Announcements

- Instructor: Nelson Padua-Perez (nelson@cs.umd.edu)
- Class Web Site:
- http://www.cs.umd.edu/class/fall2010/cmsc122/
- No posting of code in the forum
- Check class announcements daily

Course Objectives

- Introduce computer programming principles
  - Basic computer programming language constructs
  - How to design procedural solutions to problems
- Overview web design concepts/technologies
  - HTML
  - CSS
  - JavaScript
  - Authoring Tools
- We assume no previous programming experience

Syllabus

- Let's go through the different sections
- Please read the syllabus
- If you have conflict with the final let us know ASAP
- Significant amount of material not provided via posted slides
- Feel free to bring your laptop

Fundamentals: Networking

- Definition
  - Set of computers using common protocols to communicate over connecting media
- History
  - 1969 ARPANET
  - 1986 NSFnet
  - 1995 Internet
  - http://sysctl.org/rootzmap/e-map.jpg

Fundamentals: Data Transfer

- How is data transferred in the internet?
- Using Packet Switching
- Let's see an example

http://www.pbs.org/opb/nerds2.0.1/geek_glossary/packet_switching_flash.html

Fundamentals: Client/Server

- Client and server are two terms frequently used
- Client/Server Model
- Client/Server model when talking about software
- Client/Server model when talking about hardware

Fundamentals: The Web

- What is the Web ?
  - Collection of sites
  - Conceptual organization of many distinct resources
- Internet and World Wide Web do not refer to the same entity
- Tim Berners-Lee → Defined the structure associated with the world wide web (he is the father of the web)
- The following article defined was written by Berners-Lee in 1991defining the web model

  http://groups.google.com/group/alt.hypertext/msg/395f282a67a1916c

Fundamentals: IP Addresses

- **IP Address** → Unique address for machine on internet
  - Get from ISP when connecting to internet
  - Allows network to find your machine
- **Domain Name**
  - Text name corresponding to the numeric IP address
  - Example: wikipedia.org
- **Name and address for local machine**
  - localhost
  - 127.0.0.1
- **Running out of IP addresses (new protocol IPV6)**

Fundamentals: Web Server

- Web Server
  - Computer program that delivers (serves up) web pages
  - It is like a person that is in charge of a warehouse
- Popular Web Server Programs
  - Apache → http://www.apache.org/ Free!!!
  - IIS → Internet Information Services
  - Sun Java System Web Server
- You can install and run a web server in your computer
- Local address: http://localhost or http://127.0.0.1/
- Web server statistics
  - http://news.netcraft.com/archives/category/web-server-survey/

Fundamentals: DNS

- DNS → Domain Name Systems
- Protocol for translating domain names to IP addresses
  - Example: cs.umd.edu → 128.8.128.44
- Multiple DNS servers on internet.
- DNS server may need to query other DNS servers
  - edu DNS server queries umd.edu server to find cs.umd.edu

Fundamentals: Port Number

- What is a port number?
  - A number representing an application (program) running in a machine
  - Assuming the IP Address is a phone number, the port represents a phone number extension
  - A server machine could have several applications (programs) "listening" to different ports
- Web servers default port number is 80
- ssh
  - Application to connect to a remote computer
  - port number is 22
- Complete list at: **http://www.iana.org/assignments/port-numbers**

Fundamentals: URLs

- URL → Uniform Resource Locators
- Represent web resources
  - Arbitrary files
  - Web pages
- Examples
  - http://www.cs.umd.edu/index.html
  - ftp://www.cs.umd.edu/pub/doc/policies.pdf
  - https://login.yahoo.com/
  - file://dir/my.txt

Fundamentals: URL Structure

- URL consists of
  - Protocol
    - http
    - ftp
    - https (secure http)
    - file
    - …
  - IP address (or domain name)
  - Port (optional most of the time)
    - http://www.cs.umd.edu:80/
  - path

Fundamentals: Web Server

- Notice that www is not part of the name of the web server domain name. It is convention to use www as part of the name but you can name it anything you want
- Could there be other servers running in a machine?

Fundamentals: Web Hosting

- Web hosting → Service that stores the files representing your web page on a server so users on the internet can access them
- As students of the university you have a place where you can put the files representing your web page

HTTP

- Hypertext Transfer Protocol (HTTP) → protocol that defines how user agents (e.g., browser) and web servers can communicate
- HTTP is a request/response protocol between clients and servers
- Do not confuse with HTML

Firefox

- Browser we will use
  http://www.mozilla.com/en-US/firefox/?from=getfirefox
- Extensions we would like to have:
  - Live HTTP Headers
  - ShowIP

HTML

- HTML → HyperText Markup Language
- Language used to define web pages
- What the server sends to the browser
- Browser reads HTML and renders the page
  - May require downloading data from server (e.g., images)

Creating Web Pages

- HTML → HyperText Markup Language
- HTML Standard
  - Developed by the World Wide Web Consortium (W3C)
  - **http://www.w3.org**
- Document is described through a series of commands and directives present in a text file
- **HTML goal is to describe structure only**. Presentation should be left to cascading style sheets
- When interpreted by an HTML **viewer** those commands determine the appearance of the page
- HTML documents are entirely ASCII text
- Commands are explicitly inserted
- Great HTML/CSS tutorial site
  - **http://www.htmldog.com/**
- Another site: **http://www.w3schools.com/**

HTML

- Three versions of HTML
  - HMTL 4.01 Strict (excludes deprecated tags and attributes)
  - HTML 4.01 Transitional (less restrictive including appearance elements)
  - HTML 4.01 Frameset (identical to transitional but allows <body> to be replaced with <frameset>)
- Web Standards Project (**www.webstandards.org**)
  - Industry watchdog convincing web browsers developers to adhere to web standards
- HTML 4.01 is the last version for HTML. Next version is XHTML 1.0
- XHTML
  - Uses same tags as HTML 4.01
  - Enforces rules like closing tags, tags in lowercase, and others
- **We will use XHTML (strict) in this class**
- **HTML Validation → http://validator.w3.org/**

HTML Basic Skeleton

- An html document has two main parts
  - **Header** → provides information about the document
  - **Body** → contents of the page
- **Example: BasicHTMLSkeleton.html**

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
    <head>
    <meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1" />
     <title>Template</title>
    </head>

    <body>
                <!--HTML CODE HERE-->
    </body>
</html>
```

- Let's validate the above document

HTML Tags

- Tag
  - Specifies a command or directive
  - It surrounds content and apply meaning to that content
- General format
  - <***elementName attributes***>
- Most HTML elements have two tags:
  - Start tag and end tag
  - Example: <h1> text </h1>
- Tags and attributes will be in lowercase (XHTML Requirement)
- Some tags are self-closed (ending them in />)

  <hr />
 <meta /> <img />

Head/Title Tags

- <head> </head>
  - It does not generate displayed contents
  - Contains other tags (e.g., <title> </title>)
- <title> </title>
  - Part of the header
  - It is required
  - Search engines depend on it

Attributes

- An attribute extends or modify a tag
- Attributes
  - Only appear in the start tag
  - You can have several attributes in one tag each separated by spaces
  - Order is immaterial
  - Some take values which are specified after an =
- General format
  - <ELEM ATTR=“attrValue”>Displayed Text</ELEM>
- Example

- All attribute values will be enclosed in “ “ for XHTML compliance