When I took office, only high energy physicists had ever heard of what is called the Worldwide Web.... Now even my cat has its own page. Bill Clinton, 1996*

The Internet is just a world passing around notes in a classroom. Jon Stewart**

... and bring me a hard copy of the Internet so I can do some serious surfing. Scott Adams**

* Source, The Quotations Page.

** Source, The Quote Garden
Ok, I guess there are stupid questions!

One-fifth of Americans report going online ‘almost constantly’

As smartphones and other mobile devices have become more widespread, some 21% of Americans now report that they go online “almost constantly,” according to a Pew Research Center survey.

Overall, 73% of Americans go online on a daily basis. Along with the 21% who go online almost constantly, 42% go online several times a day and 10% go online about once a day. Some 13% go online several times a week or less often. And in this survey, 13% of adults say they do not use the internet at all.
CT 310 is a one semester course on web development. Emphasis is placed on the essentials needed to create fully functional websites including rich graphical content and dynamic content. The course will cover HTML, Cascading Style Sheets and graphical content. Dynamic web pages will be developed using PHP and JavaScript. MySQL and SQLite are introduced for website data management. Asynchronous JavaScript (AJAX) is introduced for fine-grained client-server interaction. Students will develop their own dynamic websites able to manage authentication, transactions and user updates.
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This course’s web presence has a public side which you are viewing as well as a private side managed through CSU's Canvas system. General information concerning lectures, schedule, assignment posting, etc. are managed through the public side. Student specific information such as grading, quizzes, etc. are managed through Canvas.

Instructor:
Ross Beveridge
Office: 348 CS Building
Office Hours: TBD
Email: ross.beveridge@colostate.edu

GTA:
Nikhil Patil
Office: CSB 120 Lab
Office Hours: TBD
Email: Nikhil.Patil@colostate.edu

Lecture Time and Place:
9:00-9:50, MWF, CSB Room 130

Recitation 1 Time and Place:
Review for Yourself

- The Syllabus
  - The textbook – yes you should have one.
  - The policies on lecture.
  - The policies on recitation.
  - Professional conduct.

- The Progress Page
  - Go here to synch up with the course.
Pelican – Why?

- One way lectures boring.
- Instructor detached.
- Students passive.
- No speaking practice.
- Avoid monopoly of a few.
- You know when you are up next.
History of the Internet

- Resources:
  - Wikipedia – yes this is a great resource
  - Computer History Museum
### History of the Internet

At a minimum, know ...

<table>
<thead>
<tr>
<th>Early Milestones</th>
<th>Key Layers of the Internet</th>
<th>Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>email@-1971 Ray Tomlinson</td>
<td><strong>CONTENT</strong></td>
<td>Berners-Lee &amp; Cailliau 1991-.html</td>
</tr>
<tr>
<td>Archie-1990 Emtage &amp; Deutsch</td>
<td><strong>SEARCH ENGINE</strong>*</td>
<td>Google Brin &amp; Page 1998-</td>
</tr>
<tr>
<td>DOS Houdini-1986 Neil Larson</td>
<td><strong>BROWSERS</strong></td>
<td>Mosaic Marc Andreessen 1993-</td>
</tr>
<tr>
<td>(Vannevar Bush, Ted Nelson, Douglas Engelbart)</td>
<td><strong>WORLD WIDE WEB</strong></td>
<td>http:// Tim Berners-Lee 1990-</td>
</tr>
<tr>
<td>ARPANET-1969 J.C.R. Licklider</td>
<td><strong>INTERNET</strong></td>
<td>TCP/IP Cerf &amp; Kahn 1975-</td>
</tr>
<tr>
<td>SAGE-1956 George Valley</td>
<td><strong>NETWORKS</strong></td>
<td>Ethernet Robert Metcalfe 1973-</td>
</tr>
<tr>
<td>Z3-1941 Konrad Zuse</td>
<td><strong>COMPUTERS</strong></td>
<td>Apple Jobs &amp; Wozniak 1976-</td>
</tr>
</tbody>
</table>

*via Wikimedia Commons*
Vannevar Bush

- Director of US Office of Science Research and Development throughout World War II.
- 1945 article “As We May Think” in *The Atlantic* inspires computer scientists to present day
  - Personal Computer
  - Tiny, low cost library storage
  - Commerce with automatic inventory control and billing
  - Digital cameras
  - Speech interfaces
  - Hypertext-links
- Goal was to augment human intellect
Memex

“A memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility”

- Full-text search, text & audio annotations, and hyperlinks
- Proposes associative links between content
- Dual display setup!
- Direct annotation of stored content
- Proposes direct connection to nervous system
Networks
Networks

CSU WAN

LAN (CS Dept.)

LAN (Math Dept.)

LAN (Psychology)
If it is not obvious, the particulars are made up.
A Worked Example (2009)

Consider loading the Moscow State University website.
Uniform Resource Locator

http://www.msu.ru/en

Protocol HTTP
Server Name

Domain Name

Web pages (entry point)
Servers and Clients

Client on my desk.

Server in Moscow, Russia

* Image from Google Earth
Domain Name System DNS

www.msu.ru maps to 193.232.113.129

Browser on client requests IP address from DNS server, then requests page from server (193.232.113.129)
TCP IP Packet Routing.

- Browser initiates a TCP connection
  - From 67.166.55.44 to 193.232.113.129
- Packets flow from server to client.
  - Packets include header plus data.
- Dropped packets will be resent.
- Route can make your head spin.
Unix Utility traceroute

... and how can we make this a bit more compelling?
Routing Example

Takeoff point - Denver

Route generated by 3DIP dashboard widget.

Claudio Procida
(http://www.emeraldion.it/)
Routing Example Through East Coast
Routing Example Across Europe
Routing Example
... and into Russia

Watch the Movie
Traceroute Goes Mainstream

Support > XFINITY Internet > Understand the Traceroute Command

Understand the Traceroute Command

Updated on July 17, 2013 at 6:26 PM

Introduction

A traceroute is a network command that can be run on your computer if you experience routing problems. It traces the “hops” between your computer and the final destination. For each hop, the traceroute will diagnose where the problem is.

To Run Traceroute, Follow the Steps Below:
New Visual Traceroute

Open source cross-platform visual networking tool

- Download Windows
  - XP/Vista/7/8/10
- Download Linux
  - deb x86
  - rpm x86
- Download Universal
- Download MacOS X
  - deb x64
  - rpm x64

Traceroute
- Feature that allows to see on a World 3D map what path the data is taking to go from your computer to the target server.
  - [Wikipedia page for Traceroute](#)

Network packets sniffer
- Allows to see what data is being sent back and forth from the local system to the Internet.
  - [Wikipedia page for Packet sniffer](#)

Whois
- `Whois` feature allows to get public information about a domain.
  - [Wikipedia page for Whois](#)
This traceroute was initiated from PVH; note how CSU is acting as a conduit for the Hospital. Specifically, hops 4 and 5 include:

fccn_gw-pvhs.colostate.edu
LAW, PRIVACY, SECURITY

A few comments about being a resident on the web
Law & Ethics

- What happens to material you post?
- What material can you post?
- What can you do with stuff you see?

Are you comfortable explaining your actions to a reporter for a major newspaper?

(remember Newspapers?)
Want to Know a Secret ...

... there aren’t any.

- Good rule of thumb ... what you say and do on the web is public.
- And you leave permanent footprints.
  - Search, web mail, Netflix, ...
- What rights transfer, example ...
  - Section 11 of Google terms of service
    - Compare April 16 2007 to current.
Privacy / Security

- With whom is your computer conversing?
- What’d it say?
- Have you noticed?
- On Mac – Little Snitch
Much to Learn
Much to Check

Steve Gibson, the man who coined the term spyware and created the first anti-spyware program, creator of Spinrite and ShieldsUP, discusses the hot topics in security today with Leo Laporte.

Records live every Tuesday at 1:00pm PT/4:00pm ET.

#439: Your Questions, Steve's Answers 181
Steve and Leo discuss the week's major security events and discuss questions and comments from listeners of previous episodes.
LECTURE WRAPUP

Programming, elements and what comes next ...
Dynamic Content

- Once upon a time ...
  - index.html was a text file.
- With the advent of Web 2.0, page content is created on the fly.
- With ubiquitous mobile the Site vs. Apps distinction is blurred.

Punchline! Building moderns Sites and Apps equals client/server interactive web programming.
Characters in this Drama

- Browser – pretty obvious.
  - Renders HTML + CSS.
- Network – TCP/IP etc.
- Server (Apache) – behind the scenes.
- Server Programming – PHP, .net, ...
- Persistent information – MySQL, ...
- Browser (again) – a machine
  - GUI plus language - JavaScript
Where to Next?

- How fast can you learn HTML?
- What do you have to help you?
  - A world wide web, truly, of examples.
- What do you have going for you?
  - Most all of it is designed to be obvious.
  - ... basic html is NOT rocket science.
- What about CSS? ...
  - There is more to CSS, next week.
Assignment 00 - Best of ...

- For the first assignment, every student will contribute a unique link to a site they consider important.
- Important may mean beautiful, useful, creative, essential, etc. Students, use your own best judgement.