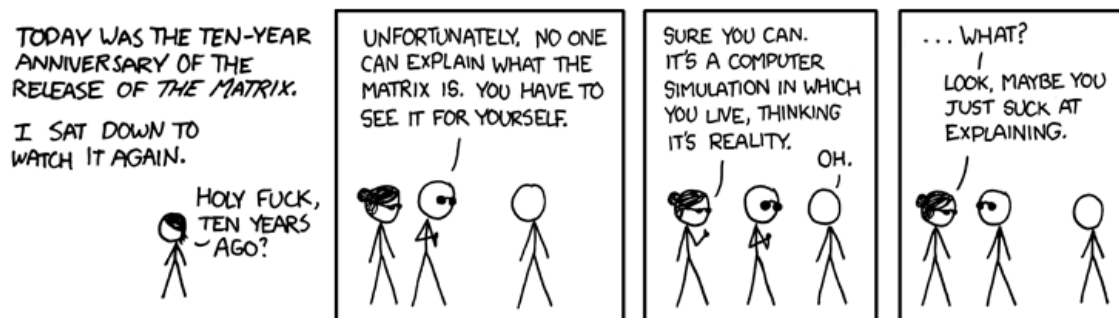


The Matrix in Computer Science (Course Missive)

Introduction



The Matrix Revisited (excerpt) <http://xkcd.com/566/>

Course Description: The aim of this course is to provide students interested in computer science an introduction to vectors and matrices and their use in modeling and data analysis. The course will be driven by applications from areas chosen from among: combinatorial optimization, computer vision, cryptography, game theory, graphics, information retrieval and web search, machine learning, and scientific visualization. For example, students will learn Google's PageRank method for ranking web pages. This course satisfies the linear algebra requirement for the Computer Science Sc.B and the Applied-Math/Computer Science Sc.B., and fulfills an "intermediate math-oriented" requirement for the Computer Science A.B.

Prerequisites: No formal prerequisites but students are expected to be comfortable with mathematics (writing a proof) and with programming. For example, you should be fine if you have taken Discrete Mathematics (CS 220) and one of CS 040, CS 150, CS 017, CS019. The course is taught using Python but if you are experienced you should be able to pick up the Python during the first couple of labs.

Meeting Time and Place Monday, Wednesday, Friday 1:00-1:50, CIT 368

Staff

The course has a professor, one head TA (HTA), and four undergraduate TAs (UTAs). If you have course questions during the semester, you should email

`cs053tas@cs.brown.edu`

which goes to the whole staff, including the professor. One of us will get back to you. Don't expect us to be on top of email during all hours, however!

The professor is Philip Klein (klein@brown.edu). Professor Klein's office is CIT 511, and his phone extension is 3-7680. Professor Klein's office hours are by appointment—just mail to set up a time. In fact, students in this class will be required to make a visit at some point in the semester, and appointments will be made in class.

The other staff are:

- Eli Fox-Epstein, grad TA Anson Rosenthal, head undergraduate TA
- Shanna Chen, undergraduate TA
- Uthsav Chitra, undergraduate TA
- Zachary Loery, undergraduate TA
- Dan Schiebler, undergraduate TA

All the TAs will hold hours in the Moonlab, CIT 227. The schedule can be found on the web site. These hours are designed to help you with homework assignments, in addition to any general questions you have about the course (things you didn't understand in lecture, etc). If you can't make it to anyone's hours one week but

really need help with an assignment, email the staff and someone will try to schedule an appointment. Please keep in mind, however, that the staff have their own lives.

Communications: The course web site, the course directory, and email

The course web site is <http://www.cs.brown.edu/courses/cs053/>, which you can reach alternatively using <http://csmatrix.org>. There you can find TA hours, tentative course calendar and other resources, including information on homework and lab assignments, and announcements.

Most announcements will be sent by email to the Brown University email addresses of the students registered for the course. Be sure you are registered so you can receive these messages. If for some reason you cannot register, please contact the professor.

If you are registered, you will automatically be given a

Textbook

The textbook for this course is *Coding the Matrix: Linear Algebra through Computer Science Applications*, Edition One. It's available at the Bookstore. Amazon has it at about the same price.

Assignments and Grading

Your final grade in the course will be broken down as follows:

Type of assignment	Percentage
Class participation/quizzes	5
Weekly lab section	20
Problem sets	25
Midterm exams	25
Final exam	25

Grades are determined by overall performance according to these measures. You are not competing with your classmates.

Lectures

There will be occasional quizzes in class, primarily in the first third of the course. This is a way of keeping you thinking in class. We will give the answers immediately after the quiz, and you are responsible for knowing the correct answers. As long as you write your name on the sheet and put some kind of reasonable answer, you will get full credit. Sometimes you will be encouraged to work on the quizzes in class.

We welcome class participation. Questions are welcome as long as they are not a way to show off your knowledge.

Almost all of the material in lecture will be in the textbook. In addition, the pdfs of the slides and videos of the lectures will be provided on the course website. This means you will not have to take notes in lecture, though you are encouraged to do so if it helps you stay focused in class.

Labs

The labs are a central part of the course. Almost every week, you will attend a two-hour lab, in which you will carry out a computation, usually requiring you to write some code and sometimes do some problem-solving on paper. The lab assignments can be found in the course textbook. The labs are intended to give you a chance to demonstrate your understanding of the course material and your ability to apply it. You are expected to show up for lab

1. with a good understanding of the lecture material,
2. with paper and pencil/pen to work out some math,
3. having read through and thought about the lab assignment.

Students who fail to meet these expectations are in danger of receiving a low lab grade. Lab is not the ideal time to ask all your general questions about the course. However, you can ask TAs questions if they are not needed for helping others with lab assignments.

If you do meet the above expectations, you should be capable of successfully completing the lab. During lab, you are encouraged to collaborate with other students. (In fact, for some labs we might require you to work in pairs.) You are also encouraged to seek as much help as you need from the TAs, who will be hovering around you for the duration of the lab. The TAs are supposed to do what they can to bring about the lab success of every well-prepared student.

The labs this semester will be offered (1) Monday 7-9 pm, (2) Tuesday 5-7 pm, and (3) Tuesday 7-9 pm. Each lab section will have two TAs leading the lab. You will give us your lab time preferences during the first lecture, and we will email you with your assigned lab time soon after that. If you miss the first lecture or cannot make your assigned lab time, email the staff. You will be expected to come to the same lab time every week. If there is a week when you need to attend the another section, email the staff beforehand so that both sets of lab TAs know.

Lab Grading: We plan to allow you to use a grading server to check your solutions to lab tasks. Your Lab TAs will assign you an integer grade between 0 and 3 for your lab, depending on what you manage to accomplish. Students are expected to complete the lab assignment during the lab session; however, you can earn up to one additional point for work done up to two days after the beginning of your lab session by showing a TA on hours what you have accomplished.

Homework

The purpose of homework assignments is to reinforce the material, sometimes teach you more material, and test your understanding of the material. The problems may include computations, proofs, and programming problems. Some collaboration is allowed on these assignments, but see the collaboration policy for more information on this.

Homework will be assigned for each lecture and due before the start of the following lecture. Each assignment may also be resubmitted by two lectures later for partial credit. We will try to return your graded homework by the lecture after it is submitted, so you can correct your mistakes and resubmit on the following lecture.

Doing homework on material very soon after the material is presented in lecture is a way of reinforcing your understanding of the material, exposing any gaps or misconceptions you might have, and making sure that everybody is up-to-date. This course moves quite quickly and the material is cumulative, so getting behind can be disastrous.

We will assign problems via email and via the course web site. To receive email, you must be registered for the class.

Some homework problems are submitted digitally using our grading server. The grading server gives you immediate binary feedback (correct/incorrect) and you can resubmit as many times as you would like. However, it is recommended that you *not* use the grading server as a substitute for testing your code. For many problems, we provide test examples for you to use in testing and debugging.

Problems not eligible for auto-grading must be turned in on paper. For proofs and other problems involving mathematical notation, please either write clearly by hand or use a math typesetting tool such as L^AT_EX.

Both auto-graded solutions and written solutions are due just before the beginning of class. You should submit written solutions to the course hand-in bin on the second floor of the CIT.

Exams

There will be three exams in the course—two midterm exams and a final exam. Midterm 1 will be held on October 14, 5:00-6:30 pm Midterm 2 will be held on November 18, 5:00-6:30 pm. The final will be on December 12, 2:00-5:00 pm. Make sure you can make these times.

The exams are the only part of the course for which no collaboration is allowed, and for this reason they will account for a significant portion of your grade.

Collaboration Policy

The CS department has rules about collaboration, and there are also some that are specific to this course. These policies are designed to make sure that every student is graded individually and fairly; according to the amount that s/he has learned. Please be aware that it is not hard for us to tell if you break any of these rules! If you have any questions about the following policies, make sure you ask us so that you do not inadvertently break any rules.

Labs

Collaboration is encouraged in labs—both with your fellow students and with the lab TAs.

Homework

You are allowed to talk as much as you want with any course TA and with the professor about any homework assignment. A TA is not responsible, however, for writing your code for you or giving you a solution. You are also allowed to talk to other students about the problems and come up with solutions together. However, we want to make sure that you actually understand these solutions. Therefore, any written record from a collaborative session must be discarded at the end, and you are required to write up your solutions on your own, without any notes and without any coaching. In other words, you need to be able to reconstruct *on your own* any work that you do with a classmate.

You are allowed to use online resources or alternative textbooks, but if you happen to find solutions or partial solutions to the specific problems we have assigned, you must not use information from those solutions; if you do find such solutions, please report it to the staff.

Exams

No collaboration is allowed during an exam.

Home Directory

As a student in CS053, you are given a CS login and a home folder on the CS department filesystem. Within that folder, you will have a course folder for CS53, called `matrix`. All your work on CS53 should be in that folder. The permissions for this folder should be set so that nobody other than the course staff can read it. In the first lab, you will run a script that should set the permissions correctly, and the TAs will verify that your permissions are correct. After that, you are responsible for making sure the permissions are correct. You are encouraged to ask a TA or a Sunlab consultant for help if you have doubts.

For homeworks, you are welcome to use either the CS Department's computers or your own computer. If you put course materials on your own computer, you are responsible for ensuring that others do not have access to those materials.

Finally...

You are expected to visit the professor's office at least once during the semester, and you are invited to come as much as you like. You don't need to have a reason, a question, or an insight. You are encouraged to come in groups. Group meetings will be scheduled in lecture. Otherwise, please use email to schedule a meeting.

If you are getting in trouble in the course, get in touch with the professor right away. We want you to succeed in this course. Catching problems early can help.

If you are sick, please contact the professor immediately. Don't endanger your health by working through your sickness. We will provide extensions if needed. And if your sickness is contagious, please make an effort not to spread it. Don't come to class or to hours or to the computer labs. We will give you a chance to make up the work.