systems-Ramez-Elmasri/dp/0133970779)]
- LaTeX
  - Wikibook (https://en.wikibooks.org/wiki/LaTeX)
  - Getting to Grips with LaTeX (http://www.andy-roberts.net/writing/latex)
  - Detexify (http://detexify.kirelabs.org/classify.html)
  - HW Template (ssl/misc/hw_template.zip)
- SQL
  - W3C SQL Tutorial/Reference (https://www.w3schools.com/sql)

- MariaDB (https://mariadb.com/kb/en/the-mariadb-library/sql-statements/)
- SQLite (http://sqlite.org/lang.html)

CLASSROOM ENVIRONMENT

To create and preserve a classroom atmosphere that optimizes teaching and learning, all participants share a responsibility in creating a civil and non-disruptive forum for the discussion of ideas. Students are expected to conduct themselves at all times in a manner that does not disrupt teaching or learning. Your comments to others should be constructive and free from harassing statements. You are encouraged to disagree with other students and the instructor, but such disagreements need to respectful and be based upon facts and documentation (rather than prejudices and personalities). The instructor reserves the right to interrupt conversations that deviate from these expectations. Repeated unprofessional or disrespectful conduct may result in a lower grade or more severe consequences. Part of the learning process in this course is respectful engagement of ideas with others.

Title IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff.

If you or someone you know has been a survivor of a Prohibited Offense, _confidential_ support and guidance can be found through **University Health and Counseling Services** staff (http://www.northeastern.edu/uhcs/ (http://www.northeastern.edu/uhcs/)) and the **Center for Spiritual Dialogue and Service** clergy members (http://www.northeastern.edu/spirituallife/ (http://www.northeastern.edu/spirituallife/)). By law, those employees are not required to report allegations of sex or gender-based discrimination to the University.

Alleged violations can be reported non-confidentially to the Title IX Coordinator within **The Office for Gender Equity and Compliance** at: titleix@northeastern.edu (mailto:titleix@northeastern.edu) and/or through **NUPD** (Emergency 617.373.3333; Non-Emergency 617.373.2121). Reporting Prohibited Offenses to NUPD does **NOT** commit the victim/affected party to future legal action.

Faculty members are considered "responsible employees" at Northeastern University, meaning they are required to report all allegations of sex or gender-based discrimination to the Title IX Coordinator.

In case of an emergency, please call 911.

Please visit http://www.northeastern.edu/titleix (http://www.northeastern.edu/titleix) for a complete list of reporting options and resources both on- and off-campus.

Students With Disabilities

Students who have disabilities who wish to receive academic services and/or accommodations should visit the Disability Resource Center (http://www.northeastern.edu/drc) at 20 Dodge Hall or call (617) 373-2675. If you have already done so, please provide your letter from the DRC to me early in the semester so that I can arrange those accommodations.

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