Comp 421 – Files and Databases: Fall 2024

Bulletin Description

Placement of data on secondary storage. File organization. Database history, practice, major models, system structure and design.

General Course Info

Term	Fall 24
Department	COMP
Course Number	421
Section Number	001
Time	Tu Th 12:30pm-1:45pm
Location	Murphey Hall-Rm 0116
Website	http://www.cs.unc.edu/~anwica/comp421_fall2024

Instructor Info

Instructor's name	Anwica Kashfeen
Email	anwica@cs.unc.edu
Office	TBA

Textbooks and Resources

The following textbooks will be used alternetively:

1. Database System Concepts
    - by Abraham Silberschatz, Henry Korth, S. Sudarshan
2. Database Management Systems
    - by Raghu Ramakrishnan, Johannes Gehrke

Course Description

Databases are an indispensable tool for managing information, and a course on the principles and practice of database systems is now an integral part of any computer science curricula. This course covers the fundamentals of modern database management systems, in particular relational database systems. The material covered in Comp 421 can be broken into three areas of emphasis. The first area includes database foundation material such as the relational model, relational algebra, relational calculus, and normal forms. The second area of emphasis is database application programming and includes among others the topics of Structured Query Language (SQL), eXtensible Markup Language (XML), integrating databases into programs, web-based database

usage, and triggers and active databases. The third area of emphasis is the systems side of databases, which includes database indexing, eficient query evaluation, the transaction-based model, concurrency, and security.

Target Audience

This course is suitable for computer science majors at both undergraduate and graduate levels. Students who wish to take this course should have some programming experience in a modern language and knowledge of data structures.

Prerequisites

All students are expected to have taken introductory courses in programming languages, data structures, and computer organization equivalent to COMP 401, COMP 410, and COMP411.

Goals and Key Learning Objectives

Comp 421 emphasizes database foundations, applications, design, optimization, and implementation. This includes the relational model and normal forms. Application programming which includes Structured Query Language (SQL), integrating databases into programs, web-based database usage. The design aspects of databases include indexing, efficient query evaluation, the transaction-based model, and database concurrency. Upon completion of Comp 421, students should be able to construct, write queries of, and tune databases. In addition, students should be able to incorporate databases into larger software applications and systems.

Course Requirements

The textbooks are optional. However, they can be used to supplement lecture materials. Each lecture will roughly correspond to topics from one of the two textbooks. Students will be assigned 3 problem sets. In addition, there will be many class works, a project, a midterm, and a final exam.

Key Dates

Midterm: Oct 01 (during class)
Final Exam: Dec 09, 4pm

Grading Criteria

The final grade will be based on the following weighting factors:
3 – HWs 30%
1 – Project 20%
1 – Midterm Exam 20%
1 – Final Exam 20%
Many CWs 10%

Course Policies

Attendance is expected, but no roll will be taken No late problem sets will be accepted. Submissions of HWs are online and are "due" just before midnight on their due date. The course final is given in compliance with UNC final exam regulations and according to the UNC Final Exam calendar.

Cheating and the UNC Honor Code

Collaboration on assignments is encouraged. ***However, what you hand in must be your own work.*** Good scholarship requires that all collaboration must be acknowledged. Thus, if you collaborate on the solution of a problem set, I expect that you list your collaborators prior to your answer for each problem. Turning in copied code (any function or fragment) written by some other person or found on the Internet is not collaboration. Discussing algorithmic design approaches and sharing test cases are good examples of collaboration. Collaboration on tests (midterms, final) in any form is, of course, a violation of the Honor Code. This includes a discussion of questions on a midterm, or final with students that have not yet taken the test. Using any unauthorized information source, such as social media (Facebook, WeChat, Slack, Shared Google Docs, etc.), texting, or any other interactive means of contacting another person during an exam is a violation of the honor code.

Diversity and Inclusion Statement:

Comp 421 will attempt to provide an objective learning experience that respects all demographic groups and LGBTQ+ identifications. The instructor acknowledges that many aspects of computer science are tinged by a history that overrepresents a small subset of privileged voices. Furthermore, it is possible that materials could be presented in ways that expose both overt and implicit biases of both the field and the instructor. The instructor is committed to integrating a more diverse point of view in this course and always encourages feedback on how to improve the course materials to make them more inclusive.

Disclaimer

"The professor reserves the right to make changes to the syllabus, including due dates and test dates. These changes will be announced as early as possible."