Syllabus

CSCI 1270: Database Management Systems
Fall 2025

The volume of data stored and processed in many applications is exploding. Modern database management systems (DBMSs) aim to provide the efficiency, scalability, and reliability required by these applications. This course provides a comprehensive introduction to DBMS internals, design, and implementation. It covers various data models and structures, as well as fundamental algorithms for query processing and optimization, concurrency control, and recovery. These topics are studied in the context of relational DBMSs and NoSQL big data systems. Our projects include the implementation of components of a simplified relational DBMS, and learning about systems such as MongoDB or Vector Databases. We will also use modern platforms such as containers and digital notebooks.

Lectures	1-2:20pm on Tuesdays and Thursdays
Room	Granoff Center for Creative Arts 110
Prerequisites	An introduction to Computer Systems course (CSCI 0300, 0330, 1310 or equivalent), minimum score of WAIVE in 'Graduate Student PreReq'.
Instructor	Ugur Cetintemel
Head TAs	Alaina Lin, Kazuya Erdos
GTA	Shu Chen
UTAs	Jonathan Zhou, Nicolas Kim, Sarah Ridley, Justin Chan, Jerome Paulos
Communication	The two official course email addresses are - cs1270tas@lists.brown.edu (which goes to all TAs) and - cs1270headtas@lists.brown.edu (which goes to the HTAs and the instructor). All students will also be added to a class EdStem, where they can ask course-related questions to be answered by TAs or peers. In general, EdStem should be used for all course-related questions. Use the above email lists when you have a reason to speak only with a specific subset of the teaching staff.

Office Hours	Ugur will hold in-person (in his office: CIT 437) and virtual office hours (via Zoom). See the hours calendar on the website. TAs will hold **Collaboration Hours** for students. TAs will supervise these sessions, where students will be able to get both high-level help such as clarifications or guidance on the solution design, as well as low-level debugging help from the TAs *and* their peers. Note that TAs will **NOT** be holding 1-1 hours.
Requirements	Programming projects, quizzes, and post-lecture quizzes (PLQs).
Time Requirements	In addition to approximately 3 hours per week in class (~36 hours in total), students should expect to spend approximately 10-12 hours per week on programming assignments and practice sets (140-160 hours in total). Assignment difficulty will vary. The overall time commitment for the course will be approximately 180-200 hours. Remote students watch the recorded lectures asynchronously. Time expectations are the same for those in the remote/asynchronous section.
Goals	The goal of CSCI 1270 is to teach the fundamentals of modern data management systems (DBMSs) with a focus on their use, design, and implementation. We study the general abstractions, principles, and algorithms commonly used by these systems. While a big focus is relational DBMSs, we also cover non-relational (noSQL) database systems that are widely used for large-scale data storage and processing. A second goal is to provide students with hands-on experience in working with modern, real-world DBMSs and data platforms. The course is best suited for students who have completed an introductory systems course and want to deepen their understanding of data systems and engineering.

Diversity: **All Are Welcome**	All members of the CS community, including faculty, staff, and students, are expected to treat one another in a professional and respectful manner. CSCI 1270 strives to create a learning environment where every student feels welcome and valued. We welcome a diversity of thoughts, perspectives, and experiences. We can only accomplish this goal with your help. If something is said in class or at TA hours (by anyone) or you come across instructional material that made you uncomfortable, please talk to the instructor about it or fill in this semi-anonymous feedback form. Only the Director of Undergraduate Studies has access to the email address you use to fill out the form; your answers only will be available to the instructor. If you feel you have not been treated in a professional manner by any of the course staff, you should also feel free to contact the Director of Undergraduate studies, the Department Chair, or the Administrative Department Manager.
Grading	*Grading breakdown (tentative; we reserve the right to make minor tweaks to the policy below as the semester progresses):* - No-curve, no grade-rounding policy. - Final letter grade cutoffs for A/B/C are 90/80/70 and above, respectively. - **To get a final letter grade of A/B, overall project and quiz grades should *each* be at least a B/C, respectively.** 1. **Projects**: 50% 1 warm-up project (Go): 4% 5 short projects: each 5% 3 long projects: each 7% (Short and long projects are each 1- and 2-weeks long, respectively) 2. **In Class Quizzes**: 44% 5 quizzes We will use your best 4 scores for grading: each 11% 3. **Post Lecture Quizzes:** 6% 1 short quiz per lecture We will drop the 3 lowest scores for grading - Projects are both auto-graded and interactively graded. - **Auto-grading:** we will manually regrade an assignment if the autograde score is less than 60% of the total score. The final score for

	the project will be the higher of the auto-grade and the manual grade, but will not surpass 60% of the total score. - **Interactive Grading:** You should be prepared for live 1-on-1 interactive grading sessions with a TA for any given project. - Partial credit is awarded for completing the PLQ. Full credit is reserved for complete and correct PLQs. No credit is awarded to missed or late PLQs.
Remote Students	Remote students taking CSCI 1270 will watch the recorded lectures asynchronously. They will have access to the EdStem discussion forum, and to TA and Instructor office hours via Zoom. The grading policy for remote students is the same as stated above except for the quizzes. In the online section, quizzes will be done interactively via 1-on-1 remote video calls after scheduling directly with the teaching staff.
Regrading Policy	All regrade requests will be submitted via Gradescope. If you have any questions or concerns about a grade you've received, submit a regrade request there, and we will respond with comments and/or amendments. **Any regrade requests must be done within a week of the release date of the corresponding grades**. Email cs1270headtas@lists.brown.edu if an issue needs to be escalated.
Incomplete Policy	We expect everyone to complete the course on time. However, we understand that there may be exceptional and unforeseeable factors beyond your control, such as major health problems and family crises, that prevent you from finishing the course on time. If you feel you cannot complete the course on time, please discuss with the instructor ASAP the possibility of being given a grade of Incomplete for the course and setting a schedule for completing the course in the upcoming year.
Due Dates	**Projects** are due 10 pm ET on the respective Monday due date. Please see our collaboration policy. **PLQs** are due 11:59 pm ET the day before the next lecture.

Late Policy	**You may not accept the next assignment until you have submitted the previous. If you do, your submission is subject to additional review and penalization.** Each student has a total of **120 late hours** for the projects. So you can hand in your projects late (while respecting the cut-off deadlines; see below), and the total amount of lateness summed over all the deadlines must not exceed 120 hours. You may divide up your 120 hours among the projects however you like without informing us. Additionally, we have **cut-off deadlines** for submitting projects. **For all projects**, hand-ins must be done **within 2 days of the original due date**. If you want an exception to these rules to be considered, you will need a Dean's note to be reviewed by the course instructor. For the purpose of calculating late hours, we exclude hours between midnight and 7am. This means that you can get a good night's sleep before you continue working on your assignment without losing extra late hours while you sleep. If you don't hand in an assignment by the cut-off deadline, we'll give the assignment a zero. However, if you hand an assignment in late, and your total late time (including the late time for that assignment) exceeds 120 hours, and you hand it in by its cut-off deadline, then we'll give it some partial credit (up to 50%) depending on whether it seems to implement the basic functionality. Therefore, it's better to complete and hand in a project even if you have already used your late hours. At the end of the semester, we will optimally distribute the penalties for the assignments to maximize each student's overall grade. **Late hours do not apply to PLQs.** If you don't submit a PLQ by the deadline, it'll be given a zero.
Accommodations	Brown University is committed to the full inclusion of all students. Please inform the instructor if you have a disability or other condition that might require accommodations or modification of any of these course procedures. You may email the instructor, come to office hours, or speak with the instructor after class, and your confidentiality is respected. We will do whatever we can to support accommodations recommended by SEAS. For more information contact Student and Employee Accessibility Services (SEAS) at 401-863-9588 or SEAS@brown.edu.

Mental Health	Being a student can be very stressful. If you feel you are under too much pressure or there are psychological issues that are keeping you from performing well at Brown, we encourage you to contact Brown's Counseling and Psychological Services (CAPS). They provide confidential counseling. In addition, the deans of student life as well as the deans of the college can provide notes supporting extensions on assignments for health reasons.
Collaboration	**General Policy:** CSCI 1270 projects require every student to turn in a separate code repository that contains their own code. Learning benefits from discussion, so you are welcome to discuss **high-level** approaches, solution ideas, pitfalls, and even program bugs you've encountered with your classmates, but you are not allowed to share your code in any format (including email, IM, etc) or work on/debug code together. Moreover: • As far as this class is concerned, **AI tools** (e.g. ChatGPT, Copilot) **are considered "people"**. If you aren't allowed to do something with a classmate, you are also not allowed to do it with ChatGPT unless explicitly permitted to. • You must not ask questions on Stack Overflow or any similar site or service. Of course, if you search for programming problems on the Internet, some answers may come up; just don't ask questions about the assignment code yourself. • If you get help, acknowledge help from others (including AI tools). If a classmate, another collaborator, or an online tool/service helps you, acknowledge this in your assignment submission. Name the helpers and briefly describe how they helped. (You do not need to cite help from course staff) • You must not use solutions from past years. • Do not post your code or solutions in a public place or make them available to future students. **Collaboration Hours:** Activities permitted during the **Collaboration Hours** (discuss code and get debugging help from your TAs *and* other students) are an exception to these rules. In particular, you can show your code to other students and discuss it, though you are **NOT** permitted to copy/share code or someone else code for you. This flexibility is **ONLY** permitted during Collaborative Hours: outside of these periods, you are to strictly follow the general policy stated above. Finally, if you aren't sure that you may be violating the collaboration policy, please ask the course staff.

EdStem Policy	If you have a question about the lectures, about course logistics, about a project, or about a bug in your code etc., you can always ask on EdStem. **Post visibility**. It is left to student discretion as to whether a post should be made public or private. If your post contains references to your code, or anything particular about your implementation, it should almost definitely be private. If in doubt, make your post private. (Course staff may retrospectively ask permission for a private post to be made public if they think it could be helpful to other students.) **Debugging code**. Unlike some other CS classes that you may have taken, you cannot sign up directly for 1-on-1 debugging hours with TAs. Instead, you should post your question on EdStem with: - A clear articulation of what stage in the assignment you are at, with reference to the assignment handout/spec if possible. Most assignments will offer EdStem thread templates, which you should use if available. - Direct references to the code, if relevant. The easiest and preferred way to link to code in EdStem posts is using Github's code snippet permalinks. If you are not using Github, then you can link the file directly in EdStem (though this is not recommended). - Detail on what you have already tried to solve the problem. Our TAs' job is to guide you to finding the answers yourself; not to provide the answers for you. - **Note that we expect that you will have made a serious attempt to resolve the issue before seeking assistance. We will defer answering your post if there is insufficient context (use the provided Edstem templates to avoid such)** Our EdStem policy has been designed to encourage sustainable "real-world" work practices on your part as students, and to provide the maximum amount of effective help with respect to our relatively limited resource in terms of TA hours. The best way to ensure that you get the necessary help (via EdStem and/or Collaborative Hours) is to start assignments early, and to ask questions early. Doing so will give you a sense of how long it is likely to take to get a meaningful response on EdStem, and will leave you in a better position to complete assignments on time. As deadlines draw nearer, you should not expect TAs to respond to EdStem posts more quickly, or to schedule additional Collaborative Hours.

Complying with class policies	These class policies are subject to change at the discretion of the course instructor. Any consequential changes will be broadly announced ASAP, and we will make our best effort to ensure that such changes will not disadvantage any students. At the beginning of the course, all students are required to formally indicate that they understand and agree to abide by the course collaboration policy by downloading the PDF of the syllabus, signing it at the bottom, and submitting it on Gradescope. No assignments will be graded until the syllabus is submitted. Failure to do so in a timely fashion will not prevent students from completing the course.

Optional Reading: Database System Concepts, Seventh Edition by Silberschatz, Korth, and Sudarshan. ISBN: 9780078022159 (supplementary). A digital version of the textbook is available in Brown's digital library. If you have trouble accessing a copy of the textbook, please contact the course staff.