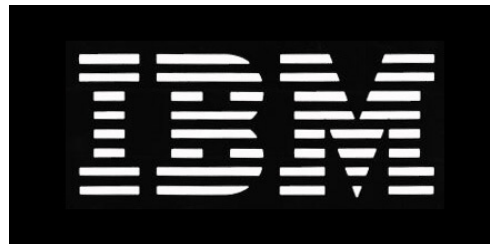# CS 380
WEB PROGRAMMING

Instructor: Xenia Mountrouidou

Who am I?

- Dr. X
- PhD at North Carolina State University
- Worked for IBM
- Post doc at College of William and Mary
- Scuba diver, manga comics collector, science fiction reader.

Course Objectives

- At the end of this class you will be able to:
  - Design and implement a professional website
  - Author web pages using HTML
  - Make stylistic decisions with CSS
  - Create interactive websites with JavaScript and jQuery
  - Enhance interactive websites with AJAX and XML
  - Use PHP for server programming

Course Objectives (cont.)

- At the end of this class you will be able to:
  - Understand the client-server programming model and apply this to your designs
  - Create your own web programming portfolio
  - Speak the web programming lingo
  - Have fun with web programming!

Why did you take CS 380?

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Why do you need CS 380?

- Professional webpage to demonstrate your portfolio, interests etc.
- Software development:
  - Middleware
  - Web development
- Cloud computing

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Lectures

- We meet at 14:00-15:15, every Mon/Wed, at Merritt Penticoff Science Bld, Room 116A
- Check the schedule in the class webpage
- Read the syllabus and policies carefully
- Reading and labs will be posted online

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Lectures

- Lectures will be interactive. This means:
  - You will need to study the new material before every lecture (slides, book, and online material)
  - We will have a lab on every lecture, so you will need to code in almost every lecture
  - You will post your questions on the discussion board before each lecture. If you do not post any questions, I assume you have understood everything. Therefore…
  - You may be called in class to explain the material to your classmates

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How to get help

- ☐ Join my office hours: Mon. 3:30-5:30 pm, Tues./Fri. 1-3 pm at Merritt Penticoff 203

- ☐ Or set an appointment with me via e-mail

- ☐ Use the textbook:

    "Web Programming Step by Step"

    by Marty Stepp, Jessica Miller,

    Victoria Kirst

Web Programming Step by Step

Marty Stepp   Jessica Miller   Victoria Kirst

Office hours and help-My schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 am :30	CS150 prep	Research	CS150 prep		CS150 prep
9:00 am :30	**CS150 – 11 lecture**		**CS150 – 11 lecture**	Research	**CS150 – 11 lecture**
10:00 am :30	**CS150 – 01H lecture**	Independent study	**CS150 – 01H lecture**		**CS150 – 01H lecture**
11:00 am :30	**CS150 – 05F lecture**	Research	**CS150 – 05F lecture**		**CS150 – 05F lecture**
12:00 am :30	**Division Meeting**	Lunch	Lunch	Lunch	Lunch
1:00 pm :30	CS 380 prep	**Office Hours**	CS 380 prep	CS340 prep	**Office Hours**
2:00 pm :30	**CS 380 lecture**		**CS 380 lecture**		
3:00 pm :30	**Office Hours**	**CS 340 lecture**	**Faculty Assembly**	**CS 340 lecture**	**Programming Competition Prep**
4:00 pm :30					
5:00 pm :30			RCSS		RCSS

We can meet during my office hours OR set an appointment during the white time slots

Grading

Quizzes	5%
Project	30%
Homework	40%
Final exam	25%
Total	100%

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

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Programming Project

- You can start working on this from the first week of the class
- Design and implementation of a professional website:
  - Professional Style
  - Interactive
- I will post topics: mostly websites needed by faculty and staff in our school
- You can complete the project in teams of two

Programming Project

- Your project should have five out of the following features (choose and document these):

   1. Use a Server-Side Framework - use a technology other than HTML/CSS on the server.

   2. AJAX - use AJAX to turn your web pages into dynamic web applications.

   3. Web Service - use an external web service, mashed up with your own application to create something even better.

Programming Project

4. Design & Evaluate - think carefully about how users will use your site, design a great interface, and evaluate it with real people.

5. Go Mobile - create a version of your project designed to go mobile.

6. Server-Side Processing - do processing on the server to prepare for user requests in advance.

7. Multimedia – use sound or video to enhance the user experience.

Homework

- It will involve:
  - Applying what we learned in class
  - Clean design and coding
  - Clear documentation
- Homework will be completed *individually*

CS 340

Policies

- Cheating means "submitting, without proper attribution, any computer code that is directly traceable to the computer code written by another person."
- Or even better:
  - *"Any form of cheating, including concealed notes during exams, copying or allowing others to copy from an exam, students substituting for one another in exams, submission of another person's work for evaluation, preparing work for another person's submission, unauthorized collaboration on an assignment, submission of the same or substantially similar work for two courses without the permission of the professors. Plagiarism is a form of Academic Misconduct that involves taking either direct quotes or slightly altered, paraphrased material from a source without proper citations and thereby failing to credit the original author. Cutting and pasting from any source including the Internet, as well as purchasing papers, are forms of plagiarism."*
- I give students a failing homework grade for *any* cheating.
- A second cheating attempt will be escalated to the chair of our Division.

Policies

- You may discuss homework problems with classmates, after you have made a serious effort in trying the homework on your own.

- You can use ideas from the literature (with proper citation).

- You can use anything from the textbooks/notes.

- The code you submit **must be written completely by you**.
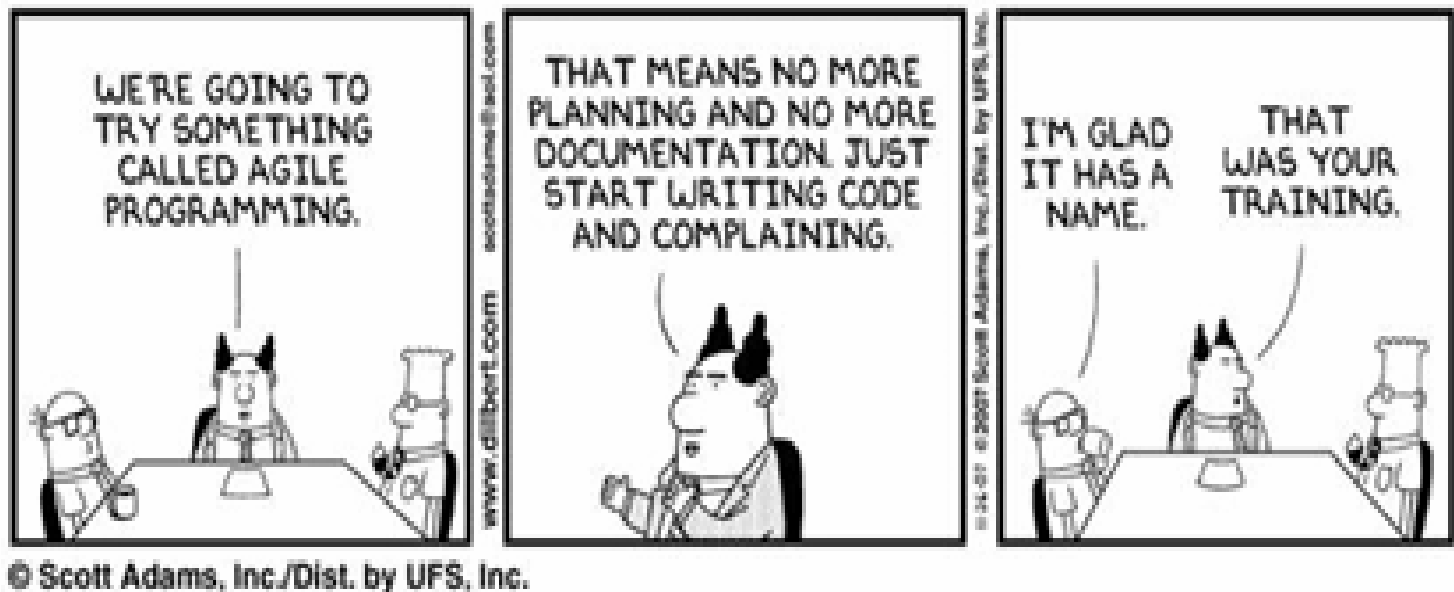
Policies

- Read the collaboration policy carefully.
- Late policy:
  - 5% is reduced by every day the homework is late

Principles of Pair Programming

© Scott Adams, Inc./Dist. by UFS, Inc.

Principles of Pair Programming

- **All I Really Need to Know *about pair programming* I Learned in Kindergarten**
  - *Share everything.*
  - *Play fair.*
  - *Don't hit people.*
  - *Put things back where you found them.*
  - *Clean up your own mess.*
  - *Don't take things that aren't yours.*
  - *Say you're sorry when you hurt somebody.*

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Principles of Pair Programming

- *Wash your hands before you eat.*
- *Flush.*
- *Warm cookies and cold milk are good for you.*
- *Live a balanced life – learn some and think some and draw and paint and sing and*
- *Dance and play and work every day some.*
- *Take a nap every afternoon.*
- *When you go out into the world, watch out for traffic, hold hands and stick together.*
- *Be aware of wonder.*

Professional Portfolio

- A collection of projects you implemented for a class or for fun.

- Examples:
  - http://lesterchan.net/portfolio/programming/
  - http://michaelmohammed.com/portfolio.html
  - http://www.quality-web-programming.com/web-programming-portfolio.php
  - http://www.energyscripts.com/Portfolio/web_programming.html

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15

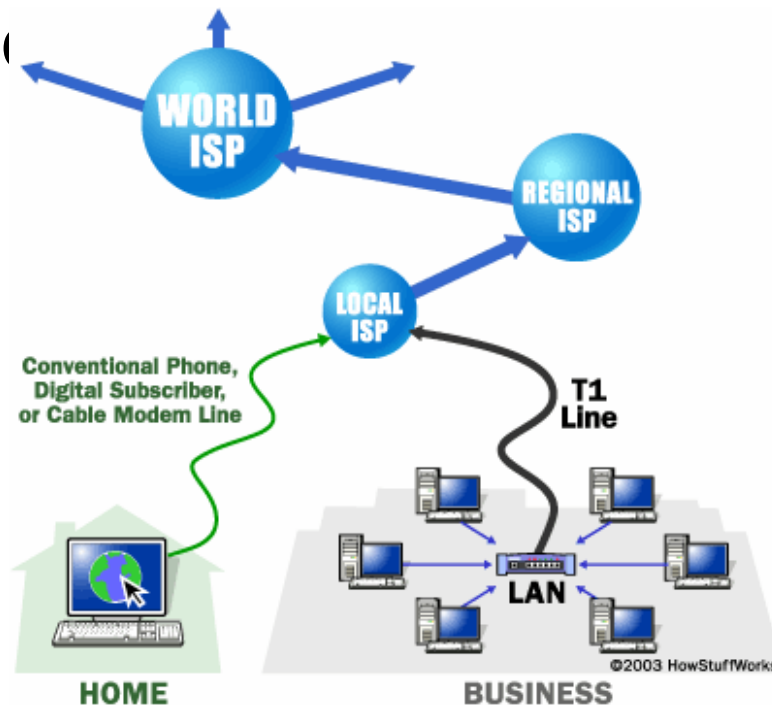# The INTERNET… and a bit of history

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What is the internet?

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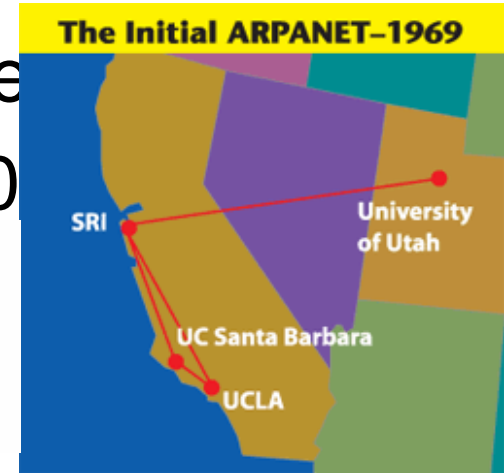- Is Google one of them?

What is the internet?

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

WORLD ISP

REGIONAL ISP

LOCAL ISP

Conventional Phone, Digital Subscriber, or Cable Modem Line

T1 Line

LAN

©2003 HowStuffWorks

HOME

BUSINESS

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Brief history

□ Began as a US Department of Defe
  network called ARPANET (1960s-70

□ Packet switching (in the 60

□ E-mail is born on 1971

□ TCP/IP beginning on 1974 (Vinton Cerf)

□ USENET (1979)

□ By 1987: Internet includes
  nearly 30,000 hosts

The Initial ARPANET–1969

USENET

Usenet Help
UIC – [Part 1 | Intro | FAQ | History | Menu/Help
| Part 2 | Home]

    * What Is Usenet:
    * Where and How should I post:
    * Alt.Binaries.Pictures Info:
    * Getting On Usenet:
    * Creating Newsgroups:
    * Usenet Software:

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Brief history (cont.)

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

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The future of the internet?

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Key aspects of the internet

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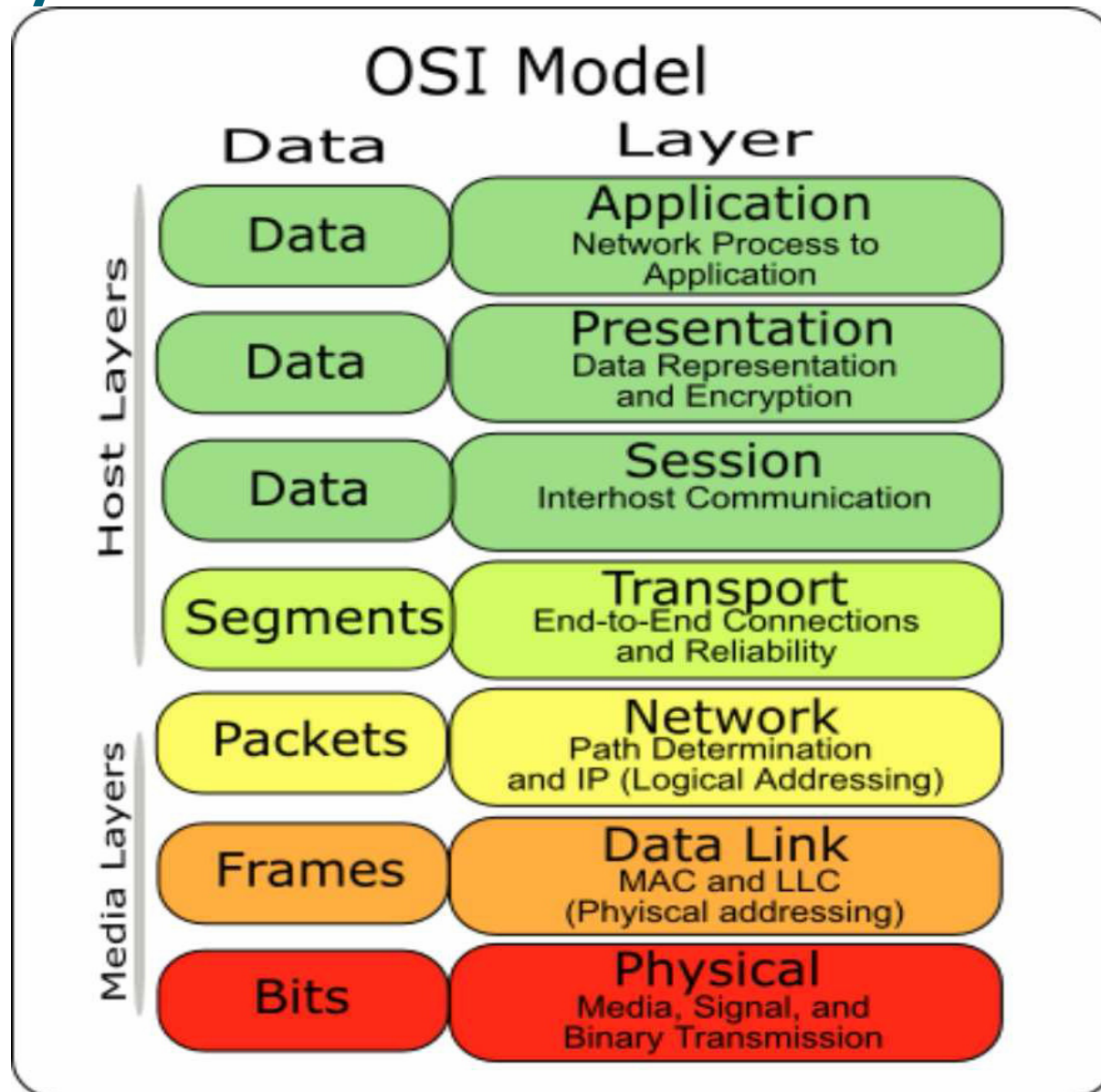- Everyone can use it with simple, commonly available software

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People and organizations

- Internet Engineering Task Force (IETF): internet protocol standards

- Internet Corporation for Assigned Names and Numbers (ICANN): decides top-level domain names

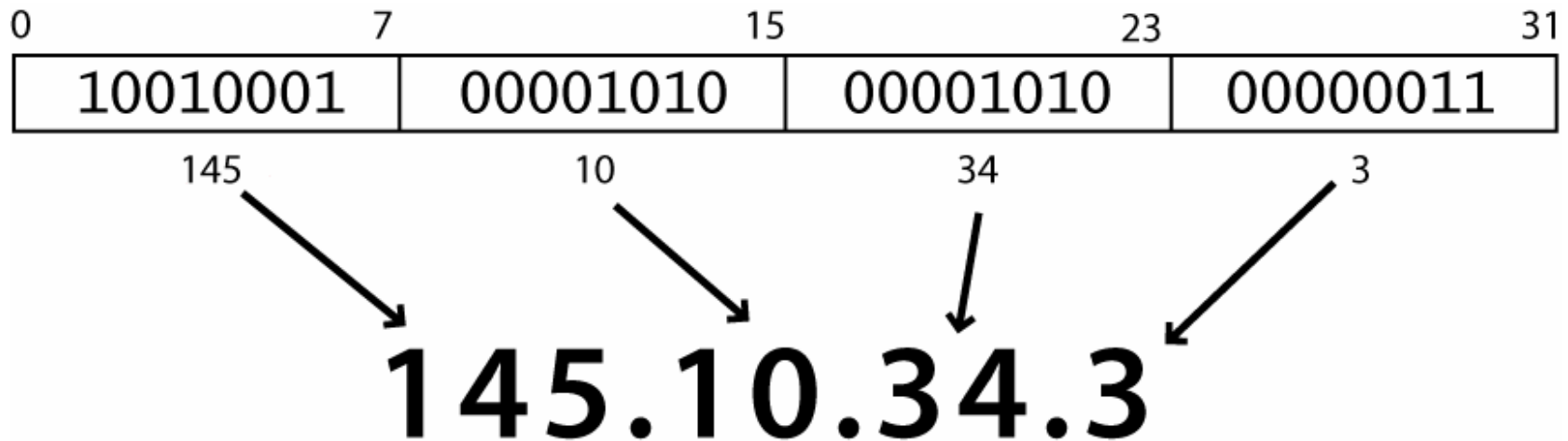- World Wide Web Consortium (W3C): web standards

Layered architecture

Internet Protocol (IP)

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

0	7	15	23	31
10010001	00001010	00001010	00000011	

145 → 10 → 34 → 3 →

145.10.34.3

Transmission Control Protocol (TCP)

- 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

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

Application Server

- Software framework that provides an environment where applications can run
  - Apache
  - Glassfish
  - WebSphere
  - WebLogic

Web Browser

□ Web browser: fetches/displays documents from web servers

  ◘ Mozilla Firefox

  ◘ Microsoft Internet Explorer (IE)

  ◘ Apple Safari

  ◘ Google Chrome

  ◘ Opera

Domain Name Server (DNS)

- 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

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Uniform Resource Locator (URL)

- 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

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Hypertext Transport Protocol (HTTP)

- 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

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HTTP Error Codes

- 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

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

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Web Languages

- 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.)

- Asynchronous JavaScript and XML (Ajax): accessing data for web applications

- eXtensible Markup Language (XML): metalanguage for organizing data