

CS193i Internet Tech

<http://www.stanford.edu/class/cs193i/>

The universe is looking less and less like a great machine and more and more like a great thought. — Ortega Y Gasset

The Course in a Nutshell

CS193i is a tour of Internet technologies for programmers. Not how to surf the web. How to write the software that builds the web. The course explores the authoring, distributing, and browsing technologies that make up the Internet, and each topic includes a programming project. Topics include...

- Networking, TCP/IP, connections, sockets, and client/server structures.
- The World Wide Web, HTML, HTTP, and server side programming with CGI and servlets.
- Standards, network effects and inertia, the prisoner's dilemma, Spam externalities, security, privacy, and other social issues.

Programming projects cover both client and server side projects working in Perl and Java.

Coverage

We will spend enough time on each topic to understand the fundamentals of how it works, see how it fits into the overall scheme, and implement a non-trivial homework assignment. As a practical matter, this means spending two or three weeks per topic. The goal is to understand the fundamentals of each of the major technologies which make up the Internet. The course will not pursue extreme depth in any one area, but I think that the topics are accessible enough that a few weeks can cover the most interesting material in each area, and in the end you have a sense of the big picture.

Prerequisites

The prerequisite for the course is moderate programming skill and a basic ability to get around Unix (described below). The basics of the Perl and Java languages will be explained in lecture (or in a special section), but the coverage is pretty quick, so students need a strong enough programming background to pick up the language material.

CS193i students should have programming experience at the level of CS106B, CS106X: software engineering, writing and debugging significant programs,

pointers, recursion, memory management. CS106A may be sufficient, but it's more of a reach. Students need to be proficient programmers because CS193i does not teach programming, but its assignments, in exercising various areas of Internet technology, require programming and debugging skills. Students without strong programming skills will need to be extra committed to starting the assignments early. Students should also have a basic understanding of editing and managing files and running programs in the Unix environment because many of the projects will need to be tested on a Unix.

S/NC Option

Students who are interested in the material but who do not necessarily have the programming background may want to take the course S/NC (i.e. "pass/no-credit"). Students taking the course S/NC may work in teams of 2 on the assignments, and the assignments will have slightly reduced requirements. Our goal is to make the course more broadly accessible to people with a general interest in the material.

Topics

TCP/IP Understand basic networking and how TCP/IP provides a standards based network to interconnect computers.

Perl A quick introduction to the Perl programming language. We will just use the basic parts of the language. There will be a one-time section to introduce Perl.

HTML/HTTP Understand how HTML and HTTP work to build the Web.

Java A quick introduction to the Java programming language. As with Perl, we will introduce the minimum necessary to write the programs we want.

HTTP Server programming Understand how HTML forms and the CGI interface build dynamic web applications.

HTTP Servlet programming Understand Java servlets and JSPs — a more sophisticated structure for building web applications.

Instructor

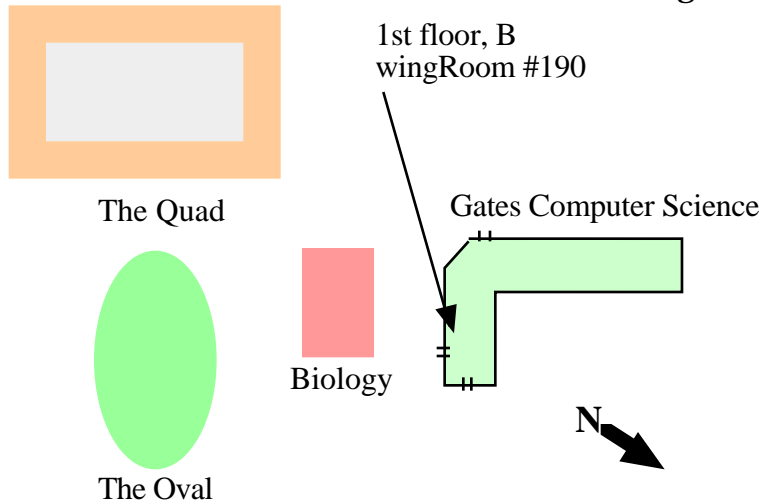
Nick Parlante

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<http://www-cs-faculty.stanford.edu/~nick/>

(650) 725-4727

Nick's Office: Gates 190. On the first floor, facing the Biology building...



Nick's Office Hours — I'll list my regular office hours along with the staff's on the course page when we get that sorted out. However, I'm very often in my office in the afternoon and evening — feel free to call or stop by.

Lecture Location and Time

Where: Gates b01

When: MWF 1:15-2:05

Broadcast: 5:30-6:45, E3

Lectures may also available at <http://stanford-online.stanford.edu/>

Electronic Materials — Course Web Page

The irony would be unbearable if this course did not to make good use of electronic materials. All course materials will be available on our course page at <http://www.stanford.edu/class/cs193i/> (cs193i.stanford.edu should redirect to the course page). The course page will include all manner of information of interest to CS193i, including assorted links and FAQs for the assignments, office hours, links mentioned in lecture, and so on. Handouts should appear on the course page at least an hour before lecture.

Paper Handouts

I will provide ample paper copies of the handouts for all who attend class in person + 20% or so. Leftover paper copies of the handouts from class are kept in the bins down the hall from my office. I'll make plenty for class time, and when they're gone they're gone, and there's no handout fee.

Books

There is not a specific required textbook for the class. In fact, no book exists that covers all of our topics. We will have class handouts and free online materials to provide basic coverage for each topic. That does not mean that books are not useful, they are just not required. The book *Core Web Programming*, below, does a good job for a large number of our topics, so it is recommended.

Core Web Programming, 2nd ed, 2001, by Marty Hall and Larry Brown.
Introduces the Java language, HTML, HTTP, Servlets and JSPs --
essentially covers 75% of our material.

I have also listed other books of interest, although these contain more detail than we will need for our projects...

CGI Programming with Perl, 2nd ed, by Scott Guelich, O'Reilly. A classic text on CGI programming with Perl.

Learning Perl, by 3rd ed, by Randal Schwartz, 2001, O'Reilly. The classic basic introduction to Perl.

Webmaster in a Nutshell, by Spainhour, 1999, O'Reilly. Brief, summary coverage of HTML, HTTP, CGI.

Just Java, 5th ed, 2001, by Peter van der Linden, Prentice Hall.
Programmer's introduction to Java. (There are many fine books on Java).

Core Servlets and JSPs, by Marty Hall, 2000, Prentice Hall. Good coverage of Java servlets and JSPs, which are our last two topics.
Does not teach Java.

Staff - Office Hours

Once the staff is finalized, I'll produce a list of everyone's contact information and office hours on the web page.

Email Question Address

We'll maintain a universal e-mail question queue at `cs193i@cs.stanford.edu`. If a question is common enough, we'll add it to the FAQ list on the course page. If your question is going to require stepping through code, looking at variables, etc...please bring it to office hours so someone can look at it properly. When framing your question, you can try to articulate what you are trying to do, what you have tried, and what you think is going wrong. Short, specific questions work well by email. More involved questions work best by coming to office hours, or calling during office hours so at least there's a dialog. I will provide a handout summarizing the time, location, and phone number for all of the staff hours once we get that sorted out.

Grading

The grading in the class is divided between a four homework projects during the quarter (50%) and a final exam (50%). SCPD students may take the exam on campus or at their site. A passing grade on the final exam is required to pass the class.

Computers

Some of the assignments will require using a Stanford leland account. For the most part, the assignments will use platform agnostics components — Perl, CGI, Java. Where possible, we will allow you to develop your projects on the platform of your choice, but we'll have you move it to leland for final testing and submission. If you do not have a leland account, you need to get one — call (650) 725-2101.

Late Submissions

Instead of having to ask for extensions on a catastrophe by catastrophe basis, everyone gets three calendar “late days” to extend the due dates of any of the assignments. In keeping with the all electronic, 24-7 theme of the post-Internet world, late days will be measured in straight calendar days with no distinction for weekends or holidays. All homework deadlines will be at midnight Pacific time. (The semantic nit in the audience will note that due to the start of daylight savings time, at some point in the quarter you will *lose an hour*. Any student concerned about this can bring a Federation approved temporal containment module to my office, and I will refund the hour.)

These late days are intended to deal with the ordinary events of student life, both frivolous and serious: 2 midterms that day, inadvertently spent all night playing WarCraft II, disk crash, med. school interview, illness, started way too late...After your late days are used up, late work loses pretty quickly— about a half a letter grade per day. Normally, we will not accept work more than one week late. If need be, skip that assignment and get to work on the next one. Come and see me in person for care in exceptional circumstances. Note that disk failure and other computer or network problems probably *do not* represent exceptional occurrences. Hoard your late days “just in case”, or spend them early and fly with no parachute— it's up to you.

Giving students their own late-day supply seems more fair since all the students are on the same footing. However it means you now need to make your own decisions about when to use a late day, and when to just turn in what you have. It should allow you to do a better job and hopefully learn more in the cases where your schedule gets disrupted. However, three late days do not provide too large a cushion. You should plan to finish your homeworks on time and reserve the late-days for real problems.

By default, I'm assuming that SCPD students and all other non in-class-in-person-the-traditional-way students have exactly the same deadlines as everyone else. The handouts and materials go up on the web at the same time planet wide. TVI or other large-latency SITN students may get an extra 72 hours on assignments. Arrange this with your TA once they are assigned.

Honor Code

You are free to discuss ideas and problem approaches with others, but all the work you hand in should be your own creation (or the creation of your team for the team project). **In particular, sharing or copying code is not OK.** If you feel a particular bit of collaboration may have crossed the line, just clearly cite what help you got and from whom in your project's Readme. You can never get in Honor Code trouble if the help is clearly credited.

There are tools we may use that do an **amazingly** good job of hunting down little sections of plagiarism within the submissions. Turn in an incomplete assignment if you need to; it's far better than getting kicked out of school.

If we are using the Foo module, and you find the key 8 lines in the docs or in a book or on the net that describe how to call the Foo module best, it's fine to use those lines without comment in your Readme. Modern programming is filled with little research episodes like that. If I have asked you to implement the Bar module, copying the 200 lines you found that implements Bar is not ok.

Lecture Plan

Here's the initial lecture and homework plan for CS193i. It basically allows 2 weeks for each major topic area. The assignments are due about once every two weeks: week 4, week 6, week 8, week 10.. Assignments will generally be due on Tue or Thu night at midnight.

Week/Mon	Topics
1 Apr 1	Introduction. What is the Internet and why is it interesting. Networking: ethernet, TCP/IP. Routers.
2 Apr 8	Finish networking. Sockets -- connecting, reading, writing. Basic Perl.
3 Apr 15	Finish sockets. Services and protocols. RFCs.
4 Apr 22	HTML and HTTP, Basic Java (HW1 TCP/IP due)
5 Apr 29	Finish HTTP, Start CGI: HTML forms, request-response, maintaining state: overcoming connectionlessness
6 May 6	Finish CGI (HW2 HTTP due)
7 May 13	Servlets, sessions, cookies
8 May 20	JSPs, advanced topics (HW3 CGI due)
9 May 27	Security and privacy. Other advanced topics.
10 Jun 3	Advanced topics. (HW4 Servlets due)
Finals	Final exam: Fri June 7th, 8:30-11:30 a.m. (the very first slot!) There will be a single alternate time for the exam, but it will be very near to the regular time, so you will need to be in town. SCPD students may take the exam on campus, or at their site.