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. The course gives broad, practical coverage on the various technologies that make up the Internet. 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, spam, security and privacy.

We'll have programming projects on both the client and server side using basic Perl and Java.

Coverage

As we tour through the various Internet technologies, we'll look at the fundamentals of how each technology 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 course will not pursue extreme depth in any one area. Fortunately, the topics are simple enough that a few weeks can cover the most interesting material in each area, and at the end you have a good sense of how the whole thing fits together.

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 special sections, but the coverage is pretty quick, so students need a strong enough programming background to pick up the language material. Fortunately, Perl and Java are pretty simple languages.

CS193i students should have programming experience at the level of CS106B, CS106X -- writing and debugging non-trivial programs. CS106A may be sufficient, but it's a little more of a reach. 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 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. Also, the assignments will often have two parts -- A and B -- and S/NC students only need to do part A to pass. Our goal is to make the course accessible for 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 web applications.

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

Miscellaneous Advanced Depending on how things go, in weeks 9 and 10 will dabble with some combination of: security, XML, Javascript, Java Thick Clients.

Instructor

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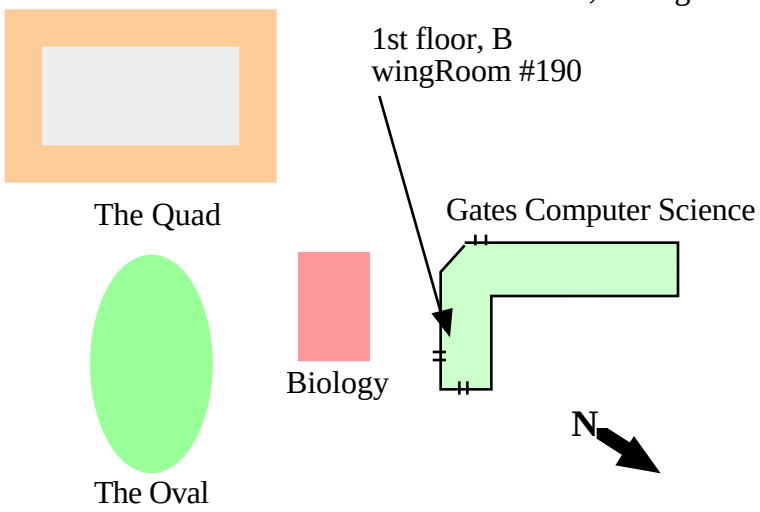
Nick's Office: Gates 190. On the first floor, facing the Biology building...



Nick's Office Hours — For the first week, I'll be in the office MWF after class. 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 the office MWF afternoon and early evening — feel free to call or stop by.

Lecture Location and Time

Where: Terman Aud (we may try to move to a smaller room)
When: MWF 1:15-2:05
Broadcast: live on E5

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.

Just Java, 5th ed, 2001, by Peter van der Linden, Prentice Hall. Programmer's introduction to Java. There are many fine books on Java, but I think this is a good one for people with some programming background.

Core Servlets and JSPs, by Marty Hall, (there's a 2003 edition on the way) 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 be 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 Mar 31	Introduction. What is the Internet and why is it interesting. Networking: ethernet, TCP / IP. Routers.
2 Apr 7	Finish networking. Sockets -- connecting, reading, writing, blocking. (Perl section)
3 Apr 14	Finish sockets. Services and protocols. RFCs. Begin HTTP.
4 Apr 21	HTTP request, response, redirects, proxies **(HW1 TCP/IP due)**
5 Apr 28	Finish HTTP. Sockets in Java. Start CGI:
6 May 5	Finish CGI -- forms, request-response, maintaining state: overcoming connectionlessness **(HW2 HTTP due)**
7 May 12	Servlets, sessions, cookies
8 May 19	JSPs, advanced topics (**HW3 CGI due)**
9 May 26	(Memorial Day monday) Security and privacy. Other advanced topics.
10 Jun 2	Advanced topics. **(HW4 Servlets due)**
Finals	**Final exam: Mon June 9th, 8:30-11:30 am** 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.