

CS 380

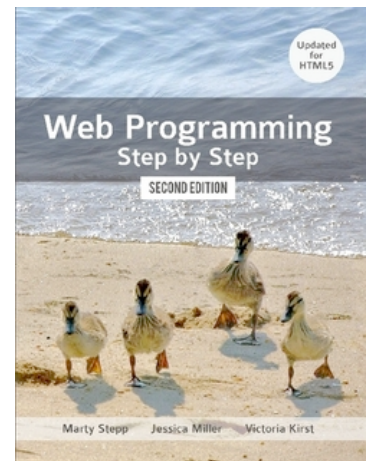
WEB PROGRAMMING

Instructor: Nat Martin

Class

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- Instructor: Nat Martin
 - ▣ Office Hours: 3:30- 4:30 Monday and Wednesday
 - ▣ Email: martin@cs.rochester.edu
- Lecture Monday and Wednesday (Dewey 2162)
 - ▣ 2:00-3:15
- Lab Tuesday and Thursday (MEL 210)
 - ▣ 12:30-1:45, 2:00-3:15, 3:15-4:40
- Textbook:
 - ▣ “Web Programming Step by Step”



Lectures (Monday and Wednesday)

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- Dewy 2163 2:00-3:15 (Bring your laptops)
- Sit with your scrum team
 - ▣ Read **before** lecture (slides, book, and online material)
 - ▣ Discuss with your group at the beginning of class
 - ▣ When all questions are answered, there will be a quiz
 - ▣ Remaining time will be dedicated to team work
- Work will be done in class to simplify scheduling.
 - ▣ This means you need to come to class.
 - ▣ Each team will report attendance

Labs (Tuesday and Thursday)

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- Mel 210
 - ▣ 12:30-1:45
 - ▣ 2:00-3:15
 - ▣ 3:25-4:40
- Time to work with your team on projects
 - ▣ Tomorrow: Assign teams
 - ▣ Tuesday, 20 January: No class

Academic Honesty

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1. Give credit
 - ▣ Reference everything you get from elsewhere
 2. Don't cheat
 - ▣ Cheating is stealing from your classmates
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- ▣ I will follow strictly the Universities guidelines for academic honesty.

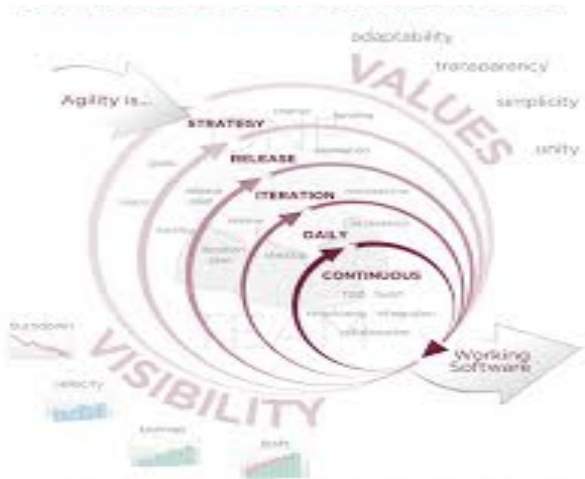
Teams

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- Development will be done using the Scrum model
 - ▣ Teams of five or six work together through the semester
- Each team will turn in one program per assignment
 - ▣ Advantage: you have a group to answer questions
 - ▣ Disadvantage: I have to assign individual grades
- Team assignments, projects and the grading of these will be published on the web

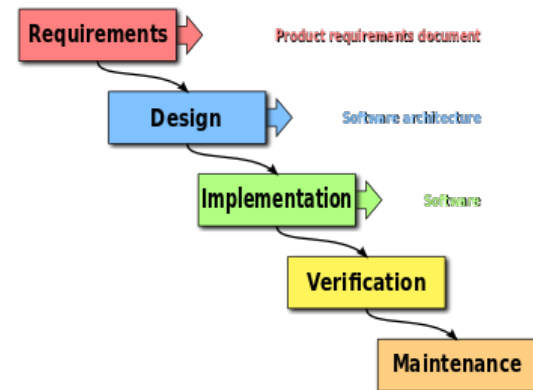
Agile

- Software changes continually
 - ▣ Software must always work
 - ▣ Requirements clarified during programming



Waterfall

- Software projects are completed
 - ▣ Software works when project is done
 - ▣ Requirements completed before programming starts



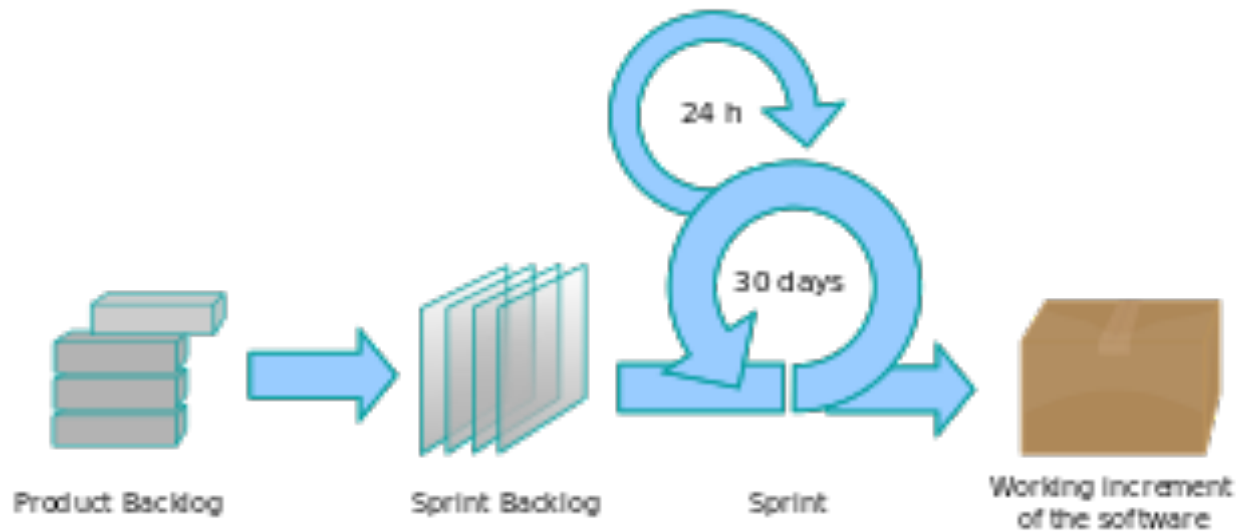
Scrum = Team focused Agile

- As in Rugby, the team moves to ball forward together



- Roles
 - Product Owner: represents the customer/user
 - Developers: write and test software
 - Scrum Master: coordinates with people outside team

Scrum Process



- Product Backlog: Work to be done
- Sprint: Work period (2-4 weeks)
- Sprint Backlog: Work for this sprint
- Demo: Working software inspected at end of sprint

Scrum Teamwork

- Daily Scrum: Team members state yesterday's progress, today's work and barriers
- Sprint planning meeting: Team clarifies and divides work
- Demo: Team shows working software generated by sprint.



Programming Project

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- You can start working on this from the first week of the class
- Design and implementation of a professional website:
 - ▣ Professional Style
 - ▣ Interactive
- You will complete the project with your team

Grading

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Tests (2)	40%
Quizzes	10%
Project (Group)	30%
Assignments (Group)	20%
Total	100%

- ▣ Homework and Programming projects will be posted online on the class webpage

First Six Weeks

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Date	Type	Topic	Reading	Assignments	Resources
Week 0: The Internet					
Wednesday, January 15, 2014	Lecture	Internet	1 Intro		
Thursday, January 16, 2014	Lab	Form Group			
Week 1: HTML					
Monday, January 20, 2014	Lecture	MLK Day			
Tuesday, January 21, 2014	Lab	No Class			
Wednesday, January 22, 2014	Lecture	Basic HTML	2 HTML		
Thursday, January 23, 2014	Lab	Assignment 0		AWS	
Week 2: CSS					
Monday, January 27, 2014	Lecture	Basic CSS	3 CSS 1		
Tuesday, January 28, 2014	Lab	Assignment 1		Github	
Wednesday, January 29, 2014	Lecture	More CSS	4 CSS 2		
Thursday, January 30, 2014	Lab	Assignment 3			
Week 3: PHP					
Monday, February 3, 2014	Lecture	Float	5 PHP 1		
Tuesday, February 4, 2014	Lab	Assignment 3			
Wednesday, February 5, 2014	Lecture	PHP 1	6 PHP 2		
Thursday, February 6, 2014	Lab	Assignment 4			
Week 4: Forms					
Monday, February 10, 2014	Lecture	PHP 2	7 PHP 3 Files		
Tuesday, February 11, 2014	Lab	Assignment 4			
Wednesday, February 12, 2014	Lecture	PHP 3	8 PHP 3 Forms		
Friday, February 14, 2014	Lab	Assignment 5			
Week 5: Programming Interlude					
Monday, February 17, 2014	Lecture				
Tuesday, February 18, 2014	Lab				
Wednesday, February 19, 2014	Lecture				
Thursday, February 20, 2014	Lab				
Week 6:					
Monday, February 24, 2014	Lecture		9 PHP 4 Forms		
Tuesday, February 25, 2014	Lab	Demos			
Wednesday, February 26, 2014	Lecture		10 PHP 5 Forms 2		
Thursday, February 27, 2014	Lab				



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The INTERNET... and a bit of history

What is the internet?

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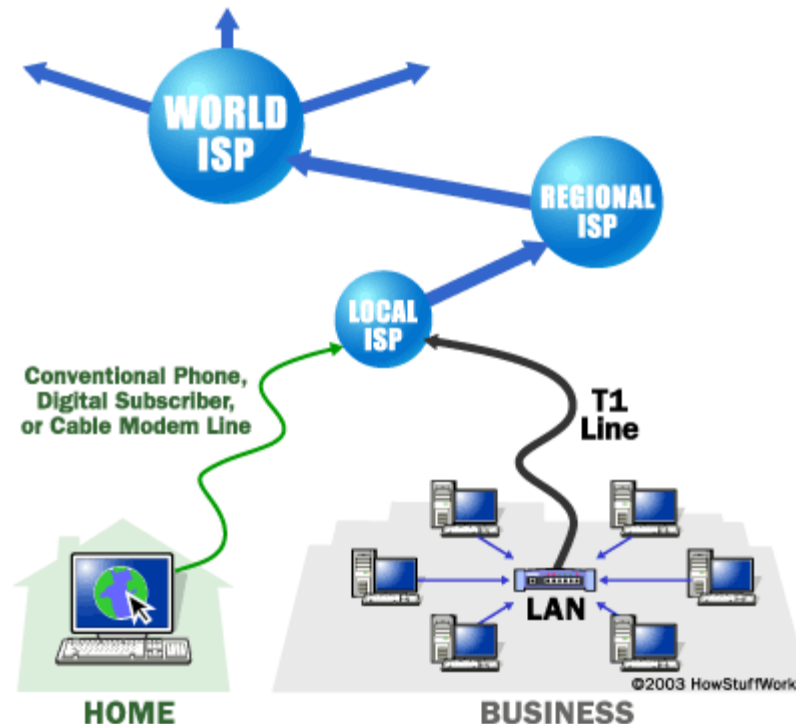
- A “series of tubes”
- How many Internets are out there?
- Is Google one of them?



What is the internet?

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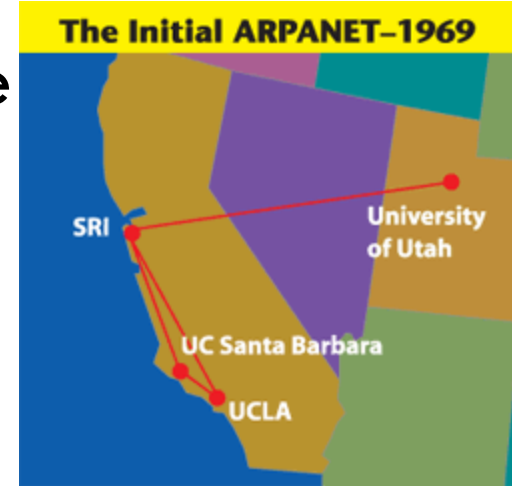
- A collection of computer networks that use a protocol to exchange data
- Is the World Wide Web (WWW) and the internet the same?



Brief history

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- Began as a US Department of Defense network called ARPANET (1960s-70s)
- Packet switching (in the 60s)
- E-mail is born on 1971
- TCP/IP beginning on 1974 (Vinton Cerf)
- USENET (1979)
- By 1987: Internet includes nearly 30,000 hosts



Brief history (cont.)

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- WWW created in 1989-91 by Tim Berners-Lee
- Popular web browsers released:
 - Netscape 1994
 - IE 1995
- Amazon.com opens in 1995
- Google January 1996
- Wikipedia launched in 2001
- MySpace opens in 2003
- Facebook February 2004



Key aspects of the internet

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- Sub-networks are independent
- Computers can dynamically join and leave the network
- Built on open standards
- Lack of centralized control (mostly)
- Everyone can use it with simple, commonly available software

People and organizations

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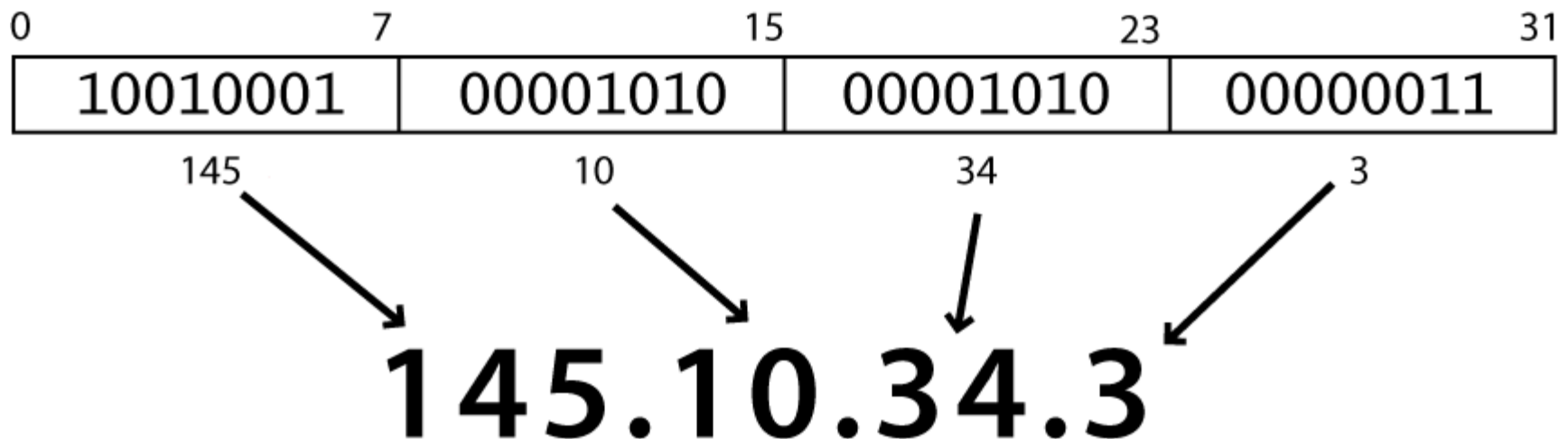
- Internet Engineering Task Force (IETF): internet protocol standards
- Internet Corporation for Assigned Names and Numbers (ICANN): decides top-level domain names
- World Wide Web Consortium (W3C): web standards



Internet Protocol (IP)

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- Simple protocol for data exchange between computers
- IP Addresses:
 - 32-bit for IPv5
 - 128-bit for IPv6



Transmission Control Protocol (TCP)

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- Adds multiplexing, guaranteed message delivery on top of IP
- Multiplexing: multiple programs using the same IP address
- Port: a number given to each program or service
 - ▣ port 80: web browser (port 443 for secure browsing)
 - ▣ port 25: email
 - ▣ port 22: ssh
- Some programs (games, streaming media programs) use simpler UDP protocol instead of TCP

Web Servers

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- Web server: software that listens for web page requests
 - ▣ Apache
 - ▣ Microsoft Internet Information Server (IIS)



Web Browser

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- Web browser: fetches/displays documents from web servers
 - ▣ Mozilla Firefox
 - ▣ Microsoft Internet Explorer (IE)
 - ▣ Apple Safari
 - ▣ Google Chrome
 - ▣ Opera

Domain Name Server (DNS)

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- Set of servers that map written names to IP addresses
 - ▣ Example: ju.edu → **204.29.160.73**
- Many systems maintain a local cache called a hosts file
 - ▣ Windows: C:\Windows\system32\drivers\etc\hosts
 - ▣ Mac: /private/etc/hosts
 - ▣ Linux: /etc/hosts

Uniform Resource Locator (URL)

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- Identifier for the location of a document on a web site
 - ▣ Example: `http://dept.ju.edu/cs/index.html`
- Upon entering this URL into the browser, it would:
 - ▣ ask the DNS server for the IP address of `dept.ju.edu`
 - ▣ connect to that IP address at port 80
 - ▣ ask the server to `GET /cs/index.html`
 - ▣ display the resulting page on the screen

Hypertext Transport Protocol (HTTP)

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- Set of commands understood by a web server and sent from a browser
- Some HTTP commands (your browser sends these internally):
 - ▣ GET filename : download
 - ▣ POST filename : send a web form response
 - ▣ PUT filename : upload
- Exercise: simulate a browser with a terminal window

HTTP Error Codes

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- When something goes wrong, the web server returns a special "error code" number
- Common error codes:

Number

Meaning

200

OK

301-303

page has moved (permanently or temporarily)

403

you are forbidden to access this page

404

page not found

500

internal server error

Internet Media (“MIME”) types

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MIME type	file extension
text/html	.html
text/plain	.txt
image/gif	.gif
image/jpeg	.jpg
video/quicktime	.mov
application/octet-stream	.exe

Web Languages

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- Hypertext Markup Language (HTML): used for writing web pages
- Cascading Style Sheets (CSS): stylistic info for web pages
- PHP Hypertext Processor (PHP): dynamically create pages on a web server
- JavaScript: interactive and programmable web pages

Web Languages(cont.)

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- Asynchronous JavaScript and XML (Ajax): accessing data for web applications
- eXtensible Markup Language (XML): metalanguage for organizing data