Course Overview CS 348: Introduction to Database Systems

(Spring 2024)

Course Web Site and This Document

The course web site is on LEARN for which all registered students should have access. This document is available for download from Learn, and is the source for course related information. Any updates to this information will be made to this document, in particular, the timing for study tasks and assignment submissions. It is therefore a good idea to review or download a fresh copy on a regular basis.

Schedule

Current study tasks are as follows (see below for module descriptions):

- 1. Module 1 between May 6–10;
- 2. Module 2 between May 13–17;
- 3. Module 3 between May 20–24;
- 4. Module 4 between May 27–31;
- 5. Module 5 between June 3–7;
- 6. Module 6 between June 10–14;
- 7. Module 7 between June 17–21;
- 8. Module 8 between June 24–28;
- 9. Module 9 between July 1–5;
- 10. Module 10 between July 8–12;
- 11. Module 11 between July 15–19;
- 12. Module 12 between July 22–26 (31);

Instructors

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Sections LEC 001 and LEC 004

Course Objectives

The overall objectives for this course are for students to learn the following:

- 1. why one might use a *database management system* (DBMS) (what are the benefits of doing so);
- 2. how to code applications using a DBMS;
- 3. how to design databases; and
- 4. a basic understanding of how a DBMS works.

A particular focus of the course is on the relational model of data and on the SQL language, the standard interface to a *relational* DBMS (RDBMS).

Prerequisites

The lectures do not assume any prior knowledge of databases. However, it is a good idea to re-familiarize yourself with the following:

- 1. elementary math (sets, relations, first-order logic);
- 2. basics of complexity theory (e.g., the O-notation, etc.); and
- 3. basic programming skills (in C).

Learning Material

The course consists of twelve modules covering a progression of twelve topics, and there are pdf files of all slides used in lecturing that can be downloaded from the course Learn site. For each module, there are two slide files:

- 1. the first is a more compact handout format, and can be used as a convenient reference; and
- 2. the second is the longer presentation slide file used in class.

The modules are as follows:

Module 1: Overview of Data Management

Module 2: The Relational Model

Module 3: Basic SQL

Module 4: Advanced SQL

Module 5: Applications Programming with SQL

Module 6: Dynamic Embedded SQL and ODBC

Module 7: The Entity Relationship Model

Module 8: Logical Mapping

Module 9: Data Dependencies and Normal Forms

Module 10: Query Evaluation

Module 11: Transaction and Recovery Management

Module 12: Database Tuning

The topics will be covered in a timed incremental fashion, with each topic allotted approximately one week. At the latest, the slides for Module i will be available for download at the end of week i - 1, or at the start of classes. At the start of each week i + 1, students are expected to have completed reviewing the slides and assigned reading for Module 1 through Module i.

Assignments and Course Evaluation

Final grades for the course will be based on the following distribution of marking:

- assignments (five in total worth 6 marks each), 30%;
- midterm exam, 30%; and
- final exam, 40%.

The timing for grading and feedback on assignments is important, so late assignments will not be accepted. It is therefore strongly recommended that you submit whatever you have completed by the due date.

Note that all assignments will be published on the course web site, and that assignment submissions will also be done online (with instructions accompanying each assignment).

Assignment scheduling:

- 1. Assignment 1 will be available on May 16 and due on May 27;
- 2. Assignment 2 will be available on May 28 and due on June 10;
- 3. Assignment 3 will be available on June 11 and due on June 28;
- 4. Assignment 4 will be available on July 2 and due on July 15;
- 5. Assignment 5 will be available on July 16 and due on July 29;

The deadlines are firm and no extensions will be given since solutions will typically be posted on the day after the due date. Remarking requests will be accepted for a week after the graded assignments become available.

Online Office Hours and Discussion Forum

There are two primary ways to receive help with course material.

- 1. The first is to pose questions on the piazza web page. In this case, we will attempt to answer questions in a timely fashion.
- 2. The second is to attend an office hours. The schedule of office hours will be posted on the course web page.

Textbook and Online Manuals

The required textbook for the course is *Database System Concepts*, by Avi Silberschatz, Henry F. Korth, and S. Sudarshan (7th edition). There is assigned reading from the textbook for each module.

Some of the assignments will require that you work with IBM DB2, a state-of-the-art commercial RDBMS supported by the school. There is a slide tutorial on using DB2 from your undergraduate accounts that is available on the Learn course page. An online references for DB2 is available at the following site:

https://www.ibm.com/support/knowledgecenter/SSEPGG_10.1.0/com.ibm.db2.luw.kc.doc/welcome.html

Student Course Evaluation

The University of Waterloo has been working hard to bring student evaluations into the modern era by eliminating the need for wasteful and timeconsuming paper surveys. The current system we are using is called "evaluate", and was developed on campus in order to meet the specific needs of the university. The evaluation survey is available online.

Polices Governing Student Behaviour and Conduct

Academic Integrity:

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. Check

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www.uwaterloo.ca/academicintegrity/
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for more information.

Grievance:

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline:

A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about 'rules' for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline. For typical penalties check Guidelines for the Assessment of Penalties.

Appeals:

A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals.

Note for students with disabilities: UW's AccessAbility Services (https://uwaterloo.ca/accessability-services/) office (AAS), located in Needles Hall, Room 1401, collaborates with all academic departments to

arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AAS at the beginning of each academic term.

COVID-19 Contingency Plan

- If in-person lectures are cancelled, the instructors will provide sufficient digital resources instead using LEARN/Bongo.
- If in-person exams are cancelled, the exams become online take-home exams.